IN-DEPTH CASE STUDY OF AUSTRALIAN SEATING SERVICE EXPERIENCE: STAKEHOLDERS’ PERSPECTIVES

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Submitted in fulfilment of the requirements for the degree of

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Abstract

The in-depth case study explores the Australian seating service experience from four stakeholders’ perspectives. To capture essential case study data, a qualitative approach collected the seating service experiences of eleven consumers, five care providers, 28 prescribing clinicians and 16 vendors. Sixty participants shared their experiences via an in-depth interview process of procuring specialised wheelchair-seating technology within the Australian seating service sector. The in-depth interviews were recorded, transcribed, and member-checked. The interview data builds on scant evidence of the seating service as experienced in Australia.

The data underwent a multi-phased analytical process to delve into their seating service experience. The first data analysis explored for emergent themes, initially for each of the four stakeholder groups, and again for common themes overall. There are six themes common across all the groups. A second analytical phase explored the data from two different perspectives. Two different analytical lens delved the data deeply from the perspective of decision-making informed by the Eggers et al. Wheelchair Service Delivery Model and again from a social justice perspective, informed by Rawls Principles of Equality, of Equity and of Opportunity Equality.

The data analysis exposes a fragmented seating service sector dominated by a restrictive funding system, on the cusp of impending change brought on by the National Disability Insurance Scheme. The case study expose eight major findings pertaining to the Australian seating service sector, its stakeholder’s experiences and the factors of influence specialised wheelchair procurements. The following eight major findings provide service structure and benchmarking needed to boost existing seating service capacity.
The first major finding exposes the importance of forming trustworthy one-to-one partnerships and these collaborative partnerships are intentionally enhanced using a person-centred service approach to manage case complexity. The second finding describes an Australian Seating Service Landscape dominated by an overarching system of governance, that influences funding at a seating service level and upon wheelchair procurement. The third finding classifies the consumer’s bio-functional postural capacity as the Four Domains of Postural Complexity. Aligned with the third finding, the fourth finding proposes a Seating Service Selection Guide based on seating approach according to postural capacity. The fifth finding describes three Decision-Making types, according to who has decision making control and where support is required, to specific resource needs. Informed by the third, fourth and fifth findings, the sixth finding establishes a holistic guide: the Determinants of Case Complexity that clarifies the direction of the seating approach and allocation of specific seating expertise in specialised wheelchair procurement according to consumer capacity. The seventh finding defines Six Seating Service Steps as a non-linear, dynamic service and procurement process operating with the Australia service sector. The eighth and final major finding establishes an Australian Seating Service Benchmark and for the first time, provides structure to build a sustainable seating service sector.

A coordinated seating service plan urgently requires a national education program, aligned with industry-based career planning and universal quality assurance program. This case study provides baseline data, much needed to shape and develop the Australian seating service capacity to adapt to a rapidly changing market place.

Keywords: wheelchair procurement, seating service, decision making, social justice.
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Glossary

ARATA: Australian Rehabilitation and Assistive Technology Association.

ATSA: Assistive Technology Supplies Australasia.

Complex seating: Describes an individual's postural and mobility needs (Carlson, 2010; Dicianno et al., 2009; Di Marco, Russell, & Masters, 2003).

Consumer: The wheelchair occupant.

NCRE: National Committee Rehabilitation Engineering.

Occupational performance: Engaging in chosen occupations that have meaning and purpose in the consumer's life (Mortenson & Miller, 2008).

OT: Occupational therapist.

Physio: Physiotherapist in Australia.

Procurement: Describes a holistic process of wheelchair and seating provision that includes services associated with assessment, provision, funding and education/training.

Seating service sector: The service groups involved in wheelchair and seating procurement.

Specialised wheelchair-seating system: A prescribed wheeled base, manual or powered, integrated with a scripted seating system (and technologies) designed for a specific wheelchair occupant.

Specialised wheelchair procurement: The process of acquiring a new wheelchair-seating system, including assessment, trial, prescription, provision, fitting and education.

Wheelchair outcome: The wheelchair-seating system provided to the consumer at the end of their seating service experience.
CHAPTER ONE:
‘You get your mobility, the world’s your oyster’

—Consumer Christine

In 2009, approximately 4.5 million Australians’ lives were affected variously by their disability (Productivity Commission, 2010). An estimated one in five Australians use devices or assistive technology for daily living (Australian Bureau of Statistics, 2009), including wheeled mobility devices and seating technology. There are no statistics of wheelchair use alone, or data that describe the seating service environment in Australia (Edwards & McCluskey, 2010). Without these data the Australian seating sector is poorly understood. The lack of wheelchair use and seating service knowledge is even more pertinent because wheelchair use in Australia is predicted to escalate rapidly in line with global predictions.

Currently an estimated one per cent of the world’s population use a wheelchair; and in the western world this number is estimated to rise by 30% by 2030 (Cook, Polgar & Hussey, 2008; Trachtman, 2002). This prediction also applies to Australians, who are living longer with complex health conditions that affect their mobility (Australian Institute of Australian Health & Welfare, 2000; Wilcock, 2006). It is predicted that in the next two decades the number of Australians living with disability, and their care providers, will double (Shorten, 2009) and the need for wheelchair technologies and services including the support from specialised seating services will escalate exponentially (Edwards & McCluskey, 2010).

Access to appropriate wheelchair technology is essential. The challenge is matching complex wheeled mobility needs with appropriate technology (Kittel, Di Marco & Stewart,
2002; Plummer, 2010; White, 1999; White & Lemmer, 1998). The wheelchair consumer group requires a robust wheelchair-seating service sector to assist them meet their current and future needs (Edwards & McCluskey, 2010; Gowran et al., 2011).

The Australian specialised wheelchair and seating service sector (abbreviated to seating service sector) is confronted with a basic problem: there are no published data on the wheelchair and seating service environment (Edwards & McCluskey, 2010). Without this, the Australian seating service sector has no benchmark by which to rate service capacity. If Australia is to build a robust and sustainable seating service sector with the capacity to meet escalating demands, these basic data are required.

**Enabling Wheeled Mobility**

Effective wheeled mobility, as in using a wheelchair, enables Australians who live with movement disability to mobilise at home and in the community (Edwards & McCluskey, 2010). Those who live with complex mobility disability require specialised wheelchairs fitted with supportive seating systems. A specialised wheelchair-seating system describes a manual or powered wheelchair base integrated with a seating system that provides postural support for daily use. This includes associated electronic technologies required to optimise mobility by adjusting drive controls, seat repositioning or to interact with other environmental control units.

Specialised wheelchair-seating systems can be manually propelled or power driven, or a combination of both, by the wheelchair occupant, or pushed or controlled by a care provider (Routhier, Vincent, Desrosiers & Nadeau, 2003). Managing specialised wheelchair and seating technologies is complex (Batavia, Batavia & Friedman, 2001; Di Marco, Russel & Master, 2003; Plummer, 2010), and informal or formal care provision is
often prominent in the wheelchair occupant’s daily life (Reid, Lalibert-Rudman & Hebert, 2002). Matching an appropriate wheelchair and seating technologies to the personal mobility needs of its occupant (the consumer) involves fitting the wheelchair-seating system into the consumer’s lifestyle and the needs of carers, family and other associates: a challenging task (Batavia, 2010; Mortenson, Demers, Fuhrer, Lenker, & DeRuyter, 2012; Mortenson & Miller, 2008). Matching personal needs and technology correctly enables the consumer’s functional and occupational performance (Mortenson, Miller & Miller-Pogar, 2007). Occupational performance describes a person’s ability to engage in meaningful and purposeful activities (Law et al., 1996; Mortenson & Miller, 2008). Increased occupational performance enhances wellbeing and quality of life (Chan & Chan, 2007; Kenny & Gowran, 2014; Hardy, 2004; May & Rugg, 2010; Mortenson & Miller, 2008; Scherer, 1996). An appropriately provided wheelchair-seating system can reduce carer reliance (Mortenson et al., 2012) and the associated dependence on disability services (Scherer, Sax, Vanbriervliet, & Cushman, 2005). Providing such specialised wheelchair and seating technology requires competent wheelchair-seating prescription (Di Marco, Russell & Masters, 2003; Plummer, 2010) and proficient technical services with appropriate range of technology options (Cooper, 1998; Waldron & Layton, 2008).

**Wheelchair and Seating Service Provision**

Providing wheelchair services to consumers who use wheelchairs on a daily basis is not as straightforward (Cohen, Greer, Berliner, & Sprigle, 2013), as buying a car. Prescribing wheelchair and seating technology is complex (Di Marco, Russell & Masters, 2003; Plummer, 2010; Plummer et al., 2013), and prescribing an appropriate wheelchair-seating system for a consumer with complex mobility and postural needs requires expertise,
access to wheelchair technology services, and sustainable funding (Arledge et al., 2011; Cohen, Greer, Berliner, & Sprigle, 2013). Specialised wheelchair and seating procurement (abbreviated to specialised wheelchair procurement) involves multiple stakeholders and proficient wheelchair and seating services and technology access (Routhier, Vincent, Desrosiers, & Nadeau, 2003) and includes a process of acquirement, assessment, provision, funding and education (Mortenson & Miller, 2008). The multiple stakeholders involved in specialised wheelchair procurement include the consumer, care providers, and a diverse range of clinical, technical and technology service providers.

The wheelchair-seating service sector resides within the overarching field of assistive technology, which describes both the 'hard technologies' (devices, products and items) and the 'soft technologies' (services, support systems, funding and education) that enhance a consumer’s functional capacity (Waldron & Layton, 2008). The seating service sector provides an overwhelming array of sophisticated wheelchair, seating and associated technologies (Cooper, 1998; Dudgeon, 2000) aimed at catering for diverse consumer capabilities and environmental challenges (Batavia et al., 2001; Batavia, 2010). Many consumers who live with mobility-related disability require non-standard, specialised wheelchair and seating technologies (Cooper, 1998; Davies, Souza, & Frank, 2003; Scherer, 2005). Specialised non-standard wheelchair and seating technology are complex and costly, but as a performance enabler, appropriately fitted wheeled mobility empowers the consumer greater occupational opportunity (Evans, 2000; Hardy, 2004; Mortenson & Miller, 2008). That is, an equal capacity to engage in community activities and occupations as desired (Gowran, 2012; Plummer, 2010).
Specialised Seating Service Sector

Most assistive technology in Australia is delivered by primary service providers (Friesen, Walker, Layton et al., 2014). Within the assistive technology sector, a small cohort of specialists provides specialist seating services and wheelchair technology for Australians living with complex mobility disabilities.

Data on the stakeholder experience of Australian seating service provision are sparse. There are some data on the consumer’s experience (Barclay, 2002; Kittel, et al., 2002), but none that describe the Australian seating service experience comprehensively from the stakeholders’ perspectives. There is scant evidence pertaining to Australian seating service process, standards or guidelines (Di Marco, et al., 2003; Lukersmith, 2011; 2012; Poulos et al., 2012). What is known informally is that as the number of existing seating specialist services is limited, gaining access to them is challenging: there is greater demand than service availability.

The lack of data pertaining to seating services in Australia is concerning. The consumers who use wheelchair and seating technology daily require complex, advanced technology (non-standard manual and powered wheelchairs). Non-standard wheelchair technology is commonly technically complex and requires proficient supply, maintenance and repair services (Batavia, 2010). Finding adequate funds to purchase expensive mobility technology is problematic (Carey, DelSordo, & Goldman, 2004), as government funding programs favour financing less expensive, standard wheelchair technology (Grasso, 2008). A poorly prescribed wheelchair deprives its consumer of full community engagement (Scherer & Glueckauf, 2005); reduces community engagement results in lost productivity
and is aligned to poorer health and wellbeing outcomes (Gowran, McKay, O’Regan et al., 2011).

In Australia, the majority of wheelchair and seating technology funding is sourced by unique state and territory disability funding programs (Cook, Polgar, & Hussey, 2008; Layton, Steel, & de Jonge, 2013). Procurement is complicated: more than one hundred funding sources (Summers, 2011) are operated variously by federal, state and local governments (Layton, et al.), insurance type schemes, and non-government organisations (Cook et al.). To procure a new wheelchair system, the consumer and the prescribing clinician have to manoeuvre through strict government funding protocols and inflexible service policy to access the often insufficient funding (White & Lemmer, 1998). Additional funds may need to be sought from alternate sources. Depending on the funding protocol, the consumer may or may not have control of and choice in selecting the technology, the service provider and specialised services (Cook et al.).

There is currently no national funding approach, although change is imminent. Between 2013 and 2018, the Australian government intends to introduce a National Disability Insurance Scheme (NDIS). NDIS is a national approach to funding for Australians living with disability (National Disability Insurance Scheme, 2014) that proposes providing self-managed funding packages to Australians living with complex disability. NDIS aims to empower consumers with control to choose the services and technology they need, and thus endorses an open-market approach that will affect wheelchair procurement and seating servicing.

This is a radical change. The existing service sector is tightly controlled by Australian government funding protocols, whereas an open market requires a responsive, robust
seating service sector, quality assurance measures (Schein et al., 2011), sustainable workforce capacity (Gowran, McKay, O'Regan, 2011; Middleton et al., 2008) and access to evolving technology (Phillips & Zhao, 1993). The current lack of information about the Australian seating service sector and its workforce status undermines its capacity to develop coherently and appropriately to meet NDIS demand.

**Terminology Used in this Thesis**

This thesis presents research that investigated the ‘people’ who engaged in ‘wheelchair technology’ for community participation, and the ‘seating services’ and ‘service providers’ who support the procurement of specialised wheelchair and seating technology. Within this thesis, the term ‘wheelchair procurement’ describes the resources (services and technology) required to construct, provide fit, and educate a wheelchair occupant, as its consumer (and care providers) to utilise wheelchair and seating technology safely. Informed by authors Plummer, Ito and Ludwig (2013), the following terminology is used in this thesis: the *people* engaged in wheelchair technology are the wheelchair occupants, as consumers; their *care provider/s* and the service providers involved in assessment, provision, funding, and training associated with wheelchair procurement. The consumer, as the wheelchair occupant, is central to the procurement process. Care providers can be informal (family/friends) or formal (employed care attendants) and their support may be physical (transfers/transport), psychosocial (emotional/social), for daily care, or to sustain wheelchair performance (maintenance). La Plante and Kaye (2010) estimate that 44% of wheelchair occupants in the United States of America require assistance in their daily routines; so the care providers’ contribution in supporting the wheelchair occupant is
important. There are no statistics of Australian care provider contribution in physically or
psychosocially supporting wheelchair consumers.

*Seating services* are the wheelchair and seating services that provide and support
wheelchair and seating technology. Each service has a role in the supply and maintenance
of the wheelchair and seating system. The *service providers* comprise a cohort of
professionals who provide technical and clinical services related to the prescription,
provision and funding of specialised wheelchair and seating systems.

Like Rousseau-Harrison and colleagues (2009), the author of this thesis, who is an
occupational therapist, believes that wheelchair performance enhances social engagement
and participation, and enables equality of occupational opportunity.

**Theoretical Framework for the Study**

The overarching theoretic framework for the study is an assistive technology
framework of Marcia Scherer, the Matching Person and Technology (MPT) (2004; 2008).
The MPT framework is chosen for its comprehensive view of matching appropriate
assistive technology to a person’s lifestyle. Emerging from a grounded theory study
(Scherer, 2005), the MPT framework aims to describe the factors associated with
technology-enhanced performance and associated quality of life (Cook et al., 2008). The
MPT framework describes three dominant layers: the personal characteristics of the
consumer; the milieu as the environments in which the consumer uses the assistive
technology; and the technology’s functions and features. The term milieu describes the
physical and personal characteristics of the consumer (e.g. functional abilities, volition,
cognition and behaviour) plus the social, cultural and eco-political environments that
impact on assistive technology use (e.g. funding, service provision and competence and
location). The MPT framework attempts to explain the contextual factors: that is the positive and negative interactions between the person and the assistive technology in the milieu in which the technology is used (de Jonge, Scherer, & Rodger, 2007).

As shown in Figure 1 the MPT framework identifies the multi-dimensional environments in which the consumer and technology are applied. A better understanding of how assistive technology is used will assist both consumers and service providers to predict the success, the potential risks and compromises associated with technology use (Federici & Scherer, 2012).

![Figure 1. Matching Person and Technology Framework](source: Scherer, 2008; slide 1)

Understanding the milieu in which the consumer and technology engage helps identify the factors associated with unsuccessful technology outcomes. Scherer emphasises
a ‘need determines use’ (2005, p. 124) approach to enhance the appropriateness of assistive technology. The Scherer approach applies to people who rely on wheeled mobility and seating technology for enhanced performance. An appropriately provided wheelchair-seating system enhances a consumer's occupational performance (Hardy, 2004; Mortenson & Miller, 2008); conversely, an inappropriately provided wheelchair system hampers optimal mobility, resulting in wheelchair avoidance or use-related injury, and for some wheelchair abandonment (Scherer, 2005).

A number of studies use the MPT instrument, the Assistive Technology Device Predisposition Assessment (ATD PA) as a measure for predicting the predisposition towards certain assistive technology (AT) by particular consumers. The study by Scherer and colleagues using the ATD PA instrument found it provided a ‘user-friendly strategy for rehabilitation professionals and AT users [consumers] to collaboratively explore AT options and to achieve positive outcomes’ (2005, p. 1329). An earlier study using the MPT framework included wheelchair technology use. In a study by Scherer and Cushman (2001) the application of the MPT instrument, ATD PA (in combination with multiple tools) was used to identify the subjective elements of quality of life associated with the use of assistive technology. Twenty-two in-patients were recruited following newly acquired spinal injuries. The in-patients were asked to characterise their personal ‘functioning, temperament, lifestyle and views of a particular assistive device’ (p. 389). The findings show that adjusting to assistive technology is multi-factorial, and included the consumer’s adjustment to the disability, personal volition, and the sense of wellbeing in relation to accepting assistive technology. The findings highlight the challenge faced by clinicians and consumers post-spinal injury, where early discharge threatens the provision of assistive
technology. The ATD PA, informed by the MPT framework, identifies potential obstacles to assistive technology use at an early stage, during spinal rehabilitation. This early alert assists in predicting the prescription of potentially inappropriate technology, including wheelchair related technology. A collaborative approach aspired to by the MPT assists in predicting potential obstacles to matching the consumer with appropriate wheelchair and seating technology.

**Statement of the Problem**

There are no current data about the Australian wheelchair and seating service experience, on how it functions or whether it works (e.g. provides satisfactory outcomes). What is known, but poorly understood, is that there is an Australian cohort in need of wheelchair and seating technology. There is a sector of commercial wheelchair supply businesses, and specialist seating services operated by both government and non-government that consume financial resources and require a specialised workforce.

Also known is specialised wheelchair procurement is a complex, growing area of specialisation (Batavia, 2010) but is not well catered for. The overarching assistive technology sector and its wheelchair and seating service workforce are poorly resourced, with no formal education currently available in Australia (Summers & Walker, 2013). This indicates an urgent need to collect rich descriptions of the wheelchair procurement and seating service experiences from consumers, care providers and service providers so that an understanding of how the Australian seating service impacts on the procurement of specialised wheeled mobility technology and service outcomes is understood. Such knowledge should inform service structure, influence funding policy, and strengthen service practice (Cohen, 2007).
This thesis provides findings of insiders’ experiences of the seating service in Australia, and in doing so begins to fill a large gap in seating service knowledge.

A qualitative approach was taken to capture insiders’ stories (Wicks & Whitehead, 2003): in this case, Australian stakeholders’ experiences. An in-depth interview process, informed by a case study approach (Simons, 2009; Yin, 2009) allowed for deeper exploration of participants’ personal stories of and reflections on their seating service experiences.

The data were analysed using multiple lenses, including a thematic analysis of stakeholder perspectives, decision-making and social justice. These processes allowed a deeper scrutiny of the qualitative data, assisting the case study aim to expose the Australian seating service experience deeply from the stakeholders' perspectives. The case study aims to provide essential first knowledge to understand the service structure and to explain the factors that influence and exert force on service delivery.

Several research questions were structured to direct the gathering of relevant data and to explore, scrutinise and analyse them for greater understanding of the experience from all stakeholders’ perspectives. With the dearth of information available, the first question sought to capture service experiences was:

**QUESTION 1: WHAT IS THE PERCEIVED EXPERIENCE OF SPECIALISED SEATING SERVICE IN AUSTRALIA, FROM THE STAKEHOLDERS’ PERSPECTIVES?**

To understand the Australian seating service experience in more depth and from an insiders’ perspective, the second research question sought to scrutinise participants’ experiences:
QUESTION 2: WHY DOES PARTICIPATING IN A SPECIALISED SEATING SERVICE BENEFIT (OR COMPROMISE) THE PROCUREMENT OF CUSTOMISED WHEELCHAIR AND SEATING SYSTEMS FOR AUSTRALIANS LIVING WITH COMPLEX MOBILITY DISORDERS?

As there is no known evidence that demonstrates what service type provides a better wheelchair outcome than another, the third research question sought to explore experiences in more detail:

QUESTION 3: HOW DOES ACCESS TO SEATING SERVICE IMPACT ON WHEELCHAIR AND SEATING TECHNOLOGY OUTCOMES?

To expose and explore the decision-making process, positive and negative, the stakeholders’ experiences need to be pursued, to find how decisions are made and what factors impact on their making. The fourth research question sought to collect and challenge what, when and why decisions are made and who makes them, to expose factors that empower or hinder the decision-making process in the Australian seating service experience.

QUESTION 4: HOW DOES THE TYPE OF SEATING SERVICE AFFECT THE DECISION-MAKING PROCESS?

Finally, in light of the changes proposed by the National Disability Insurance Scheme, the fifth research question sought the stakeholder’s perceptions in anticipation of its implementation:

QUESTION 5: WHAT IS THE CURRENT ROLE OF A SPECIALISED SERVICE SEATING AND WHY IS IT RELEVANT IN THE FUTURE WITHIN THE CONTEXT OF A NATIONAL DISABILITY INSURANCE SCHEME?
Overall Research Aim

The purpose of the qualitative research was to investigate the experience of four stakeholder groups involved in Australian specialised seating servicing for specialised wheelchair procurement: the consumers, the care providers, the prescribing clinicians and the vendors. The aim was to capture the experiences comprehensively from those receiving services and those providing services.

The Australian seating service sector needs evidence-based research to guide wheelchair-seating service practice. The lack of evidence-based knowledge of current wheelchair-seating services policies, procedures, and workforce capacity weakens service sustainability (Gowran, 2012; Plummer, 2010; Summers & Walker, 2013). It is anticipated the information gathered from this study will help to remedy this. Australian knowledge is required to build a robust seating service with the capacity to meet anticipated consumer complexity and the changes expected from an evolving NDIS-funded environment.

This is the first of eight chapters. The second chapter presents the Australian literature and critiques this, along with the more abundant international literature pertaining to wheelchair procurement, seating services and practices. Chapter three presents the research methodology and study design. Chapters four, five and six present the findings. Chapter seven discusses the findings and interprets the data from a social justice perspective. The final chapter, chapter eight discusses the findings and interprets these as relevant to the Australian seating service and wheelchair procurement.
CHAPTER TWO:
Literature Review

This chapter analyses the literature relevant to wheelchair use, seating services and wheelchair procurement. An international overview of the development of wheelchair technology is followed by an Australian synopsis of seating services. A critical analysis of the prominent works dealing with assistive technology service provision and in wheelchair and seating service delivery is presented. This includes factors such as decision-making and social justice that are associated with wheelchair procurement and seating service provision. The chapter ends with a summary of current issues and gaps identified in the literature and their relevance to this study.

Literature Search Process

The major database used to explore the available literature was EBSCO host, accessing Academic Search Complete, AgeLine, The Allied and Complementary Medicine Database, CINAHL, Health Business Elite, Health Policy Reference Center, Health Source: Consumer Edition, Health Source: Nursing/Academic Edition, MEDLINE, PsycINFO, and SPORTDiscus. Additional databases like Science Direct, Web of Knowledge/Web of Science, Informit (Australian), Scopus and Google Scholar were searched for grey literature. The searches used the following key words: (‘seating servic*’ OR ‘wheelchair clinic*’ OR ‘posture clinic*’ OR ‘wheelchair fitting*’ OR ‘seating orthotic*’ OR ‘wheelchair seating’ OR ‘wheelchair prescription’) AND (‘service delivery’ OR ‘service evaluation’); and (‘social justice’ OR ‘injustice’ OR ‘occupational injustice’); and (‘clinical reason*’ OR ‘decision mak*’ OR ‘choice making’ OR ‘control’ OR ‘empower*’).
The Cochrane Library database was also employed, but found scant relevant wheelchair and seating service evidence. Reference lists of relevant literature from the assistive technology/wheelchair-seating networks were examined. Searches were limited to English language and occurred between 2010 and 2014.

Three articles relevant to Australian service delivery or standards of practice, and 22 international references dedicated to wheelchair-seating service delivery, were of relevance. Five Australian and 49 international references were relevant to wheelchair outcome and service evaluation, as were two Australian studies and 16 international references addressing decision-making in wheelchair procurement. Five Australian and 28 international references dealing with seating service process were located, along with seven articles related to Australian disability funding policy development, six more addressing social justice in wheelchair procurement, seven international papers addressing policy issues, and four on social justice.

The Activity of Sitting

Sitting is so fundamental to human activity that at times it is an invisible body function (Pynt & Higgs, 2010; Strobl, 2013). The process of sitting only becomes a conscious act when it becomes uncomfortable (Pearson, 2009). In line with the key elements of the International Classification of Function (Üstün 2002), seating comfort is adversely affected by the person's body function or biomechanics, the design of the seat's technology in relation to the activity or task to be undertaken in the seated position, such as the ergonomics in relaxing, dining or in office work (Samuelsson, Larsson, Thyberg, & Gerdle, 2001). Poor sitting posture impacts on functions such as breathing, eating and digestion (Dicianno et al., 2009), speaking and communication (Herman & Lange, 1999)
and on head control and vision (Pederson, Lange, & Griebel, 2002). Functional, dynamic seating maintains body health and helps to make one feel comfortable (Pearson, 2009; Strobl, 2013). When sitting becomes uncomfortable, most people change posture, often intuitively to stand or move, or even lie down to stretch out. Most people have the capacity to adjust posture, change seats, or reposition themselves to maintain seated comfort while undertaking a particular activity.

Consider a person who has significant mobility difficulties. This person is unable to stand, move independently or lie down to change posture according to their functional need. The person with a significant mobility disability is often the same person who uses wheeled mobility technology, that is, a wheelchair integrated with supportive seating. The wheelchair-seating system may be manual or powered, or both. Good supported seating is essential during wheeled mobility, as the wheelchair occupant requires sitting stability and comfort for functional sitting, for example during assisted propulsion, for active self-propelling and/or to drive their powered wheelchair (Batavia, 2010; Cooper, 1998). An appropriately fitted wheelchair-seating system consists of technology that allows the occupying consumer to adjust their posture and/or accommodates for their needs to enhance health, comfort and support, such as assisted repositioning for functional posture and/or for pressure relief or reduction.

**Wheeled Mobility**

The purpose of wheelchair's seating is to provide comfort, postural support and stability for a person to undertake functional activity (Plummer, Ito & Ludwig, 2013). Achieving postural comfort is the ideal outcome, especially as wheelchair occupants spend many hours in their wheelchairs (Smith, McCreadie & Unsworth, 1995). Batavia (2010)
estimates an active wheelchair consumer use their wheelchair for at least eight hours for community participation. Occupational therapist Elizabeth Pearson (2009) defines postural comfort as a lack of discomfort, or where one does not need to change position due to fatigue or pain. An objective measure of discomfort, she proposes, is the frequency of postural shifts made in a specified setting over a set time.

When independent mobility is impaired, the development of pressure ulcers due to cell hypoxia is a constant concern (Coggrave & Rose, 2003; Stockton, Gebhardt & Clark, 2005). Recuperation from a pressure ulcer located on sitting anatomy is disruptive, as ‘time off seating’ to heal is time-consuming, especially when accompanied with complex disabilities. The impact of pressure ulcer rehabilitation on productivity can be immense (Gorecki, Brown, Nelson et al., 2009), perhaps weeks or months of disrupted sitting activity (or more if hospitalised), and is associated with lost productivity (Banks, Graves, Bauer, & Ash, 2010). Pressure care management is a determining factor when matching a person with suitable wheelchair and seating technology (Batavia, 2010; Cooper, 1998).

A wheelchair successfully matched with a consumer’s needs liberates energy-efficient, functional mobility (Kreutz & Taylor, 2002). Efficient wheeled mobility enables consumer engagement in meaningful occupations (Harris, 2007; May & Rugg, 2010; Mortenson, Miller, & Auger, 2008; Reid, Laliberte-Rudman, & Hebert, 2002) across the environments in which they live, work and play (Batavia 2010; Di Marco, Russell, & Masters, 2003; Hardy, 2004; Pedersen et al., 2002), and enables greater community engagement which enhances quality of life (Cook, Polgar, & Hussey, 2008; Scherer, 2002b).
The provision of specialised wheelchair and seating technology is however complex (Batavia et al. 2001; Huhn, Guerrera-Bowlby, & Deutsch, 2007; Plummer, 2010; Reid, 1999; Samuelsson & Wressle, 2008). Complex wheelchair and seating provision requires competent, confident experienced professionals (Batavia, 2010; Di Marco et al., 2003; Schein, Schmeler, Brienza et al., 2008) and a proficient vendor sector (Batavia et al., 2001; Eggers, Myaskovsky, Burkitt et al., 2009; Sprigle & De laune, 2013). Successful wheelchair performance also requires supportive care providers (Demers et al., 2009; Mortenson et al., 2012; Woods & Watson, 2005) for supporting the wheelchair occupant, their use of and in maintaining the wheelchair system for optimal performance.

The International Classification of Function (ICF) framework views a person living with a mobility disability by what they can and need to do (Mortenson & Miller, 2008). ICF views the wheelchair as a technology facilitator, an essential personal enabler (Chaves et al., 2004; Gowran, 2012). The wheelchair as a technical enabler is challenged by social commentators Woods and Watson (2004a) who state the wheelchair, as a primary mobility enabler is a simplified notion, as an appropriate wheelchair system becomes embedded in one’s occupational and social fabric of a person’s life. As such Woods and Watson also assert the wheelchair’s place in society is poorly understood. Despite this the wheelchair has been used as a powerful political statement since the mid-1960s to advocate for social inclusiveness (Sapey, Stewart & Donaldson, 2006).

Historical Perspective of Wheelchair Technology

To understand the changes in the societal view of wheelchairs, a historical context is presented. Before wheelchairs, people with mobility difficulties were transported in litters or pushed in single-wheeled carts (Cook, Hussey, & Polgar, 2008; Cooper, 1998). The
earliest wheelchair image is etched on a Chinese sarcophagus from the 6th century (Cooper, 1998). The first official recording of wheelchairs appears in 1588 (Cook et al.) as the ‘rolling chair’. This was a ‘heavy cushioned armchair with a reclining back and front legs equipped with castors’ (Cooper, p. 2) occupied by the 16th-century Spanish King Phillip V, used during bouts of gout. A little later, and again sanctioned by royalty, ‘the roulette’ became a fashionable indoor wheelchair used in the French court of Louis XIV (Cook et al.; Cooper).

There was little development during the 18 and 19th centuries to the manual wheelchair, which remained as a wooden armchair on wheels designed for recuperation, not for activity (ABLEDATA, 2006; Cooper; 1998). As these early wheelchairs were cumbersome and heavy, they were pushed by an attendant (Cooper).

The manual wheelchair evolves.

There are a number of impetus noted to the development of the manual wheelchair. All were driven by increased demand, the first was propelled by veterans’ need post the American Civil War (Cook et al., 2008; Cooper, 1998). Added to which, wire-spoke wheels appropriated from bicycle technology in the 1870s helped lighten the wheelchair weight and improve propulsion. These wheelchairs were not yet designed for independent outdoor mobility.

The second momentous wheelchair innovation is noted in 1932. Mining engineer Herbert Everest and mechanical engineer Henry Jennings designed the first E&J (Everest and Jennings) wheelchair, a comparatively light, metal frame and folding wheelchair designed for Everest’s personal use (Cook et al., 2008; Cooper, 1998). The E&J is the first folding wheelchair: a standard 18 inch cross-braced aircraft metal wheelchair frame with a
slung seat. The first E&J folding manual wheelchair weighed 22kg, considerably less than previous wooden wheelchairs (Cooper, 1988). Its lighter weight enabled greater, more consumer energy efficiencies and its folding capacity enabled easier transport, facilitating more participation in community life. The E&J manual wheelchair was designed for self-propelled wheeled mobility by its designer Everest for outdoor use and travel. The development of the E&J folding wheelchair is a great example of person-centred innovation where the consumer’s needs informed technology design.

A third impetus to wheelchair development occurs after World War II. The introduction of life-sustaining antibiotics enabled veterans to live longer following spinal injury (Woods & Watson, 2004b) and as such greater numbers of young veterans needed wheelchairs for active lifestyles (Cooper, 1998; Godfrey & Weisman, 2010). They also required rehabilitation and physical fitness for longer, active wheelchair lives. In Britain a progressive wheelchair sports rehabilitation program, instigated by Sir Ludwig Guttmann at Stoke Mandeville Hospital, responded to this rehabilitation need by introducing wheelchair sports; aimed at enhancing physical and psychological lives (Godfrey & Weisman, 2010). As a result, wheelchair sportsmen required better-performing wheelchairs than the standard heavier, one-size-fit-all then available (Olson & DeRuyter, 2002). Greater variety of lightweight manual and sports wheelchairs appears during the mid-1950s (ABLEDATA, 2006) and as wheelchair use became more visible, societal attitudes to disability evolved.

**Wheelchair technology evolves with societal change.**

Prior to 1960s, disability was largely invisible as many people living with mobility disabilities were bed-bound and/or accommodated in institutional care due to the lack of suitable wheelchair and seating technology enabling community participation (Telfer,
Solomonidis, & Spence, 2010; Watson & Woods, 2005). Around the 1960s and 1970s three elements aligned to advance development in wheelchair and seating technology. The impetus for wheelchair and seating technology advancement was: to meet the needs of another large group of young war veterans, this time from the Vietnam War, who required sophisticated wheelchair technology; a population of children living with limb deficiencies caused by thalidomide, requiring supportive seating; and societal change towards socially inclusive attitude towards disability (Watson & Woods).

In America, wheelchair technology rapidly responded to Vietnam veterans living with high-level spinal injury (Cooper, 1998). These veterans required pressure care management (Watson & Woods, 2005b), but the basic wheelchair with slung canvas seating of the 1950s and 60s provided insufficient postural support or pressure care. By the 1970s, the evolution in new composite materials (ABLEDATA, 2006; Cook et al., 2008) helped to manufacture lighter, more functional and aesthetically pleasing wheelchairs for a discerning consumer market (Cooper). A decade earlier across Britain, Europe and North America, campaigns to relocate institutionalised people living with mobility disabilities moved these into their communities, thus needing wheeled mobility. The need for specialised wheelchairs grew as a result (Watson & Woods, 2005b; Winchcombe, 2008). Disability rights movements commenced in earnest the 1970 and 1980 and these championed for full participation and equal opportunity in society (Anti-defamation League, 2005; Cooper). Western governments responded, for example: the British government produced the McColl Report in 1989; the Americans their Disabilities Act 1990 and the Australians their Disability Discrimination Act of 1992 (Cooper; Cooper, 1999; White, 2003). These government policies encouraged greater community access and inclusiveness for all members of society.
Wheelchair and seating technology developed in response to the needs of the greater numbers of people living with their complex mobility disabilities in the community. Supportive seating provided greater support for sitting out of bed and for longer, and light-weight wheeled mobility enabled independence (Watson & Woods, 2005a).

Simultaneously, social activism campaigned for special and then integrated education for children with disabilities (Watson & Woods, 2005b). School children living with mobility disabilities required supportive seating to sit, to attend and to learn (Watson & Woods), and adjustable paediatric seating accommodated growing bodies. In Canada, Netherlands and Britain, and particularly Germany, adaptive seating developed rapidly to seat thalidomide-affected children (Watson & Woods). Specialised wheelchairs with seating systems, including powered mobility, were developed to fit individual mobility and support postural goals (Cooper, 1998; Pederson et al., 2002).

**Powered mobility arrives.**

The first powered wheelchair (1940s) was recorded as a standard manual wheelchair powered by a car engine and batteries (Cook et al., 2008; Woods & Watson, 2003; 2004b). In Britain the power chair technology surged after the 1986 McColl Report advocated greater community engagement of people living with disability (White, 2003). Government funding protocols changed, to empower community participation using powered chairs designed for indoor-outdoor use (Frank, Neophytou, Frank, & De Souza, 2010; Winchcombe, 2008). The advancement of community participant was empowered by philosophy espoused by the ICF framework of health and wellbeing being empowered by functional engagement in one’s society (Chaves, Boninger, Cooper et al., 2004; Rimmer,
and thus influenced wheelchair procurement for greater inclusion.

The value of powered mobility is noted as: providing greater freedom and independence to the wheelchair driver (Davies, De Souza, & Frank, 2003; Hardy, 2004), and inspires greater community engagement. Appropriately procured powered mobility helps lessened the care-giving load (Demers et al., 2009; Mortenson et al., 2012) and reduces carers’ occupational injuries associated with pushing heavy manual wheelchairs (Frank et al., 2010; Schuringa & McGarth, 2004).

The evidence shows power chair technology evolves in line with computer and electronics evolution, incorporating microcomputers, electronics and space-age materials (Cook et al., 2008; Olson & DeRuyter, 2002). Increasingly intuitive electronic control systems further facilitate powered mobility for indoors and outdoors and thus enables greater independent mobility beyond the home environment (Ward et al., 2010), to work, socialise and participate in all life domains. There is a positive link noted between enhanced occupational performance and powered mobility for all ages (Buning, Angelo & Schmeler, 2001; Hardy, 2004; May & Rugg, 2010).

By the 2000s, attention turns to developing powered mobility for children with physical disability, often deprived of essential development by the lack of active play exploration (Tefft, Guerette, & Furumasu, 1999). Powered mobility facilitates developmental growth in affected young children (Huhn et al., 2007) and early wheeled mobility enables infants to move spontaneously to explore their environment (Rodby-Bousquet & Hägglund, 2010; Wright-Off, 2005). Early infant powered mobility (18–36 months) is a facilitator of neurological and psychosocial development through independent
exploratory play (see Guerette, Furumasu, & Tefft, 2013; Sawatzky et al., 2007; Tefft et al., 1999; Wright-Off, 2005). The introduction of smart technology (robotic mobility devices activated by sonar) further empowered wheeled mobility technology, enabling intuitive wheeled movement directed by the driver’s balance. Smith, Dennis, Stansfield and Larin (2010) experimented with unimpaired infants of up to two years old and found these children intuitively moved the robotic mobility device to explore and play.

The revolutionary iBOT 300, designed by Karen in 2001, was an extension of the intuitive Segway smart technology during that decade. The iBOT 300 was driven on two wheels by an occupant driver – in supported seating – and directed by smart technology through intuitive balance (Sawatzky et al., 2007). That is, when the driver’s eye gaze sought a certain location, this informed their balance shift that was interpreted by smart technology as a directional command. The iBOT 300 was capable of unique wheeled performance not previously wheelchair accessible, such as powered stair climbing, and this increased independence offered better quality of life (Sawatzky et al.). Its safety was endorsed in a 20-participant study (Uustal & Minkel, 2004), but at US$30,000, the iBOT 300 wheelchair was prohibitively priced. Despite its unique mobility opportunities, iBOT production ceased in 2009 (Vincent & Lawson, 2010).

**Consumer propelled wheelchair-seating servicing.**

These forms of powered mobility and smart technologies provided greater mobility options for many consumers with complex mobility needs (Fomiatti, Richmond, Moir, & Millsteed, 2013; Huhn et al., 2007; Reid, 1999). The enhanced acceleration and deceleration of powered mobility, this requires greater postural support for the driver.
(Cooper, 1998; Kreutz & Taylor, 2002; Gilinsky, Cody, & Hosack, 2008), resulting in development of greater seated support for the occupant to drive their power chair.

In response to an escalating demand of seating specialisation in the 1960s, a clinic-based wheelchair-seating service flourished, operated by traditional multi-disciplinary teams (Cooper, 1998; Reid et al., 2002) and were hosted by hospitals or disability institutions, as an augmentative specialist service.

The early seating clinics (in the 1960s and 70s) were aligned with a medical model approach (Cooper, 1998; Harris, 2007, Ozer, 1986) and the clinic-based service was dominated by the seating team; the consumer’s role was passive. The clinic team roles were traditionally discrete to mirror specific professional core sets of skills. Engineering, prosthetics and orthotics departments manufactured much of the customised seating as a body-conforming splint-like device (Trefler & Taylor, 1991), a seating system was often described as seating orthosis (Herman & Lange, 1999). The wheelchair-seating manufacture was a long and labour-intensive and required a highly competent professional team and patient consumers (Gilinsky et al., 2008). The literature of the time was devoted to the bioengineering processes of manufacturing bespoke seating: individualised seating inserts (Cooper, 1998; Watson & Woods, 2005b). Manufacturing methods included one-off moulded seating, using an enclosed foam-pour process known as foam-in-place (Watson & Woods, 2005) or seat inserts constructed with foam blocks affixed to a wooden base (foam-on-ply) shaped into the desired seating shape. Complex wheelchair-seating prescription and manufacture became a specialised area of rehabilitation (Cooper), and was controlled by the specialised seating service sector. As specialised seating need expanded, the manner by which seating service was delivered evolved to meet consumer need.
**Seating and wheelchair technology go modular.**

The demand for adjustable seating system that adapt for consumer needs, saw the introduction of modular seating systems. Adaptable modular seating system were designed originally for a paediatric cohort in the mid-1970s and this changed the concept of wheelchair-seating prescription (Trefler & Taylor, 1991). American physiotherapist Nancy Mulholland developed the Mulholland adjustable seating system, with on-board adjustable components, capable of changing to address tonal difficulties experienced by children living with cerebral palsy (Cooper, 1998). The adjustable Mulholland system provided flexibility to fit a child’s individual postural needs while accommodating for growth and postural change. Thus a modular revolution in wheelchair and seating technology was generated. The next to appear was the Adaptive Seating for the E&J wheelchair (Watson & Woods, 2005a) and was followed by a greater array of adjustable, modular seating system options.

Modular seating system technology also generated a revolution in specialised wheelchair procurement. As noted the benefit of adaptable seating systems, was its ability to accommodate for children’s growth and adult's postural changes (Cooper, 1998). As such, their inherent adjustability (on-board adjustable components) reduced the need to make a new bespoke seating system to accommodate paediatric growth, which previously had been necessary, often on a yearly basis. Modular seating technology changed the way wheelchair and seating technology was provided for all ages (Cooper).

By 1970, an estimated 550 wheeled mobility products (scooters and wheelchairs) were available, providing Americans with considerable commercial choice (Hoenig, Giacobbi, & Levy, 2007). The availability of ready-made seating products and adjustable
wheelchair frames changed how wheelchairs and seating systems were configured (Hoenig et al.; Trefler & Taylor, 1991). The availability of off-the-shelf, modular seating systems and adjustable wheelchair technology attracted many users, and reduced reliance on custom-made wheelchairs and specially constructed seating systems (Trefler & Taylor). Seating services evolved in response: community-based and mobile services evolved to provide specialist services in people’s homes, away from the structured clinic-based seating services (Cooper, 1998; Olson & DeRuyter, 2002). As described by Cooper (1998), the community-based and a mobile service added an extra service scope to traditional multi-disciplinary clinic-based service. These two services evolved in America in response to consumer demand seeking modular solutions. A mobile service delivery system was ‘a self-contained workshop and assessment unit’ (Cooper, p. 360), staffed by a smaller multi-skilled trans-disciplinary team that delivered their service into community centres, beyond the traditional clinic-based service reach. The community-based seating service as described by Cooper, was a small mobile expert team capable of delivering modular technology solutions and expert technical support to regional locations. Service access to one of these three service types was dependant on the consumer's location, the type of wheelchair technology and seating system required.

As with any expansion of service delivery, there were positive and negative aspects raised by the changes in seating service delivery. The positive was in delivering responsive community-based and mobile service that enabled timely provision of modular wheelchair and seating technology. Again, smaller mobile services allowed some service team members to provide both seating consultations and technology distribution, as such concern of technology bias was raised (Cooper, 1998). Additional concern was raised regarding
maintaining quality control measures and evaluating service efficiency as service delivery changed. Numerous smaller, multi-skilled community and mobile services operated differently and evaluated their wheelchair procurement and service delivery outcomes variously. This changed quality assurance practices, when compared to the standards of rehabilitation and engineering departments, operating a structured clinic-based service model.

Studies in Britain and America into wheelchair satisfaction and service effectiveness show some reoccurring common themes in providing appropriate wheelchairs (Datta & Ariyaratnam, 1996; Karmarker, 2009; Karmarker, Collins, Kelleher, & Cooper, 2009; Suzuki & Lockette, 2000; White & Lemmer, 1998). The commonalities: regimented wheelchair protocols, access to adequate funding, competent prescription, and the practice of ‘one-size-fits-all’ (the provision of standard or ‘depot’ wheelchairs) all impacted on the service efficiency when matching appropriate wheelchair and seating technology with personal mobility and postural needs. Wheelchair ‘appropriateness’ describes the degree of fit in adapting the technology for consumers’ personal needs that actually enhances occupational performance in desired roles and environments.

International Classification of Functioning, Health and Disability

The growth in complex wheelchair and seating technology and the acknowledgement of its servicing as a rehabilitation specialisation coincided with changes in describing health. In 2001 the World Health Organization (WHO) endorsed an updated International Classification of Functioning, Health and Disability (ICF) framework to express a person’s health within a social construct rather than as a medical disability. The ICF framework expresses health and disability in terms of a person’s functional capability and capacity to
engage within their psychosocial-occupational-physical environments (Üstün, 2002). The ICF framework also acknowledges the health of people living with disabilities are more vulnerable to physical and psychosocial environments (Rimmer, 2006). Informed by the ICF framework, people with a mobility disability are enabled by wheeled mobility technology, when multiple environmental and personal factors are considered within their wheelchair use (see Figure 2). In the ICF framework, environmental factors are considered more broadly - than just the built and natural environment - encapsulating as well the cultural, social, societal and economic environments in which the consumer resides. In addition to the above factors, both the ICF and the Matching Person and Technology (Figure 1) frameworks identify access to funding as a significant contextual factor to appropriate technology and service access. Access to adequate funding is identified as a contributing factor to appropriate technology (Barbara & Curtin, 2008; Scherer, 2005) and in the appropriateness of wheelchair procurement (Arledge et al., 2011; Batavia, 2010; Eggers et al., 2009; Gowran, 2013; Gowran, McKay, O’Regan, et al., 2011; Mortenson & Miller, 2008; Plummer, 2010; White & Lemmer, 1998; World Health Organization, 2008).

Also noted within the contextual factors are the personal factors identified in the ICF framework (see Figure 2). These include the consumer’s capacity and their motivation within their occupational and social roles, as well as their carer support network; these are the same factors that inform the multi-dimensional MPT framework (Scherer, 2002a, 2002b, 2004).
Figure 2 Applying the ICF framework to wheelchair-seating procurement

The contextual factors identified in the ICF framework align with the secondary (psychosocial environmental) factors acknowledged in the Scherer’s MPT framework. These secondary factors, help describe the milieu in which a wheelchair is used (2004), including the support services (provision, care and funding access) to facilitate the performance of a person living with a mobility disability (Brubaker, 1986; Rigby, Ryan & Campbell, 2009). The assistive technology milieu supports a holistic construct of health and assistive technology (Scherer). According to contextual factors, identified by Scherer factors, as the impact on the ‘fit’ or match of assistive technology (and its possible
abandonment) within the personal milieu of the wheelchair occupant. In accord with Scherer, Mortenson and Miller (2008) noted an appropriate wheelchair procurement is influenced by environmental factors, including access to technology and service provision, as well as consumer and clinician experience. Eggers and colleagues (2009; p. 1033) refer to other consumer factors including: ‘client priorities and objectives’, client participation and decision making capacity. These are elaborated later in this chapter.

Employing Scherer’s MPT framework, social scientists Sapey, Stewart, and Donaldson (2004) investigated the social implications of increased wheelchair use in England and Wales. Their findings suggest that societal acceptance of disability altered the procurement behaviours of service providers. Thus, the milieu surrounding wheelchair acceptance and selection helps to support and build greater service capability. Responsive service alters its service delivery according to community need (e.g. community services) and the wheelchair is perceived as addressing consumer sense of self and role identification (Cooper, 1998). Sapey et al. findings show service evaluation is measured by service provision and behaviours as well as consumer’s satisfaction with the wheelchair technology.

Early studies in Britain and America assessed seating services for wheelchair satisfaction and service effectiveness (Datta & Ariyaratnam, 1996; Suzuki & Lockette, 2000; White & Lemmer, 1998). Regimented wheelchair protocols are found to limit funding access and the practice of ‘one-size-fits-all’ reduces the appropriateness of the wheelchair match for actual consumer need (Mortenson & Miller, 2008; White, 2003).

Australian occupational therapists Waldron and Layton (2008) appropriated the ‘Odor’s concepts of term hard and soft technologies’ (p. 61) to define the activities and
roles of those who used and supplied assistive technology. Hard technology (e.g. wheelchairs/seating/electronics) is considered ineffectual without the support services (soft technology) such as carer support, service expertise and education. Scherer’s MPT framework assists validate the distinction between hard and soft technology; and to prioritise matching the person and the technology. Similarly, Routhier et al. (2003) propose a conceptual framework of wheelchair mobility that encapsulates the consumer’s user profile, their physical and social environment within the context of the consumer’s occupations, activities and roles. This conceptual framework considers the impact of the hard wheelchair and seating technology with the soft technology (such as: service provision, assessment and training) in achieving optimal wheelchair mobility to enhance the consumer’s occupational and social participation.

A high-quality wheelchair prescription accounts for both hard and soft technology in the consumer’s milieu (Federici & Scherer, 2012; Mortenson et al., 2012; Plummer, Ito & Ludwig, 2013). Poor wheelchair outcomes lead to consumer dissatisfaction or worse, wheelchair abandonment (Kittel, Di Marco, & Stewart, 2002). While abandonment is rarely optional for those reliant on wheelchair mobility (Barker, Reid, & Cott, 2004), overlapping elements shape wheelchair acceptance, use and rejection or abandonment (Hocking, 1999) and is linked to personal motivation and meaning, or self-identity (Hocking, 2008). Hocking advises that as assistive technology is symbolic of consumers’ disability status, as in social acceptance or stigma, an insightful prescription approach is indicated. An insightful prescription approach includes intentionally matching of technology holistically with personal needs and lifestyles to avoid wheelchair abandonment (Batavia, 2010). This
aligns with the milieu of assistive technology acceptance (Federici & Scherer, 2012; Scherer, 2002b) in matching appropriate wheelchair technology and personal goals.

Wheelchair appropriateness matches personal lifestyle, physical capacity and lived experience (Kittel et al., 2002), within a psychosocial context (Parette, Huer, & Scherer, 2005) and the physical and politico-economic environment (Layton & Walker, 2012; Sapey et al., 2004). Within this milieu, prescriber competence is a consideration (Batavia et al., 2001; Eggers et al., 2009; Plummer et al., 2013).

**Technology Innovation Expands Seating Service Delivery**

Maintaining service quality and prescriber competence are challenged as the use and range of modular technology increases. Coincidentally, as the application of modular technology increases, the multi-disciplinary support provided by larger clinic-based seating service decreases. Modular technology allows a less formal delivery formats (not in a clinic), where seating service occurs on a display floor or in a person’s home. This offers the consumer greater control over selection and the smaller community-based services and mobile seating services extend service reach (Cooper, 1998). The challenge to wheelchair-seating procurement however is sustaining clinical assessment and prescription competency administered by remote providers delivering service in remote locations.

Providing outreach services to regional America and Canada was trialled using tele-health service delivery (tele-rehabilitation). Barlow, Liu and Sekulic (2009) conducted a study of the services provided to regional Canadians, comparing participation in wheelchair-seating assessment and prescription services delivered by tele-rehabilitation (N=10) with the same services delivered face to face (N=20) by four remotely located clinic-based services using a person-centred approach. Participants were equally satisfied
by both services, however of interest is the tele-rehabilitation assessment took half the time of the clinic-based assessment. The advantage of receiving professional services via tele-rehabilitation means consumers who had difficulty travelling receive professional assessment; but vendor follow-up in wheelchair provision remains logistically difficult given the Canadian winter weather and the long travelling distances.

Accessibility to professional seating assessment via tele-health services was also supported by an American study (Schein, Schmeler, Saptono, & Brienza, 2010). Forty-eight participants received a tele-rehabilitation service facilitated by a locally based clinician located approximately 100 miles from the host service, the Center for Assistive Technology (CAT). A pre- and post-evaluation and prescription survey method captured participants’ satisfaction with service delivery, tele-rehabilitation experience, and savings in travel expense and reduced disruption to work. The data show a statistically significant improvement in both pre- and post-evaluation and prescription satisfaction rates. Providing regional specialist services is relevant within the Australian context, where accessing regional communities require extensive travel (Middleton et al., 2008).

**An Australasian Seating Service History**

Australasian seating services commenced in the mid-1960s, initially as traditional metro-based clinic-based seating services. There is scant evidence of early wheelchair history in Australia, but evidence shows New Zealand had an early wheelchair industry.

**New Zealand as the Seating Service Trail Blazer**

response to a poliomyelitis epidemic in 1960s, a second wheelchair group, Betsone, began manufacturing the ‘chairmobile’ in Christchurch. By the 1970s, both Betsone and Thompson wheelchairs were being manufactured in Christchurch, and were exported to Australia (Whitcombe-Shingler). Over time, many smaller manufacturers of wheelchairs within the Australasian region have been absorbed into the multinational Invacare Corporation. In 2001, the New Zealand Disability Strategy created a disability policy that altered service provision to align with the social model of disability (Hickey, 2006).

In New Zealand today, complex wheelchair seating prescription is undertaken formally on medical referral by accredited ‘needs assessors’ (prescribing clinicians) credentialed under the Wheeled Mobility and Postural Management Competency Framework (Howard-Brown, 2010). This Framework recognises two levels of needs assessors, non-complex and complex, based on the prescriber’s clinical experience and the cost of the technology to be prescribed. Unlike Australia, the funding application is enacted after the wheelchair is fitted and issued by a specialised seating service, funded by Enable New Zealand: a comprehensive no-faults disability funded scheme. The complete wheelchair procurement process can take a few months (E. Gooder, personal communication, 14 March 2012) and is relatively less complex than current Australian wheelchair procurement.

**Australian Seating Service as Remembered**

As Australian wheelchair-seating history is sparse, the following historical synopsis has been compiled, by the author, from oral reflections of members of the peak body, the Australian Rehabilitation and Assistive Technology Association (ARATA). Grey literature
from historical in-house disability organisation newsletters provided additional background. The dates provided should be considered approximate.

It is probable the first Australian seating service commenced in the mid-1960s at The Spastic Centre in Sydney. Initially established by one family, the Sydney Spastic Centre disability service model spread throughout Australia. The Spastic Centre Newsletter of 1967 announced an ‘electric wheelchair appeal and [the] building of the first two hundred electronically controlled wheelchairs’ (The Spastic Centre, 2010, p.1); as part of an internal technical employment program. An evolved Cerebral Palsy seating service operates today as TASC (Technology Solutions for Computer Access, Seating and Communication) and continues to manufacture bespoke wheelchair-seating systems for complex needs.

The second oldest Australian seating service commenced in Adelaide, South Australia, around 1976–8 as part of the Crippled Children’s Association (Schmidt, 2012). Now rebadged as NovitaTech, it is predominately a rehabilitation engineering team customises mobility and seating solutions for South Australians living with disabilities (NovitaTech, 2009). In 1978, the Rehabilitation Engineering Clinic located in the Royal Perth Hospital, Western Australia, was perhaps the first hospital-based spinal seating service in Australia. Relocated and rebadged as the Rehab Technology Unit (RTU) (Schmidt) this service offers ‘disability technology services in the areas of pressure management, special seating, mobility (wheelchair provision and maintenance), and assistive devices for ADL, augmentative communications’ (Royal Perth Hospital, 2002).

In Sydney, hospital-based spinal seating services operated from Prince of Wales Hospital from about 1982–1984 and from the Assistive Technology & Seating (AT&S) at the Royal Rehabilitation Centre, Sydney. Each large metro-based spinal service in Australia
provides an in-patient spinal seating service as a clinic-based service and, for some, a mobile spinal service (Schmidt, 2012).

The Spastic Welfare League operated the first seating service in Brisbane, Queensland before 1979 (Schmidt, 2012). Rebadged as ETS Mobility and relocated off-site, it currently operates as a separate business entity under the Queensland Cerebral Palsy League. Also in 1979, a second Brisbane based seating service, initially for paediatrics, commenced at the Royal Brisbane Women’s Hospital (RBWH) (Schmidt). Currently the RBWH service customises wheelchairs, seating and controls for all ages using ‘engineering principles and skills and knowledge of health science to create effective technology solutions to assist people with disabilities’ (Royal Brisbane Women’s Hospital, 2010).

Melbourne, the second largest Australian city, does not currently operate a specialised seating service, as defined by Cooper (1998). There was, in the mid-1980s a hospital clinic-based seating service operating in St Nicholas Hospital, Melbourne: it was transferred twice, due to closure first of its hospital base and then of its second residential host, Kew Cottages. After the Kew Cottages closure, the seating service was amalgamated into the Spastic Society of Victoria as TREC (Schmidt, 2012) until it ceased operation in the mid-2000s.

Early research in Australia studied spinal wheelchair procurement and seating service process. A study of three individual cases by Kittel, Di Marco and Stewart (2002) investigated wheelchair procurement following spinal injury. The findings show that accumulated experience as a wheelchair occupant positively impacts on the consumer’s decision-making capacity. The Kittel et al. case study identifies a notable increase in consumer engagement in selecting their second wheelchair when compared with their first
wheelchair selection. The consumer’s lived experience provides greater knowledge to enable and empower the consumer’s service interaction and their decision making control.

Di Marco, Russell and Masters (2003) investigated wheelchair-seating prescription protocols in spinal rehabilitation. A performance-monitoring tool was used to evaluate standards of wheelchair prescription practice for 128 inpatient recruits undergoing spinal rehabilitation in Australia. Informed by the study findings, Di Marco and colleagues designed flexible clinical guidelines for prescription that focussed consumer-centred prescription on individualised need. Of note, they proposed a post-provision three-month follow-up process as allowing adequate time for the wheelchair evaluation but less time to form entrenched behaviours too difficult to alter.

The above studies alludes to a consumer-centred approach to wheelchair selection and prescription as being linked to greater consumer satisfaction. Whitcombe-Shingler (2006) and Hickey (2006) advocate for consumer-directed control. At the time of their publications, they argued the existing system of government policies, in their New Zealand system, paid lip-service to the notion of consumer-centred servicing. In response they called for a release of system control, instead favouring greater consumer say in how services, funds and technology were delivered; they called this a client-directed approach. Client-directedness, however, requires a societal change in attitude to disability, and flexibility in how governmental support is provided. To enact client-directedness in service provision, Whitcombe-Shingler state, changes at the service level need to mirror prevailing social attitudes, as these tend to lead political changes. Governmental funding policies like service provision and wheelchair procurement, she states need to change and empower a consumer-directed service approach.
In line with a consumer-driven approach to disability servicing, the Australian government enacted the National Disability Insurance Scheme Act 2013. This national approach to disability support services proposes an equitable, consumer-driven approach to service access for Australians living with a complex disability. It proposes a consumer-driven funded environment where consumers have greater control of and choice in the selection of services and resources. Consumer control in their wheelchair procurement and choice in selecting wheelchair-seating technology, seating services and providers.

**Acquiring Clinical Reasoning and Seating Skills**

Two studies undertaken by Schmidt (2006) and Williams and de Jonge (2010) exposed the clinical reasoning and seating practices employed by Australian clinicians. In a small qualitative scoping study, Schmidt interviewed six Melbourne seating experts, occupational and physiotherapists with an average 14 years seating experience, to investigate their clinical reasoning processes. The data reveals that in the absence of formal seating education program, early career exposure within nurturing seating teams, timely supervision, quality networking and lifelong learning are key factors in the participants’ acquisition of expert clinical reasoning. By comparison, an online survey study undertaken by Williams and de Jonge surveyed 97 predominately Queensland-based occupational therapists, of whom 43% had less than 10 years of clinical experience. The study shows time-poor therapists are over-reliant on experiential skill acquisition, they predominately learn on-the-job from their more experienced peers. Their findings show self-reported poor evidence-based practice as being linked to busy caseloads and lack of time for reflective practice. The study shows professional development by these primary therapists was
developed through spasmodic workshop attendance, self-directed learning and occasional engagement in evidence-based project work.

Addressing the clinical practice gap, a more recent Australian government-sponsored study by Poulos et al. (2012) investigated static and mobility seating and postural practices for older Australians with dementia living in residential care. The study identifies a lack of exposure to seating expertise in this area, and as a consequence, residential staff lack an appreciation of the benefits of competent seating-postural practices or the merit of mobility and seating technology. To raise seating and mobility awareness within residential care, the Poulos team designed two clinical guidelines, one for care providers and practitioners and another for care facility management, designed to increase stakeholder awareness.

Investigating user characteristics, Edwards and McCluskey (2010) recruited 202 adult participants using either power chair or scooter technology, via convenience sampling; the median age of respondents was 77 years. A cross-sectional self-administered survey explored the participants’ experience with service provision and wheeled mobility use. The study show: the only 33% of the larger scooter user group had access to professional prescription services than their power chair users. The study also shows that while powered mobility enhanced independence and quality of life, environmental challenges resulted in consumer accidents. This is concerning as 11% of the participants required hospitalisation. These findings confirm those by occupational therapist Hardy (2004), who critiqued the available literature on powered mobility practice using an Occupational Performance Model (Australia) framework. Hardy’s findings show appropriately prescribed power chair technology enhances a consumer’s capacity to engage in meaningful life roles.
In Australia in general, clinic-based and community-based seating services are located in large Australian cities; not all offer a mobile seating service (Schmidt, 2012). The challenge lies in the provision of seating services to a geographically diverse population (Middleton et al., 2008).

**Rural Services and Access to Specialist Seating Knowledge**

Australia’s population is largely urbanised, with most centres set along a coastal fringe (Gething, 1997). There are, however, large regional, rural and remote areas of Australia where seating servicing is required and delivered.

Australian physiotherapist Struber (2004) identified 36% of prescribing clinicians working in regional and rural Australia worked as sole practitioners, 90% of these were female. Recognising the scope and complexity of the regional services they provided, Mills and Millsteed called these regional and rural therapists ‘more generalist than specialist’ (2002, p. 254). This highlights that regional and rural Australians have less access to specialist services (Stagnitti, 2008), so their local primary therapists provide a broad range of services, including wheelchair technology and seating services.

The need to travel means regional and rural consumers seek specialist services in a measured way. Wheelchair appointments are carefully scheduled according to life–work commitments, and this may delay access to after-sale service for timely maintenance and repairs (Elliot-Schmidt & Strong, 1997). Wheelchair breakdowns ‘can cause major life disruptions, sometimes with devastating financial and emotional implications’ (Batavia et al., 2001, p. 549). Timely access to competent wheelchair services is an essential service long after initial wheelchair provision (Sprigle & De l'aune, 2013; Sprigle, Lenker & Searcy, 2012).
The mobile seating service provision bridges the metro–regional divide. Delivering specialist services to the consumer’s local environment allows the service team to contextualise the consumer’s wheelchair use and provides an educational opportunity for regional practitioners, in providing specific practical skills and knowledge exchange normally inaccessible (Middleton et al., 2008; Mills & Millsteed, 2002). Lack of resources, extensive travel distances and varied caseloads are common in regional and rural therapy practice (Elliott-Schmidt & Strong, 1995; Schein et al.). Accessing metro-based specialised health and disability related services and professional educational events are difficult for regional and rural clinicians (Elliott-Schmidt & Strong; Middleton et al.). Travel and accommodation expenses are exacerbated by the lack of relief workers to cover service time taken away from heavy caseloads (Millsteed, 2000). Regional prescribing clinicians, often working as sole therapists (Struber, 2004; Millsteed), rely on their networks for professional support (Stagnitti, 2008). Maintaining professional competence and confidence in the seating assessment and prescription process requires proactive life-long learning to stay current (Sheppard & Mackintosh, 1998; Thomas & Penman, 2005) and this applies to currency in wheelchair and seating technology, best-practice knowledge and skills (Schmidt, 2006).

Two studies have addressed the provision of direct service to rural and remote Australia. An early Australian pilot study by a Queensland Spinal Outreach team demonstrated the Goals Attainment Scale as an effective consumer-centred outcome measure, by assisting stakeholders in ‘communication, decision-making and prioritisation’ (Cox & Amsters, 2002, p. 259). A study undertaken in 2000 and 2005 by Middleton et al. (2008) explored the issues and challenges of delivering spinal services to regional New
South Wales. The study implemented a needs analysis to identify existing spinal expertise and services, exposing the target groups and identifying the educational requirements of the clinicians working in the regions. As a result, a service-needs baseline was established and a spinal network model was implemented to support direct client intervention and educate locally based service providers.

The Funding System for Wheelchair Technology in Australia

At the time of this study (2010–2014) there were two main disability funding streams for wheelchair procurement in Australia. Dominant funding for disability support and technology was supplied by governments at federal and state level; the term ‘non-compensable’ will be used to identify this type of funding. These operate independent state-funded disability programs to fund care support and assistive technology for non-compensable consumers living in the community. Each operates to a different eligibility criteria, some are means tested, and all are non-transferable (Cook et al, 2008). The other major system consists of a range of private insurance-type schemes that remunerate services and technology on behalf of their members following traffic or work-related trauma (Cook et al.). The term ‘compensable’ is used for this type of funding. In some states where a wheelchair system may be partially financed, top-up funding may be sought from one of a hundred charity grants or philanthropic trusts (Summers, 2011). Veterans living with a disability are supported under a separate federally funded program (Cook et al.). The consumers who do not fit into these funding categories or who lived in a care facility are forced to self-fund their wheelchair procurements. The Australian disability funding environment is notably inequitable, described as ‘underfunded, unfair, fragmented
and inefficient, and [giving] people with disability little choice and no certainty of access to appropriate supports’ (Productivity Commission, 2011, p. 2).

During the course of this study a political shift in the thinking about disability-related support funding was underway: called National Disability Insurance Scheme (NDIS). This new system was mooted to transform the fragmented, underfunded and inequitable disability funding systems (Productivity Commission, 2011) to enhance personal control and choice for Australians with complex needs through self-directed funding packages. During 2011–12 there was great media excitement about this, but very little detail and no certainty of how the program could or would be funded in the then tight economic climate. This changed in March 2013 when the Senate passed the NDIS Bill-2013 approving a national disability support program based on an insurance business model funded by a federal tax-based levy. The National Disability Insurance Scheme was launched in five test sites across Australia (in 2013) after data collection for this study had ceased. Therefore data collection occurred during the fragmented funding system, as described by the Australian Productivity Commission.

The Primary Stakeholders in Wheelchair and Seating Procurement

The international literature shows the primary stakeholders in wheelchair and seating procurement are the service recipients: the consumers, their care providers or carers; and service providers: the clinicians, and the vendors (Eggers et al., 2009; Arledge et al., 2011). Consumers and care providers appraise wheelchair outcomes from different perspectives (Smith, McCreadie, & Unsworth, 1995), and each had different outcome measures to their service providers (McDonald, Surtees, & Wirz, 2007). McDonald et al. compared the opinions (by questionnaire) of the parents and prescribing clinicians of children receiving
specialised wheelchair and seating technology. The parents’ feedback show they focus on
the personal fit of the wheelchair-seating system with their lifestyle, while the clinicians
focus on supporting the body function and postural structure of the child seated in the
wheelchair.

The consumer as wheelchair occupant.

In this study the term consumer describes the wheelchair occupant. The literature
shows consumer satisfaction is measured by improved consumer function, activity and
increased independence (Mills et al., 2002; White & Lemmer, 1998), enhanced consumer
occupational performance (Mortenson, Miller & Auger, 2008), greater socialisation and
community participation (Chan & Chan, 2007) and the perception of improvement in the
consumer’s quality of life (Chan & Chan, 2007; Davies et al., 2003; Scherer, 1996). Chaves
and colleagues (2004) state that body functionality and changes to activity are measured
routinely as factors in seating service satisfaction, while Mortenson, Miller, & Miller-
Pogar, (2007) note less attention is paid to whether the seating service meets the
consumer’s goals.

A case study within a larger qualitative study by White and Lemmer (1998) explored
the culture of the seating service experience of nineteen young seating service consumers
who required supportive seating to access their community. Data were gathered from
participant observations during seating clinics and in community venues. An interview
protocol was developed from the participants’ feedback. The protocol, designed in
collaboration with both participants and researchers, helped prioritise the provision of
seating service as expressed by clinicians, carers and consumers. The dominant need for
‘adequate postural support’ (p. 303) dominated need for all groups and this took priority over ‘mobility needs’ (p. 303).

Measuring the ‘success’ of wheelchair provision challenges service providers and frustrates their consumers. Kittel et al.’s (2002) case study, a study by Mortenson and Miller (2008) and the critical appraisal of outcome measures by Kenny and Gowran (2014), found that a high-quality wheelchair procurement process is informed by the consumer’s own experience. Consumer–clinician interaction is more efficient when the consumer knows what is important for them as the wheelchair occupant. Experience and knowledge are employed by the consumer to interact productively with clinicians and vendors to achieve an effective wheelchair and seating outcome (Kittel et al.; Mortenson & Miller).

A qualitative study by Evans (2000) collected consumers’ views of how their occupational lives were affected by powered mobility. All eight British participants indicated their occupational lives were transformed by using power chairs in their community. These participants indicated powered mobility enabled greater control of and choice in participating in meaningful occupations and roles to extend their life experiences. An increased social participation results in improved self-esteem and wellbeing. These findings are consistent with those of Hardy (2004), whose critique of the literature found the powered chair was a human performance enabler and by Gowran (2012) who states wheelchair technology is a basic human right for enabling human mobility.

**Consumer focus: person-centred seating service approach.**

A Swedish study by Samuelsson, Larsson, Thyberg and Gerdle (2001) confirms a successful matching of wheelchair and person is best approached using a client-centred or person-centred service. A person-centred approach reduces consumer dissatisfaction in
wheelchair procurement (Eggers et al., 2009; Kenny & Gowran, 2014; Pimental, 2008; Samuelsson & Wressle, 2008; White & Lemmer, 1998).

The person-centred service approach (Parker, 2011), a derivative of Carl Roger’s client-centred approach (Law, Baptiste, & Mills, 1995) has become synonymous with appropriateness of wheelchair and seating provision. A person-centred service attends closely to the person’s ‘preferences, needs and values’ (Dolan, 2013, p. 364) and is based on the agreed personal goals of the consumer. A collaborative person-centred approach to wheelchair prescription empowers the consumer's contribution, through education and informed decision making (Mortenson & Miller, 2008; Plummer, 2010).

Aligned to the person-centred approach, physiotherapist Batavia (2010) specifically advises an intentional approach to wheelchair-seating prescription, which prioritises goals based on the complex mobility needs from the consumer’s perspective. Batavia advocates a person-centred approach to intentionally select sophisticated technology solutions in anticipation of future person–environment–technology demands. Prescribing sophisticated wheelchair technology early, as recommended by Batavia, aims to forestall injuries that may occur in the consumer’s interface with technology. An example provided by Hardy (2004) is the early provision of power mobility to avoid the shoulder pain associated with prolonged self-propulsion of a manual wheelchair.

Hindrances to providing consumers with an appropriate wheelchair according to individual needs is noted in the literature. These included: inadequate funding (Batavia, 2010; Suzuki & Lockette, 2000; White & Lemmer, 1998), unhelpful funding protocols, and limited access to wheelchair technology and competent seating services (Pimental, 2008; Eggers et al., 2009). Subjugating consumer needs to external systems or protocols is
viewed as a major extrinsic factor that results in the consumer being provided with less appropriate wheelchair (Barbara & Curtin, 2008; Duffield, 2013; Gowran et al., 2011; Plummer et al., 2013). Matching the consumer needs with appropriate wheelchair technology results in a positive impact to the consumer’s life role, wellbeing and health status (Chan & Chan, 2007; Hardy, 2004; Mortenson & Miller, 2008; Scherer, 2005).

**The care provider’s role and expectations.**

The care providers’ role in supporting assistive technology is recognised as an important factor (Demers, et al. 2009; Waldron & Layton, 2008) and this resonates with safe wheelchair use (Mortenson et al. 2006; 2012). Care-giving roles and carer occupations lead to the carer’s expectations of the consumer-wheelchair outcome differing from those of the consumers they supported (Datta & Ariyaratnam, 1996; Smith et al., 1995). Smith et al. studied the expectations of British consumers and their care providers from three seating services to develop an audit tool for wheelchair services. Fifty wheelchair users with various health conditions and their care providers were interviewed to determine their ‘dimensions of satisfaction and expectation, the intended use of the wheelchair and the users’ and carers’ preference’ (1995, p. 75). The study highlights that consumers and their care providers come to a seating service with pre-conceived expectations of wheelchair and seating technology. While consumers focused on the quality of seating fit-and-comfort, for the carers the wheelchair needed to be portable and easy to move so they could socialise with their consumer in the community. Similar findings by Datta and Ariyaratnam (1996) show parents value their child’s wheelchair’s transportability and its compatibility within their family lifestyle. A similar outcome was noted by McDonald et al. (2007), who surveyed British parents of children. The parents stated the efficiency of the child
The impact of wheelchair technology on the care provider’s role.

Exploring the care provider’s contribution, Demers and colleagues (2009) undertook a four-part study to understand care providers’ relationship with assistive technology. Four factors were identified that related to the assistance required: as a primary stressor and the care-giving overload: the secondary stressor. The study shows both stressors are influenced by the use and type of assistive technology, as a moderating factor, and by the carer’s personal resourcefulness, as a mediating factor. How well the stressors and factors are balanced, impacted negatively or positively on the care provider’s role and quality of life.

Carer interface with wheelchair technology is relevant to wheelchair use and care-giving activities. Reduction in the carer’s burden may be measured by a reduction in carer activity and associated fatigue (Mortenson et al., 2012). The appropriateness of the consumer–wheelchair match enhances the consumer’s performance, resulting in a lessening of input required by the care provider. The carer’s quality of life is linked to the reduced requirement for, and the actual input of their carer–wheelchair interaction.

A systematic literature review by Mortenson and colleagues (2012) investigated the evidence pertaining to the impact of assistive technology upon care provision in eight relevant studies. Powered mobility and home modifications that increase the consumer’s
functional independence at home and in the community positively impact on carer provision. Powered mobility however, as a moderating factor, reduces the care-giving burden only if they were confident its use is safe (Mortenson et al.).

The prescribing clinician as wheelchair prescriber.

Australian Di Marco and colleagues acknowledge matching appropriate wheelchair technology with the consumer’s needs represents ‘a challenge to therapists involved in wheelchair prescription’ (2003, p. 38). The process of prescribing specialised wheelchair-seating technology is complex (Eggers et al., 2009; Kittel et al., 2002; Plummer, 2010; White & Lemmer, 1998). Complex wheelchair-seating prescription requires competent, confidence and knowledgeable needs assessors: i.e. the prescribing clinicians (Batavia et al., 2001). Prescription expertise requires competence acquired through clinical experience (Plummer, 2010; Plummer, Ito & Ludwig, 2013). A recent Participatory Action Research study undertaken by Plummer identifies the importance of the professional competency of the prescriber in specialised wheelchair-seating prescription. Plummer’s data expose competent seating skill should blend a person-centred approach to informed seating assessment, and advocates for a consumer-driven approach to wheelchair selection. As wheelchair use is acknowledged as enabling social inclusion (Watson & Wood, 2005), a person-centred service approach endorses matching the consumer’s lifestyle with appropriate wheelchair technology (Mortenson & Miller, 2008; Samuelsson et al., 2001; Scherer, 2005). The person-centred approach to seating service and wheelchair procurement is however challenged by limited access to competent seating expertise (Plummer).
A study by White and Lemmer (1998) raised issues regarding the need for ongoing training for the occupational therapists and physiotherapists, as wheelchair prescribers, to ensure the competence of their knowledge and skills. A follow-up study by White (2003) to evaluate the impact of professional education showed that trained clinicians provide improved wheelchair prescription. From her study, White speculates that trained staff could provide a positive flow-on effect to seating service delivery.

**Prescription skills.**

Competent wheelchair assessment and prescription skills require ongoing clinical experience, accumulated knowledge, and an active capacity for lifelong learning (Isaacson, 2011; Plummer, 2010). Americans Cooper (1998) and Batavia (2010) provide comprehensive resources to the wheelchair-seating service sector. Cooper’s *Wheelchair Selection and Configuration* is written from a bio-mechanical engineering perspective, while physiotherapist Batavia wrote his *Wheelchair Evaluation* text comes from a clinical perspective. One other dedicated text, *Special Seating: An illustrated Guide* by American physiotherapist Zollars (1996; 2010) was, and is, a popular instructive clinical tool, used by Australian paediatric clinicians. Also prominent, the Australian *Seating and Positioning* instructional and interactive CD-ROM (Novak & Watson, 2005), written by and for clinicians working in complex mobility such as cerebral palsy, provides specific assessment techniques. An additional Australian tool written by and for spinal seating clinicians and professionals is the *Spinal Seating Professional Development Program* (State Spinal Cord Injury Service, 2009). *Spinal Seating Professional Development Program* provides eight on-line skill-based educational modules specifically addressing seating evaluation for spinal injury. The on-line format, universally accessible, is a masterstroke in creative
educational format and equitable access. Accessible educational format was recommended by White in 2003, and this format caters to busy clinicians and is accessible from all regions in Australia. Plummer (2010) supported alternate educational formats for both prescribing clinicians and consumers alike, stating wheelchair education empowers collaborative, respectful and informed decision making. The accrued knowledge and experience empowers the service provider and recipient's engagement in wheelchair procurement (Mortenson & Miller, 2008). More recently, Lukersmith (2011; 2012) published two prescription guidelines: the first for seated wheelchair and scooters, the second for sit-to stand wheelchairs (both funded by her state-run funding authority).

Complex seating assessment requires competent needs assessors (Plummer, 2010). In a two-part study informed by Delphi technique, Isaacson (2011) gathered opinions from a panel of 15 occupational and physiotherapy seating clinicians with an average of 18.4 years accumulated experience. This expert panel confirmed that clinical experience, competent skills and technology knowledge are important, but the need for ‘sensitivity to the consumer’s needs’ (p. 16) was identified as vital in wheelchair prescription. Isaacson’s findings are presented visually in the form of a wheel, with each spoke representing an essential concept: ‘experience, hands-on technique, skills, technology, resources, self-directed learning, follow-up and consumer relationships’ (p. 20). Using the metaphor of ‘The wheel’, Isaacson states missing any concept is equivalent to having a broken spoke. Therefore, missing any one concept deliriously impacts on the quality of the seating service provided. Access to appropriate wheelchair technology and a network of proficient vendor services offering hard and soft technology compliments the prescriber's competencies and are factors identified in Isaacson’s best practice wheel model. These findings confirm the
Plummer's doctoral study into wheelchair-sating prescription, in 2010, that endorses a person-centred team approach to specialised wheelchair procurement.

**The vendor and access to technology.**

The literature does not pay as much attention to the vendor’s contribution as it does to the prescribing clinicians’ seating service role. Batavia et al. (2001) state that wheelchair technicians must be competent in technology selection and configuration, and proficient in provision and fitting of the consumer, and aware of the environmental demands arising from the consumer’s wheelchair use. Batavia et al. advises inexperienced wheelchair technicians should collaborate with more experienced prescribing clinician role models. Research by Sprigle, Lenker and Searcy (2012) quantified the vendor’s contribution in providing complex technology solutions. Their time-motion study shows the vendor’s input increases relative to the complexity of the wheelchair-seating need. There is greater vendor input noted in frequency of pre-delivery and follow-up activities, while providing and fitting non-standard wheelchair-seating technology requires greater intervention time and frequency of service than standard technology.

In a follow-up study by Sprigle and De l’aune (2013), the technical time involved in the vendor’s provision of non-standard wheelchair technology was studied more closely. This study notes the vendor activities of pre-delivery, delivery and follow-up activities are more intense, for power chair and ultra-light manual wheelchair procurements. The study shows wheelchair type is a greater predictor of vendors’ service intensity than the consumer’s health condition.
Evaluating the Seating Service Experience

Measuring the success of a wheelchair-seating outcome commonly refers to measuring the seating service and the wheelchair system provided. A British study, by Datta and Ariyaratnam (1996) documented an audit of participation in a paediatric seating service over one year. Participant feedback showed parents and prescribing clinicians were satisfied with their service (79% worthwhile), even though only 30% of their children’s total mobility needs were met by technology supplied. White and Lemmer (1998) investigated the effectiveness of their British seating service in a four-part study using interviews, questionnaires, participant observation and case studies. A range of service participants including vendors, younger power chair consumers and older manual wheelchair consumers, were recruited. The study exposed a link between consumer satisfaction and their access to a therapy assessment. Seventy per cent of the younger power chair consumers preferred home-based wheelchair assessments because most lived in non-adapted housing. They also considered the clinic-based service was more suited for complex needs such as ‘complex switching’ or postural management services. This feedback highlights the availability of specialist seating servicing as appropriate for very complex seating needs.

Suzuki and Lockette (2000) carried out a survey evaluation of their year-old Hawaii seating service (N=41). With a survey response rate of 63%, participants indicated general service satisfaction with suggestions for service improvements: a need for more information about wheelchair costs from vendor services, timely post-provision follow-up, and better access to wheelchair servicing. These findings are consistent with those of Karmarkar et al. (2009) and Smith et al. (1995) who found care providers and seating
Clinicians want greater access to vendors for wheelchair provision, and for repair and scheduled maintenance. Timely access to technical services and adequate funding are critical to support the provision of and use of wheelchair and seating technology (Batavia, et al., 2001). The findings by Sprigle and colleagues (2012; 2013) also confirm ongoing access to after-sale vendor service provision as an essential wheelchair resource. Non-standard wheelchairs and power chairs require a funded maintenance regime for optimal technology performance (Cooper, 1998).

**Efficient Service Provision**

Efficient wheelchair provision is the timely and successful match of consumer needs with appropriate wheelchair and seating technology (Arledge, et al., 2011; Di Marco et al., 2003; Eggers et al., 2009; White & Lemmer, 1998). Di Marco et al. (2003) state that getting the match right requires skilled, knowledgeable service providers and competent prescribers. Post, van Asbeck, van Dijk and Schrijver (1997) align efficient service with the fitting of appropriate wheelchair and seating technology. A later study by Post et al. (2009) found a positive link with timely access to efficient and effective specialist services and a consumer’s positive adaptation following spinal injury. Plummer (2010) advises all stakeholders be educated early to enhance their service engagement.

Efficient service provision depends on the ‘competence, proficiency and experience of the professionals assisting the user’ (Cohen et al., 2009, p. 47). An efficient team approach clearly articulates their service goals to and for the consumer (White & Lemmer, 1998). Meeting the consumer’s goals is dependent on the consumer’s experience (Kittel et al., 2002), the prescribers’ experience and competence (Mortenson & Miller, 2008;
Plummer, 2010), and the availability of proficient vendor and specialist services (Arledge et al., 2011; Eggers et al., 2009).

Providing a quality seating service for complex mobility goals require flexible practice guidelines (Di Marco et al., 2003; Isaacson, 2011). The study findings by Plummer (2010) expose the lack of standardisation, consistency and best practice guidelines act as significant service limitations. The lack of service guidelines impacts negatively on the quality and appropriateness of the prescription and provision of wheelchair and seating technology. Plummer's research recommends clear consistent service guidelines to ensure competent wheelchair assessment and prescription processes for high-quality outcomes.

**Seating Service Pathway**

Early work by spinal specialist Ozer highlighted the clinical steps to wheelchair prescription as ‘identification of the problem/s’, ‘definition of the goals’, ‘measure of user participation’ and finally ‘review and revision’ (1996, pp. 31–34). These five procedural steps are in line with early medical model guidelines suitable for a clinic-based spinal service. At this time, consumers were assessed objectively and subjectively to evaluate their wheelchair performance according to their physical status and within their physical environment to determine necessary adjustments, post spinal injury. According Ozer, informed by a medical model the consumer’s fit to wheelchair technology was restricted to hospitalisation: that is, as rehabilitation recipient, learning to acquire wheelchair skill within the spinal rehabilitation.

As wheelchair technology improved aligned to societal acceptance these helped facilitate greater consumer engagement within the community. This required a wider view of the influence of environmental factors relevant for delivering better wheelchair
outcomes. Resulting in greater attention paid to physical and eco-social environmental factors that impeded or facilitated community participation using mobility assistive technology (Batavia, 2010; Cooper, 1998; Scherer, 2005). Understanding the psychosocial and physical environmental contexts in which consumer and wheelchair functions elevates the need for clear seating service pathways, beyond the confines of hospital care.

Physiotherapist Jean Minkel (2000) employed the Stien's Person–Device–Environment Model to evaluate the factors that affected wheelchair selection following spinal injury. The Person–Device–Environment Model emphasises the impact of the physical environmental on the consumer’s function, ability and community participation. This confirms Ozer's describers: technology effectiveness needs to measure the consumer's wheelchair efficiency in their desired environments. Minkel’s model evaluates the effectiveness of the consumer–wheelchair fit. That is, considering the consumer's physical impairment (e.g. following spinal injury) and their efficient functional ability using their wheelchair for effective participation with their community environment. Minkel provided an early seating service pathway.

The person–device–environment approach is developed further to include the consumer’s occupational capacity as an outcome measure. Routhier et al. (2003) employed a person–device–environment approach to construct a conceptual framework aimed at evaluating the effectiveness of a wheelchair outcome. They tested the wheelchair fit with the consumer’s capacity as gauged by their occupational performance and social participation. In this context, occupational performance describes effective wheeled mobility that enables the consumer's capacity to engage in purposeful activity and meaningful roles (Hardy, 2004; Kenny & Gowran, 2014; Mortenson & Miller, 2008).
Recent international activity in developing new guides for wheelchair procurement is noted. The World Health Organization (WHO) designed the *WHO Guide for the provision of manual wheelchairs in less resources settings* (2008) as a simple but comprehensive service guide for providing wheelchairs in less resourced setting. The WHO guides provides an educational tool in wheelchair procurement and informs necessary service provision. Five discrete descriptors are detailed: an introduction to manual wheelchairs, seating components and their uses; an overview of wheelchair and seating design and production; a pathway for pre- and post-delivery service delivery; training considerations for the service recipients and the providers and an overview of the international wheelchair-seating sector including policy and planning strategies for localised seating servicing implementation and wheelchair provision.

The American assistive technology peak body RESNA (Rehabilitation Engineering and Assistive Technology Society of North America) recently published *The RESNA Wheelchair Service Provision Guide* (Arledge et al., 2011) to list the procurement process components of wheelchair service provision as: ‘Referral, Assessment, Equipment Recommendation and Selection, Funding and Procurement, Product Preparation, Fitting, Training and Delivery, Follow-up Maintenance and Repair, and Outcome Measurement’ (p. 3). The RESNA guide details the specific service processes that are aligned with specialised wheelchair procurement. In Scotland, Dolan (2013) published *Clinical standards for wheelchair and seating* as a person-centred service approach under their National Health System (NHS). The Scottish NHS Quality Improvement Scotland (QIS), responsible for the development of the NHS QIS clinical standards, identifies the service components as: ‘referral and screening, assessment and review, prescription, design and provision,
equipment management, quality, effectiveness and service improvement’ (p. 367). The Scottish clinical standards for wheelchair and seating procurement provide a decision-making reference that concentrates on person-centred service outcomes, incorporating environmental factors such as equitable access to efficient service provision and service provision delivering time-efficient, safe, and effective outcomes.

The *Wheelchair Service Delivery Model* designed in America by Eggers et al. (2009) is the most illuminating. Designed from analysis of interview data collected from 10 wheelchair-seating experts and integrated with available literature on wheelchair procurement, the model defines a four-domain service process. These include: the ‘influential factors’ and ‘service components’ involved in ‘wheelchair appropriateness’ and quality ‘outcome’ (see Figure 3). The influential factors are further expanded to identify a web of complex decision-making factors that influence service delivery and successful consumer-wheelchair match: as varied as team culture, carer contribution and vendors’ motivations.

Of particular interest in the Eggers et al. model is the domain of influential factors applied by the North American healthcare system. The model recognises the influence of external systems such as service policies, industry standards and regulations, which overlap, merge and influence key stakeholders and their contributions. Key stakeholders in the Eggers et al. wheelchair service model are identified as the ‘supplier factors’ (vendors), ‘client factors’ (consumers and care providers), ‘provider factors’ (prescribing clinicians and engineers) and ‘payor factors’ (funding systems). Each stakeholder factor is expanded into its contributing elements. The consumer ‘client’s complexity of need’ describes consumer-related qualities: ‘functional’, health/safety, ‘environmental’ and condition of
chair’ (Eggers et al., 2009, p. 1033). To this complexity of need, the consumer’s qualities are added: ‘client decision-making capacity’, ‘client priorities and objectives’ and the consumer’s and care provider’s ‘participation’: ‘Clinician factors’ and ‘supplier factors’ describe service providers’ qualities as ‘expertise’, ‘drivers’ and ‘participation’; service provision factors include ‘team approach’, quality of assessment tools’ ‘available time’ and ‘facility standards/procedures’ (p. 1033).

The second domain described by Eggers et al. is of service components. The service components describe seven elements of wheelchair service delivery. Each is linked to the appropriateness of the wheelchair provided to the consumer. The third domain is wheelchair appropriateness (see Figure 3), and these three domains all lead to the final domain, wheelchair outcome. The outcome domain pertains to the delivery of an appropriate wheelchair that effectively facilitate safe mobility for enhanced quality of life for the consumer.

The Eggers et al. study recommends further investigation into factors that influence wheelchair service delivery, including: the location of service delivery, the role of service providers, the decision-making structure within the service, the expertise of the prescribing clinician as principal prescriber, the consumers’ lived experience as it pertains to their insight and perception of need, and the funding factors that complicate decision-making, service provision and wheelchair procurement (Eggers et al., 2009). The recommendations confirm the aim of this study.
Figure 3 Model of wheelchair service delivery (Eggers et al., 2009, p. 1033)
The pre-provision process of seating assessment and prescription, or ‘needs assessment’ (Eggers et al., 2009), is identified as crucial to an effective wheelchair outcome (Di Marco et al., 2003; Plummer, 2010; Plummer et al., 2013).

Seating assessment.

A competent assessment underpins the prescription and selection of the most appropriate wheelchair technology (Plummer, 2010; Plummer et al., 2013). A competent prescription relies on insightful seating assessment, in combination with a ‘sitting exam and a mat exam’ (Batavia, 2010, p. 63). The sitting exam assesses postural and sitting capacity against gravity, and the mat exam functional ability in lying with minimal gravitational effects. A seating assessment, known colloquially as the ‘mat evaluation’, evaluates the person’s ‘anthropometrics [body dimensions], postural alignment, active movements, sitting balance, muscle tone/reflexes, endurance, speed, strength, perception, cognitive status, passive range of motion, skin status and sensation’ (Batavia, 2010, p. 63). Herman and Lange (1999) note that the seating assessment becomes especially complex when combined with abnormal muscle tone or spasticity, such as those associated neuromuscular conditions (Dicianno et al., 2009; McDonald et al., 2007). Ozer (1996) advises a complex seating assessment requires confidence and skill and is best undertaken within a supportive seating clinic environment. Eggers et al. (2009) and Plummer (2010) confirm supportive teamwork develops competent seating assessment and prescription skills.

Factors that impact negatively on successful prescription and wheelchair selection identified in the literature include: inequitable access to funding, poor service provision, limited technology range (Dolan, 2013; Eggers et al., 2009; Plummer et al., 2013), poor prescriber competence, poor technology fit or design (Di Marco et al., 2003; Routhier et al.,
2003; White & Lemmer, 1998), and consumer inexperience (Batavia et al., 2001; Kittel et al., 2002). Carlson (2010) warns clinicians of a short sighted prescription practice, for example one dictated by funding guidelines that restrict technology provision, was ill advised as the outcome often leads to consumer dissatisfaction.

Funding is a constant factor in the procurement of wheelchair-seating solutions, especially when non-standard, expensive, complex technology is required to satisfy complex needs (White & Lemmer, 1998; Di Marco et al., 2003; Duffield, 2013; Plummer, 2010; Scherer, 2005). Plummer, Ito and Ludwig state ‘research consistently identifies funding as a major barrier in obtaining AT devices’ (p. 2) and they link inadequate funding for wheelchair and seating technology to economic and societal oppression (2013). As wheelchair mobility is rarely a choice, an editorial by Gowran (2012) endorses wheelchair and seating technology act as a mobility enabler and therefore should be considered an essential consumer resource; a basic human right.

While funding access is an influential factor in unsatisfactory wheelchair-seating prescriptions, Batavia et al. (2001) warns that ‘many inadequate wheelchair prescriptions occur, not because of lack of specialisation of the providers, but ironically, because of the failure of the providers to think be generalists’ (p. 544). The term ‘generalists’ in this context indicates a holistic approach to specialised wheelchair procurement. Batavia and colleagues advise seating teams to combine specialised team skills with a deep understanding of all the complexities of a consumer’s wheelchair use, within the consumer’s personal and environmental lifestyle, for an optimal outcome. To achieve this, they suggest a trans-disciplinary approach for pre- and post-wheelchair provision. They emphasise the value of intentional prescription, which requires the team to prescribe
wheelchair technology in anticipation of future personal needs, to avoid use related injury and to predict and meet lifestyle changes.

To ascertain the state of wheelchair-seating assessment practice and procurement, Plummer (2010) surveyed 115 purposively recruited participants (clinicians, vendors and consumers) predominantly from America. The study findings identify the importance of partnership in delivering a seating service, informed by a respectful person-centred approach that empowers consumers’ contributions.

Gowran and colleagues (2012) scrutinised current seating practice and wheelchair-seating provision in the Republic of Ireland. They argue that seating service sustainability should be linked to unified service guidelines that address a comprehensive service including wheelchair provision and production, education and training, emergency and service delivery, after-sale maintenance and repairs. This recommendations are consistent with the *WHO Guidelines on provision of manual wheelchair in less resources settings* (2008) and as such Gowran advocates for a global view to seating service: a ‘shared understanding among all stakeholders to take sustainable action is seen as essential, in order to promote a seamless system that does not jeopardise a person's survival and participation as an equal citizen’ (2013, p. 290). Communication among stakeholders is identified as vital to partnership equality, therefore Gowran et al. recommend a plain language approach to enable inclusive communication to understand the meaning of a wheelchair from the consumer’s perspective (Gowran, McCabe, Murphy, Murray & McGarry, 2012). Gowran’s editorial (2012) endorses the wheelchair as an intrinsic and extrinsic enabling technology. Aligned to enabling performance, Gowran and colleagues state appropriate wheelchair and seating technology is unique in its enhancement of basic consumer rights which, in the
context of a person living with mobility disability, not only enhances health, improves quality of movement, posture and mobility but acts as a personal liberator linked to freedom and survival (Gowran, McKay, O'Regan, Murray, Sund et al., 2011). The Gowran et al. stance on sustainable seating services aligns with previous literature that regards the wheelchair as ‘political tool ... to explore issues of access, control and the autonomy of disabled people’ (Parr, Watson & Woods, 2006, p.161). These authors support the notion an appropriate wheelchair is an extension of self (Batavia, 2010; Cooper, 1998; Gowran, McKay and O’Regan, 2012) that positively identifies and enhances self-esteem (Scherer, 2005).

**Evaluating wheelchair satisfaction.**

When the wheelchair has such personal meaning, measuring wheelchair satisfaction is not easy (Pearson, 2009). In evaluating wheelchair satisfaction, Demers Weiss- Lambrou, and Ska (2002) and Scherer (2005) advocate a ‘person-first’ approach to measuring satisfaction by consumer attitude; such as consumer perceptions, expectations and personal values. Weiss-Lambrou (2002) contends that satisfaction be considered a positive attitude aligned to gratification, as in, to give a meaningful judgement of the technology’s ‘value and impact’ (p. 79). This aligns to a notion where gratifying wheelchair provision enhances consumer wellbeing (Scherer, Craddock & Mackeogh, 2010). Measuring satisfaction, however, is difficult when based on one consumer’s opinions about specific values, needs and expectations. Evaluating the degree of personal comfort and discomfort is considered to align with a person-first approach: that is seating discomfort acts as a warning system or a pressure care alert that indicates that the fit of person and wheelchair is unsuccessful (Chan & Chan, 2007; Crane, Hobson, & Stadelmeier, 2010).
The Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST 2.0) is an outcome measure of satisfaction (Demers et al., 2002). The QUEST measures satisfaction from two domains: the satisfaction with the technology or application (device domain) and, the service/s supporting the use of the assistive technology (service domain). Three studies of interest using QUEST 2.0 have explored satisfaction with wheeled mobility use. The first, undertaken by Samuelsson & Wressle (2008), used a Swedish version of QUEST 2.0 to evaluate and compare the satisfaction levels of two consumer groups, one of which used a manual wheelchair and the other a wheeled walking frame (N=262). The manual wheelchair group indicated less satisfaction with ‘ease of use’, ‘effectiveness’, service ‘delivery’, and service ‘adjustment’ than the wheeled walker group. Samuelsson and Wressle suggest the device domain helps explain service differences for technologies, as the manual wheelchair group noted the importance of ‘service follow-up’ for ongoing wheelchair performance.

Criticism of the QUEST 2.0 as a measurement tool focuses on the absence of questions pertaining to consumer characteristics (age), living conditions, use of assistive technology, or its effect on activity and participation. Samuelsson and Wressle (2008) study supports the earlier findings of Samuelsson et al. (2001) that participants living with spinal injury rank seating ‘comfort’ important for functional manual wheelchair self-propulsion. Pearson (2009), however, advises that evaluating physical comfort as an outcome measure should be undertaken with caution as, the term ‘comfort’ has been used in the literature to refer to a spectrum of personal responses (i.e. comfort, discomfort and pain).

A second study by Chan and Chan (2007) administered a Chinese version of the QUEST 2.0 (C-QUEST) in combination with the ‘Participation Restriction’ and
Environment Factors of the ICF and the Hong Kong version of the WHO Quality of Life Questionnaire. The study investigated relationships between spinal injury and the wheelchair consumer’s ‘satisfaction, perceptions of their community participation and quality of life’ (p. 123). It included 33 participants living with spinal injury who used either light-weight manual wheelchairs or power chairs for community mobility. All lived with family or care providers. Findings show a moderate positive relationship between consumers’ satisfaction with wheelchair use and quality of life. Conversely, unsatisfactory seating systems impact greatly on consumers’ quality of life, especially in those consumers with higher spinal injury, who were heavily reliant on their wheeled mobility system to provide postural control and comfort. 'Having better social support' (p. 139) and being engaged in leisure activities were good indicator for enhanced quality of life.

The third study was undertaken by Karmarkar et al. (2009), using QUEST 2.0 to compare a cohort of older manual wheelchair users with a younger consumer group, many living with spinal injury. The older group lived in residential care where policy dictated they be issued with standard manual wheelchairs (depot: one type fits all). The younger participants lived in community dwellings and used ultra-light manual wheelchairs and power chairs. The ultra-light wheelchair consumers scored the greatest level of satisfaction in wheelchair service delivery. The power chair consumers indicated satisfaction with both their wheelchair-seating technology and their seating service; and the manual wheelchair consumers had the lowest levels of satisfaction in both wheelchair and seating services. The researchers argue that the poor scores in wheelchair satisfaction were related to the residential protocol that routinely issues basic manual wheelchairs regardless of an individual resident’s mobility need. The younger ultra-light wheelchair consumers were
more satisfied with wheelchair weight, manoeuvrability and comfort, while the less physically able residents were issued heavier depot wheelchairs.

These findings demonstrate the relationship between perceived levels of satisfaction with wheelchair use (device) and a poor prescription process (service). The QUEST device and service domains provide indicators that suggest changing service provision policies from one-size-fits-all or depot wheelchair policy to a person-centred approach based on consumer need and capacity (Batavia et al., 2001).

Di Marco et al. (2003) raise five possible reasons for unsuccessful prescription outcomes: lack of consumer involvement; lack of professional skill, competence and training of the prescribing team; changes in the consumer’s needs after technology was provided; poor technology performance; unsatisfactory design; and technology poorly matched to the consumers’ needs. Plummer (2010) recommends the wheelchair and the seating assessment should be undertaken by knowledgeable service providers, in collaboration with the consumer, family and relevant others. That is, to apply a person-centred approach to evaluate the consumer's need. Plummer advises a seating service approach should reflect a ‘systematic, standardized and consistent service approach’ (p.139).

**Evaluating the service experience.**

Harris and Sprigle (2008) state that the purpose of outcome measurement is to establish an outcome baseline of service delivery by determining, for instance, effectiveness (what works, how well, for which consumer) and efficiency (cost–value for resources expended). Measuring outcomes ascertains the effectiveness of the resources allocated. As noted by Lenker, Harris, Taugher, & Smith (2013), a consumer’s perceived
assistive technology outcomes are linked to the effectiveness of the technology, its cost, and the service that supports its procurement. Lenker and his team interviewed experienced assistive technology users using a focus group approach. The findings endorse the notion that person–technology success is related to technology effectiveness in increasing participation and associated wellbeing. Technology efficiency is related to cost-efficiencies in time and use. The Lenker participants were frustrated by the paperwork associated with funding applications and service inefficiencies that interrupted their productivity (Lenker et al., 2013).

Informed by the demand for evidence-based practice measurements, a number of specific wheelchair outcome measures have been designed using the ICF principles of body function, activity and participation. Person-centred wheelchair-specific outcome measures such as the Wheelchair Outcome Measure (WhOM) by Canadian Mortenson et al. (2007), measure wheelchair consumers with complex needs such as high-level quadriplegia and progressive disorders. Unlike The QUEST measurement of consumer’s satisfaction; WhOM quantifies the participation and activity of the consumer related to wheelchair use; it does not measure the consumer’s perceptions. WhOM provides a formal tool to measure consumer feedback according to person-centred goals, established in consultation with their service provider (Mortenson, Miller & Miller-Pogar).

The Functional Evaluation in Wheelchair (FEW) measure was designed by Mills and colleagues (2007) from Pittsburgh. FEW assesses the effectiveness of seating and mobility interventions based on functional performance (Mills et al., 2007). The FEW outcome measures a more physically capable wheelchair cohort, for example those who are capable of reaching and transferring in and out of their wheelchair.
A critical evaluation of five outcome measures was undertaken by Kenny and Gowran (2014). The wheelchair-specific WhOM and FEW tools, plus the Goal Attainment Scale (GAS), the QUEST and the Psychosocial Impact of Assistive Devices Scale (PIADs) were evaluated for their suitability in evaluating wheelchair-seating provision. They endorsed WhOM and GAS their person-centeredness, based on their provisions for mutual goal setting and collaborative decision-making.

The Decision-making Process

There are several levels of decision-making evident in wheelchair procurement. The first happens at the consumer-provider level, the second occurs during the selection of service and wheelchair technology and the third guides the seating service process.

The consumer-provider collaborative phase.

Seating assessment is an acknowledged complex, multi-variant process (Isaacson, 2011; Plummer, 2010). Research undertaken by Angelo, Bunning, Schmeler and Doster (1997) using focus group methodology identified best practice factors of assistive technology assessment in occupational therapy. These included employing a person-centred approach, that included all relevant stakeholders and to make evidence-based occupational therapy evaluations that included the funding parameters. Angelo. et al. findings are confirmed by a study by Plummer (2010) who used a participatory action research methodology. Plummer also identifies a person-centred seating assessment approach should be undertaken by a qualified seating team capable of a holistic assessment of the consumer’s performance capacity (including a mat evaluation) to make a collaborative wheelchair selection within the consumer's environmental parameters (e.g. physical, psycho-social, societal, funding and competent service factors). This finding endorses
Pimental (2008) recommendations for establishing person-centred goals, a comprehensive seating assessment establishes a consumer’s bio-psychosocial capacity within an environmental evaluation, including funding parameters (i.e. access to private and external funding).

To gather a comprehensive understanding of the consumer’s capacity and needs, Scherer (2002a) endorses a collaborative service approach involving the consumer and the seating team. Team collaboration provides a space to listen and hear the consumer’s expectations (Scherer, 2005) of what the mobility technology should achieve and to understand their lived-experience and technology expectations. Barclay (2002) identifies the importance of understanding the consumer’s expectations when setting realistic personal and mobility goals to ensure a successful outcome that satisfies. Setting realistic personal goals also requires educated, informed consumers who are better able to collaborate actively in the selection of their wheelchair (Kittel et al., 2002; Plummer, 2010; Scherer, 2005).

**Clinical reasoning skill.**

A recent Australian study was undertaken by Hogden, Greenfield, Nugus and Kiernan (2013) explored the decision-making role of family carers supporting consumers with amyotrophic lateral sclerosis (ALS). They found that effective, person-centred, collaborative decision-making required time and planning so stakeholders could access appropriate information and services, both specialised and non-specialised. A collaborative service approach facilitated inclusive the consumer and carer decision-making. While service providers were keen to proactively plan their service in anticipation of consumer need, the study found that such advance decision-making was often obstructed by
unexpected health issues (associated with ALS progression) that required a service reaction. A collaborative service structure empowers inclusive and proactive consumer and carer decision making, as noted by Plummer (2010).

Enabling collaborative decision-making, when managing complex health conditions, requires clinical competence: competent clinicians confident in their clinical reasoning skills. Complex seating assessment and wheelchair prescription requires competent clinical reasoning (Di Marco et al., 2003; Plummer 2010). Benner (1982) identifies five levels of nurse practitioner competence: ‘Novice, advanced beginner, competent, proficient and expert’ (p. 402). The top three levels of competence are based on a complex mix of the clinician’s personal attitude, reflection and philosophy over years of clinical practice to develop required skill, competence and proficiency. The least experienced, novice practitioner, according to Benner, have no experience in the clinical environment in which they are expected to perform and therefore require clinical practice and process structure to develop clinical reasoning skill. By comparison, those most experienced, the expert, perform intuitively without reliance on any ‘analytical principle’ (p. 405).

A comparative study comparing clinical reasoning of three inexperienced and three experienced Dutch physiotherapists (Embrey, Guthrie, White, & Dietz, 1996) explored their clinical decision-making process using a ‘retrospective think-aloud procedure’ (p. 20). Their findings show clinical experience combined with clinical reflection develops confident clinical reasoning. This degree of competence enables the clinician to adapt and respond proactively during therapy sessions. Embrey and colleagues study shows experienced clinicians rely on past experience, to form schemata, used to make rapid
decisions and are more psychosocially attuned to the stakeholder’s interactions: two qualities that result in positive service provision.

An Australian comparative study by Mitchell and Unsworth (2005) explored the clinical reasoning processes of community health occupational therapists. Five novice and five expert occupational therapists were recruited. Head-mounted video recordings collected the data by which the participants then described their clinical reasoning. The data analysis shows expert clinicians develop a clear, confident, interactive technique. Isaacson (2001) calls this level of interactive reasoning, developed through clinical experience, ‘reflection-in action’ (p. 17). The expert clinicians’ reflection-in action reasoning is fluid and relaxed. This was confirmed by findings by Australians Chaffey, Unsworth and Fossey (2010) whose research found expert clinicians are quick to frame the problem and use past schemata to make rapid tacit decisions. Isaacson states wheelchair and seating knowledge is key to accelerating clinical reasoning skill. Expert clinicians employ their considerable knowledge with creativity, skill, extensive networks and research capacity to circumvent barriers to wheelchair and seating procurement; such as time limitations, access to adequate funding or trial technology. Conversely, novice clinicians rely on clinical structure and process to guide their clinical reasoning (Unsworth, 2001). Both Benner (1992) and Unsworth note novice clinicians are more measured in their reasoning. Called ‘procedural reasoning’ (Unsworth, p. 171), this is develops through timely clinical support and service structure to grow competence and with that confident clinical reasoning.

**The selection phase.**

Batavia et al. (2001) highlights the importance of the consumer taking responsibility for their decision-making during the selection of the service provider/s and wheelchair
technology. Good choice making develops with accumulated experience and knowledge (Kittel et al., 2002; Mortenson & Miller, 2008). Bettman and Sujan (1987) state inexperienced consumers are poor at framing a problem, and therefore are less confident and able to make choices: they are be easily influenced. Kittel et al.’s study found that novice consumers were overwhelmed during the selection of their first wheelchair. However, with lived experience the same participants were better informed, more engaged when selecting their second wheelchair. They had greater capacity to engage their service providers in the decision-making process. Plummer (2010) states wheelchair consumers who are educated about wheelchair technology and its capacity are empowered to make informed decisions during wheelchair selection.

A qualitative study by Mortenson and Miller (2008) identifies five relevant factors that influence how decisions are made. Mortenson and Miller investigated the wheelchair procurement process from both the consumer’s and the prescribing clinician’s perspective (N=34). Five key themes identified from the interview data are: ‘who decides’; ‘expert experience’; ‘form versus function’; ‘fitting in’ and ‘(re)solutions’ (pp. 164–171).

The first theme of who decides identifies where decision-making control is located. Mortenson and Miller (2008) notes that it may be within the consumer’s control or be driven by the service provider. They note that larger teams dealing with complex needs are more prone to take over decision-making; noting where decision-making control lies during wheelchair procurement is relevant. This is endorsed by Eggers et al.’s (2009) model of wheelchair service delivery that shows there are multiple stakeholders and therefore multiple agendas associated with complex wheelchair-seating procurements.
The second theme identified by Mortenson and Miller (2008) is the importance of expert experience. This theme recognises the differing levels of experience and expertise of all stakeholders and their interplay with making decisions as a team. That means recognising that each stakeholder contributes particular knowledge and experience. Like Eggers and colleagues (2009), this theme acknowledges the degree of stakeholder experience and how their collective knowledge affects the procurement outcome. A proficient seating team balances the prescriber’s goals with the consumer’s goals for the best outcome. As previously noted, consumer experience is an essential skill in making informed wheelchair selections (Kittel et al., 2002). Of equal importance in a successful procurement process is the clinical experience, skill and competencies (Di Marco et al., 2003; Eggers et al., 2009; Plummer, 2010; White & Lemmer, 1999) and technical knowledge and skill (Arledge et al., 2011; Sprigle et al., 2012; Sprigle & De l’aune, 2013) of the service providers.

The third theme identified by Mortenson and Miller (2008) involves capturing and balancing conflicting stakeholder goals (i.e. form versus function). A proficient seating team manages and balances multiple stakeholder agendas. As the prescriber’s goals (e.g. consumer’s posture), the consumer’s goals (e.g. wheelchair aesthetics) and carer’s goals (e.g. wheelchair portability) may not be the same. This third theme links with the first theme: who decides? Understanding whose is in control of procurement decisions is essential when juggling multiple stakeholders’ agendas and often conflicting goals.

The fourth theme describes the influence of environmental factors in wheelchair procurement, including the consumers’ usual environments, the consumer’s coping capacity and the prescriber’s clinical stance and strategy in working within funding
protocols (Mortenson & Miller, 2008). This theme mirrors the Matching Person and Technology framework (Scherer 2004) that contextualises the application of technology in the consumer’s lifestyle. It also aligns with Eggers et al.’s (2009) wheelchair service delivery model that highlights the significance of service providers’ motivations, experiences and team culture in wheelchair procurement.

The final theme identified by Mortenson and Miller (2008) covers strategies used to resolve procurement issues. A person-centred approach is indicated as the most serviceable method of educating and working collaboratively with consumers in wheelchair trials. Collaborative person-centred services approach informs decision-making.

Person-centred seating assessment and wheelchair selection process has been discussed from a consumer's perspective, but person-centred service delivery has not. A person-centred approach to service provision is a strategy evident in the literature. Samuelsson et al. (2001), Sumson and Law (2006) and Plummer (2010) consider a person-centred approach to seating servicing provides an effective tool that enhances collaborative decision-making. They recognise the value two-way communication where all stakeholders’ needs are of value (Sumson & Law, 2006) and helps shift the decision-making power into the consumer’s domain (Samuelsson et al., 2001; Plummer, 2010). A person-centred approach focusses on the occupational roles that are important to the consumer (Law et al., 1995): that is central to the consumer’s personal goals.

As previously noted, person-centred selection of one’s own wheelchair and one’s choice of service provider are dominated by external factors often beyond consumers’ or service providers’ control (Eggers et al., 2009).
Wheelchair Procurement from a Social Justice Perspective

Recently, in Australia and internationally, the wheelchair discussion has moved from practice standards to consumer empowerment and social policy. The term social justice implies the fair distribution of human resources and opportunity so that all people may realise their potential within their own community.

In the current climate of community inclusion, Layton (2014) suggests the true integration of Australians living with disability requires political will and the formalising of equality policy to drive change. This conforms to the arguments of New Zealanders Hickey (2006) and Winchcombe (2008), who assert consumer-directedness requires societal support for policy change. Plummer's study expose funding as the most agreed upon limitation to wheelchair procurement (2010). In Australia, disability-related funding protocols drive wheelchair and seating procurement (Barbara & Curtin, 2008) and dictate technology and service selection. In response a consumer driven group, the Aids and Equipment Action Alliance (AEAA) (Aids and Equipment Action Alliance, 2007) was formed in Victoria, a southern state of Australia, to advocate consumers receive equitable access to disability-related services and assistive technologies. The members of AEAA claim the provision of assistive technology is directed by policy guidelines and not according to consumer needs. In a recent public statement the AEAA group provided half a wheelchair frame (with half a speech device and other half items) as representative of the real funding allocation per eligible consumer in Victoria (Aids and Equipment Action Alliance). In doing so the AEAA group advocate for sustainable funding to procure assistive technology, as essential needs therefore a basic human right (Layton, Steel & de Jonge, 2013).
Top-heavy, restrictive system protocols displace the consumer as the central decision-making agent in their wheelchair-seating procurement (Plummer, 2010). Attention to the meaning of fair provision of wheelchair technology and seating service has escalated in the literature (Layton, Steel & de Jonge, 2013; Mortenson & Dyck, 2006; Plummer et al., 2013; Gowran et al., 2011). Weller (2009) states human rights should embody economic and social rights that encompass an ‘adequate standard of living, including adequate food, clothing and housing’ (p.76). Backed by the ICF philosophy, Gowran (2012) and her colleagues (2012) state the wheelchair is an enabler in a consumer's life. Therefore the wheelchair and seating technology acts as a basic ‘prerequisite in the hierarchy of needs from basic survival to self-actualisation’ (Gowran, p.2). Gowran and colleagues state wheelchair and seating technology are a basic human right for enabling consumers’ mobility, posture, occupational performance and social inclusion (Gowran, McCabe, Murray et al., 2012). The wheelchair-seating system directly influences the consumer's life by meeting primary needs, for some the wheelchair becomes part of a person's 'skin', their ‘legs’ (p.2). Rousseau-Harrison et al. (2009) categorises wheelchair mobility as a life habit: as part of a 'usual or favoured activity or social role' (p. 346) that enables social participation. Suppression of the consumer's mobility, as life habit, may jeopardise the consumer's survival (Rousseau-Harrison et al). Layton (2012) confirms human mobility is a key right within The Rights of Persons with Disabilities (CRPD); of which Australia is a signatory. As such, mobility freedom is related to community accessibility that enables self-fulfilment through effective participation, for enabling equal opportunity and social inclusion.
Hahn (1991), in advocating for a social orientation to disability, states empowerment should be a collective view within a ‘minority-group paradigm’ (p. 17). Conceptualising disability in this way contextualises it within societal attitude that shapes public policy: changing societal attitudes requires public policy reinforcement (Hickey, 2006; Winchcombe, 2008).

Seminal work in the 1970s by John Rawls, an American philosopher, advocates fair distribution of society’s basic resources. Rawls is lauded for his equality-minded liberalism, advocating ‘the inviolability of individual rights and the idea that when justifying social inequality – some degree of which was inevitable in a flourishing and prosperous society – absolute priority should be given to needs of the worst off’ (Katz, 2002, para. 4). The John Rawls Theory of Justice (1971) addresses fairness and equitable distribution within prosperous societies of essential resources such as work, education, money and power. More specifically, Rawls champions greater distribution of essential resources to those who have the least. In proposing an unequal share of resources for those with the least, Rawls proposes empowering equality of opportunity to enhance participation opportunity in society. This aligns with Mortenson and Miller (2008) who champion optimal wheelchair performance for greater occupational performance.

Rawls extols his equality philosophy based on three principles: equity, access and equality (Buchanan, 1980). These principles are contextualised to explore the concept of equal and equitable access to technology and services that enables wheelchair mobility for all people living with mobility disability. Following this theme, access to wheelchair technology and seating services should be considered basic human resources in accordance with basic human rights as Weller (2009) proposed. As a basic right, wheeled mobility
should be prioritised to enhance an individual’s standard of living and provide the opportunity for individuals to engage across all life domains as desired (Hahn, 1991; United Nations, 2006). An appropriate wheelchair-seating system addresses the consumer’s physical and social needs, for safe use, is durable and fitted for stable, comfortable postural control (Eggers, et al., 2008; Mortenson & Miller, 2008; World Health Organization, 2001; 2008). Implicit in a person-centred approach is the understanding that a consumer has the right to control decision-making during their own wheelchair and seating procurement.

The terms ‘consumer choice’ and ‘empowerment’ have become politicised in recent Australian commentary. Following recommendations made by the Productivity Commission Report (2010), the National Disability Insurance Scheme aspires to a social justice approach for the effective distribution of disability services (including assistive technology) based on consumer inclusion in ‘choice and preferences’ (p. 13). Speaking the language of consumer control and choice, the National Disability Insurance Scheme (NDIS) provides a much needed media platform to raise awareness in Australian society of disability rights and service provision, prior to its enactment: the NDIS Act 2013. The incremental roll-out of NDIS commenced in mid-2013 with an anticipated completion date of 2018, aims at enabling a consumer-driven approach to service provision and technology acquisition (National Disability Insurance Scheme, 2014). Layton, Steel & de Jonge, 2013). (The NDIS enactment and subsequent implementation was prior to data collection.)

**Summary of Literature**

In the 1990s, the literature pertaining to wheelchair and seating provision focused on biomechanical issues in assessment and prescription. Prescription protocol and practice were of interest, especially those related to fitting manufactured seating systems for an
increasing number of consumers with complex mobility needs. At a similar time
environmental factors, such as physical barriers that might impact on wheelchair use and
access to the community, were raised. In the mid-1990s discussion shifted from a
biomedical focus to a growing activism based on social change and new attitudes to
disability: a shift inspired by the Social Model of Disability and the ICF approach of health
and disability. Spasmodic interest was shown in the literature regarding the effectiveness of
seating service provision from the perspectives of consumers and care providers. There was
scant attention to a collective service experience from all the stakeholders' perspectives.

By 2000 there was a clear concentration in the literature on psychosocial issues of
wheelchair-enhanced mobility. The literature focused on enabling independent access to
communities that were becoming more welcoming of wheelchair use. Wheelchair-enhanced
occupational performance was researched and critiqued in the mid-2000s. Client-centred or
person-centred practices that invited greater consumer involvement in wheelchair
prescription and provision began to appear. Research into person-centred practice
increased and qualitative data began to be collected from the insider’s perspective. The
most recent literature raises issues surrounding decision-making and who has control of
choice-making in wheelchair procurement.

Gaps in the Literature

Little research focuses on specialised seating service delivery or provision in
Australia, and no available descriptive data of the wheelchair-seating service experience
exist. There is scant qualitative evidence that explores the experience of participating in a
specialised seating service, or that this experience is beneficial from all stakeholders’
perspectives. There is no literature pertaining to the combined experience of service
recipients and service providers participating in specialised seating services. There is no evidence of the experience of participating in different types of specialised seating service operating in Australia.

**Rationale for Work to be Undertaken**

There are no descriptive data of the wheelchair-seating service experience in Australia. Such data are required before commencing any exploratory investigation of the seating service experience from participants’ experience. Without knowledge of the insider’s descriptive experience, the seating service sector is poorly positioned to make sense of the current seating service environment; or its needs, to plan for a robust sector capable of meeting the proposed increase in demand: when the NDIS endows Australians with discretionary spending power to drive their own specialised wheelchair procurement.

A qualitative investigation into the wheelchair-seating service experience is the appropriate method to gather descriptive data from the insider’s perspective. An in-depth case study provides the discipline to explore the variety of experiences, from differing stakeholder perspectives and to scrutinise the many complexities of the service process, as experienced in Australia. This case study proposes to meet this need.

The next chapter, Chapter 3 presents the study research method.
CHAPTER THREE: 
Research Design

Chapter 2 presents the literature review, providing an historical overview of wheelchair and seating technology and its impact on service development, internationally and within Australia. This chapter describes and justifies the qualitative research methodology chosen to address the case study exploring the seating service experience in Australia from the stakeholders’ perspectives.

A seating service is a dedicated service that personally fits a wheelchair base (manual or powered) with a customised seating system and if successfully matched enables a consumer optimal community mobility for social participation. In order to study the service experience, this study collected the stories, opinions and views of key informants with insider experiences (Higgs, Titchen, Horsfall, & Armstrong, 2007). A qualitative approach provides the most suitable research method to focus on collecting data directly from key informants (participants), by listening to their stories of participation and, in exploring their views and opinions of, their experiences (Curtin & Fossey, 2007).

The questions presented in Table 1 guided the collection of data on the participants’ stories of their wheelchair procurement and seating service experiences.

Table 1 Research questions

| QUESTION 1: What is the perceived experience of specialised seating services in Australia, from the stakeholders’ perspective? |
**QUESTION 2:** Why does participating in a specialised seating service benefit (or compromise) the procurement of customised wheelchair systems for Australians living with complex mobility disorders?

**QUESTION 3:** How does a consumer’s service access to a seating service impact on their wheelchair outcomes?

**QUESTION 4:** How does the type of seating service employed affect the decision-making process?

**QUESTION 5:** What is the current role of a specialised seating service and why is it relevant in the future within the context of a National Disability Insurance Scheme?

**Australian Seating Service Context**

There are four main stakeholder groups identified in specialised wheelchair procurement and seating services. These are: the consumer who is the wheelchair occupant; the care provider who supports the wheelchair occupant; the prescribing clinician, and the vendor group. The latter two groups provide services in wheelchair and seating procurement (Eggers et al., 2009).

There are no known documented descriptions of seating service experiences in Australia. Many locally based prescribing clinicians are employed by health or disability services to provide generic services (Mills & Millsteed, 2002) and the task of wheelchair-seating prescription is considered a component of their wider clinical knowledge base (Boshoff & Hartshorne, 2008).
Author’s Stance

The author’s interest in the Australian seating service is related to my clinical experience. Over a three-year period in early 2000 I worked as a service coordinator and sole clinical consultant within a pilot-funded Seating Advisory Service in Melbourne. The service stopped operating after three years when funding ceased. Several proposals to attract state government fiscal support were unsuccessful; feedback cited the lack of evidence-base data to support funding a specialist seating service model for Victorians living with complex mobility conditions.

In the early 2000s, in pursuit of missing data, I engaged as a Health Science masters student to investigate the clinical reasoning processes of six Melbourne-based seating experts (Schmidt, 2006). My investigation of the available literature confirmed my belief that the specialised seating services required deeper scrutiny. At that time and to during this study there was very little research published on Australian services, or on participation in specialised seating services. There were no evidence-based data on whether Australian seating services were effective or if participants were satisfied with them.

Simons (2009) notes that the subjectivity of an informed investigator is a weakness in a case study approach. To counter this, my role as sole investigator was carefully considered and addressed as part of the research reliability process (Yin, 2009; Polgar & Thomas, 2000) within the supervisory sessions. As sole investigator, I worked conscientiously at being research objective during data collection, analysis and interpretation (Simons). Addressing investigator bias and ensuring trustworthiness is discussed later in this chapter. An informed investigator is crucial (Simons; Stake, 1995;
Yin) to interpret qualitative data and to measure the plausibility of the participant’s experiences against what is known and expected (Esterberg, 2002; Stake, 2009).

**Justification for Qualitative Methodology and Case Study Research Design**

A link between positive service outcomes and optimal wheelchair procurement can be life transforming (Chan & Chan, 2007). As noted in Chapter two, the literature confirms the link: when wheelchair and seating technology are poorly matched to individual lifestyles, this can lead to health-threatening conditions, occupational and social deprivation (Batavia, et al., 2001; Gowran, 2012; Layton, 2012; Plummer, 2010). There is little available literature on wheelchair procurement in Australia, or on the Australian seating service experience: a gap in the seating knowledge inspired this study.

At the start of this study, in 2010 there were no data that described the Australian seating service experience from the stakeholders’ perspective. Rich descriptive stories of seating service participation were needed to describe this experience in an Australian context. A collection of key participants from a range of stakeholder perspectives was required to explore insider experiences (Higgs et al., 2007). Depth of knowledge was necessary to provide the data-rich information that was missing.

**Method**

A qualitative research methodology was used as an overarching enquiry into Australian seating service experience. In the absence of evidence-based data, baseline data was required to explore the Australian seating service experience. A case study methodology provided the systemised research focus required to scrutinise the Australian seating service experience. Informed by the discipline provided by a case study approach assists in collecting quality data essential to examine the nuances, variations and
commonalities that are particular to current Australian seating service experience. These are essential new data needed to understand the Australian experience. This case study aims to provide baseline data, to extend and strengthen knowledge of the contemporary experience of participating in Australian seating services.

The case study was informed by the social science research texts of Helen Simons (2009), Robert Stake (1995), and Robert Yin (2009). The case study approach enables an in-depth, and detailed exploration into the ‘particularity, the uniqueness’ (Simons, p. 3) of a complex issue. That is, experiences, features and issues particular to the Australian seating service experience from differing perspectives. A case study methodology empowers an in-depth contextual analysis of the experiences of the participants from different experience perspectives (Simons, Yin). That is, exploring the particular experiences of being a service recipient and from a service provider. This data are required for analysing the Australian data with what is known internationally. A case study approach focuses the close-up examination of the insiders’ experiences (Stake) as contextualised. That is, contextualised by four identified Australian stakeholder groups and by their location: i.e. across a variety of seating services in metropolitan, regional, and rural areas. A case study approach was considered appropriate methodology to scrutinise the Australian experience, to describe its features and to define the positive and negative factors that contribute to the uniqueness. The current Australian seating service experience (2010-14) is the focus of this in-depth case study.

**Participants**

Sixty participants were recruited from across metropolitan and non-metropolitan Australia (i.e. metro, regional and rural locations): eleven consumers, five care providers,
28 prescribing clinicians, and 16 vendors. The majority were women (73%). There was an equal balance of participants who were ‘metro-based’ and those who were located in ‘regional’ or ‘rural’ areas. Six participants stated they provided ‘state-wide’ services (i.e. across all three locations). This study captured participants’ experiences from 16 of 19 specialist services identified as operating in Australia, at the time of data collection (2011-12).

While sample size is not a criterion in case study methodology (Stake, 1995), Simons (2009) advises that purposive sampling is appropriate when collecting data from key informants, and in in-depth interviews. Yin (2009) advises that collecting data from multiple perspectives within the case-specific context is more relevant than the number of participants or ‘actors’. An estimate of five participants (replications) was used as a guide for a high degree of certainty for sampling rich data.

This study collected data from four stakeholder groups. All stakeholder groups contained at least five actors. The care providers group was the smallest, with five actors, representative from metro-based, regional or rural Australia. The sample from multiple perspectives was considered a fair representation of key case study participants within the context of Australian seating service.

The inclusion criteria required each participant to be adult (aged 18 or over), residing in Australia at the time of recruitment, and who had participated in a seating service in Australia in the past three years. Each participant had to communicate in English and be able to share seating service experiences during an interview process. Other inclusion criteria specific to each stakeholder group were also determined; these will be identified as each group is presented.
Figure 4 shows the participants by age and stakeholder group. The participants’ age ranged from 22 to 72 years old. The majority of the participants were under 40 (N=36), and 23 participants were over; one participant did not disclose age.

![Figure 4 Participants by stakeholder group and age range](image)

The study participants were recruited from all Australian states and territories (see Figure 5) except the Australian Capital Territory (ACT). The greatest number of participants were recruited from Victoria (32%). All four stakeholder groups were represented in the Victorian (Vic) and the Queensland (Qld) samples. The care provider group was not represented in New South Wales (NSW) or from the Northern Territory (NT). The consumer group was not represented in Tasmania (Tas). The consumer and care provider groups were not represented in South Australia (SA). Western Australia (WA) was represented by the prescribing clinician group only; there is no known reason why no participant interest from potential WA consumers, care providers or vendors was received.
The study was unable to acquire ethical clearance from a major Western Australian organisation, The Centre for Cerebral Palsy (refer to Ethical Considerations for more detail), which operated a specialist seating service. This refusal may in part explain why consumers and care provider participants were not recruited, but does not explain why vendors chose not to participate from Western Australia.

The variation in sample participation across the four stakeholder groups was determined by the number of willing participants who fitted the inclusion criteria. Efforts were made to recruit participants from each stakeholder group across each state, but despite this, ACT was not represented. There is no known reason for this.

Figure 5 Stakeholder groups by Australian state

Key: Vic=Victoria; Qld=Queensland; NSW=New South Wales; Tas=Tasmania; SA=South Australia. WA=Western Australia; NT=Northern Territory.
The consumer group.

The consumer is the central seating service client or customer in wheelchair procurement. To collect rich data from consumers, it was important to attract key informant consumers who were able to share their personal seating service experiences. The inclusion criteria were:

- Having used a wheelchair-seating system for at least 12 months for community mobility (beyond home use)
- Being cognitively able to recall, discuss and reflect in detail on past seating experiences
- Having the capacity to share experiences independently, verbally or using communication technology.

Of the eleven consumer participants, six were men and five women, all aged between 22 and 72. Thirty-four per cent were aged under 30 and an older cohort aged over 50 (see Figure 4). The consumers from Victoria were dominant (55%), and the remainder representative from three other states (see Figure 5).

Six consumers were located in cities (metro-based). Seven had accessed non-specialist services for their most recent specialised wheelchair procurement. One lived independently and alone, while ten lived with family or friends. Four had at least one university degree and one other had deferred graduate studies. Five were in paid employment; two were participating in ongoing spinal rehabilitation. One consumer defined his role as a full-time student in higher degree research. Another defined her role as a full-time parent. Five consumers were non-compensable recipients of state-run funding schemes in Victoria and New South Wales. Five consumers across three states (Vic, NSW
& NT) had self-funded their last wheelchair-seating system. One other consumer had been fully funded by her insurance agent, as a compensable recipient (Qld).

Three consumers were manual wheelchair occupants (see Table 2) whose wheelchair use was intermittent (between 2–16 hours daily). Manual wheelchair use was dependent on each consumer’s energy and health conditions, which among this cohort included incomplete spinal injury, multiple sclerosis and postural tachycardia. One consumer used his manual wheelchair for work and community mobility, but his fluctuating health condition did not allow work or participation in his community every day.

The reliance on a manual wheelchair for daily life was evident. The three consumers who used a manual wheelchair stated it assisted in home mobility, helped with carer tasks, and allowed them to socialise and to work (100%). One consumer said her manual wheelchair assisted with postural support, however the consumers' pressure management was not an activity assisted by their manual wheelchair technology.

The remaining eight consumers used powered mobility daily. Six stated they spent all their waking hours in their power chair (12–18 hours per day). Four used a second wheelchair; this was, variously, a light-weight manual wheelchair for car travel, a manual wheelchair for in-home mobility, a compact power chair suitable for in-home manoeuvrability, and a compact power chair for airline travel.

Two of the eleven consumers were first-time wheelchair occupants (≤2 years post spinal injury). All eleven consumers used their wheelchairs for independent travel, to carry items and to reduce their carer input. As can be seen in Table 2, those using power chair mobility relied on their wheelchair for daily activities. Eight relied on their power chair for postural support, to socialise and to work (100%). Seven relied on their power chair for
community access. Three consumers stated their power chair technology assisted in the
caring tasks and in pressure care management. One consumer drove his modified car while
seated in his power chair.

Ten consumers indicated they were satisfied with their wheelchair base (91%) and
four indicated their current seating system was satisfactory (40%); one participant did not
rate his seating satisfaction. Five consumers were disabled from a health condition acquired
in adulthood (N=2 trauma related). Five have lived with their disability from childhood.
One consumer described his mobility disability as having occurred ‘a lifetime ago’
(Consumer Ken). Five consumers lived with a disability that affected their spinal function
through trauma or disease. Three lived with a condition affecting their physical abilities,
like cerebral palsy or polio. Two relied on wheelchair mobility because of fatigue related
conditions: multiple sclerosis or postural tachycardia.

Eight consumers used occupational therapy services and two accessed physiotherapy.
Of the ten who had accessed therapy services during past wheelchair procurements, eight
indicated they were satisfied with them. One regional, self-funding consumer had no access
to therapy services in her location.
Table 2 Consumer wheelchair type by the application to life activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Power Wheelchair (N=8)</th>
<th>Manual Wheelchair (N=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home mobility</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Assist with caring tasks</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Community access</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Independent travel</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Postural support</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Pressure management</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Carry items</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Socialising</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Work</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce carer input</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (N=11)</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Total %</td>
<td>64</td>
<td>62</td>
</tr>
</tbody>
</table>

Note: The activity ‘communication’ was removed from the list as there was 0% response.

The care provider group.

Each of the five care providers recruited provided informal support to a family member (as the wheelchair occupant) during the procurement of a wheelchair-seating system. The carer’s role in this study was informal, as a family member, however additional care provision was also provided for some, formally by employed care attendant/s. The care providers provided both physical and psychosocial support to their family members’ use of their wheelchair-seating technology and service engagement. Tasks involved daily attention to activities as hygiene, transfers, and meals, and enabling community access by providing wheelchair transport. The care providers’ familiarity with
the consumer’s wheelchair use meant they had exceptional knowledge of their occupant’s needs, including their occupational goals and the environmental challenges they faced.

The inclusion criteria for this group were aimed at attracting carers willing to share their experiences of supporting a wheelchair occupant during customised wheelchair and seating acquisition. Carers had to be:

- an adult currently providing or who had provided (in the past three years) physical and/or psychosocial support to a wheelchair occupant during the procurement process of wheelchair and seating technology
- able to describe and discuss their experience (paid or unpaid) in the process of participating in an Australian seating service.

Of the five care providers who participated, four were female. As indicated in Figure 4, all carers were aged between 40 and 60, with an equal spread in the younger age ranges of 36–40 and in the middle age 41–50 (40% each); with one carer older. Two consumers were metro-based, two were regional and one rural.

All five care providers had provided informal, unpaid support for sons or a spouse for between 14 and 50 years. This mirrored the age spread of the family wheelchair occupants they supported, whose ages ranged from 14 to 50. Four carers supported a family member living with a physical condition like cerebral palsy without cognitive impairment, or spinal injury, or with multiple disabilities including intellectual and physical conditions. Three, as parents commenced their carer’s role at the birth of their sons; a fourth parent began in her son’s adolescence and a fifth carer commenced care giving following the spinal injury of her spouse.
Two care providers supported a family member using power chair technology. At the
time of data collection three carers provided full-time in-house support. Two provided part-
time support outside the family home after their respective sons moved out, one to
residential care and the other to establish his own home.

The care providers' roles involved participating in therapy services (40% occupational
therapy and 60% physiotherapy) during their support of their family member's most recent
specialised wheelchair procurement. Three care providers indicated that neither they, as
advocate for the consumer, nor the one they supported, had control over choosing their
therapist as the prescribing clinician. Three stated the therapy provided met the needs of the
wheelchair occupant, their family member.

Table 3 Care provider sample by support activities and wheelchair type

<table>
<thead>
<tr>
<th>Support activities</th>
<th>Power chair support (N=2)</th>
<th>Manual wheelchair support (N=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Physical: Manual handling</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hoist transfers</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Load/unload WC</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Transport</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hygiene</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Domestic</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Shopping</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Financial/legal</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Advocate</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Funding</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Leisure</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>WC selection making</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Three care providers acted as advocate decision-makers on behalf of their sons. One care provider stated the wheelchair selection process was within their domain of control in that her spouse chose his wheelchair-seating system. Another stated the funding system allowed limited control in the choice of her son’s wheelchair. The remaining three carers said wheelchair selection was controlled by the prevailing funding program. In general, the four care providers found the wheelchair supplied for their family member was satisfactory: 60% carer satisfaction with the wheelchair base and 80% with the seating system. Every carer’s experience of wheelchair procurement was within state-run, non-compensable funding schemes across three Australian states (Vic, Qld and Tas).

**The prescribing clinician group.**

In this study the prescribing clinician group consisted of two sub-groups: 20 occupational therapists and eight physiotherapists. The prescribing clinician group were responsible for the assessment and prescription of both the wheelchair and seating systems. In the funding environment in Australia at the time of data collection, both non-compensable and compensable funding systems required a wheelchair-seating prescription from a prescribing clinician.

The inclusion criteria for the prescribing clinicians were that they must:

- be an occupational therapist or physiotherapist, currently working (or have worked within the past eighteen months) in Australia
- have at least three years’ clinical experience in specialised seating and wheelchair prescription in Australia
be able to competently discuss and reflect on their role in providing a seating
service to Australians living with complex mobility needs.

Of the 28 prescribing clinicians recruited, the majority were female (89%). They
represented all the participating Australian states and territory (see Figure 5). Of the 28,
30% were within the 20–30 year age band, 40% in the 31–40 age band, and a smaller 27%
fell into the 50–70 age band. One clinician did not supply an age. Seventy-nine per cent
worked in the disability sector, one was self-employed as a seating consultant, and the
remaining clinicians worked in the health sector (18%). Three clinicians worked across
both health and disability sectors. More specifically, 49% worked in community-based
services, 29% in non-government organisations, 14% in hospitals and the remainder in
government departments (7%) or private employment (7%). Five had worked or were
working in spinal rehabilitation (18%) and six had international seating service experience
(21%). Thirteen (46%) said they were employed in dedicated service roles in specialised
wheelchair procurement, as seating consultants. Twenty-two prescribing clinicians were
metro-based, four were regional and two were rural.

The demographic data of this group were compared by sub-group. The occupational
therapists (N=20) outnumbered physiotherapists (N=8). Fifty-five per cent of the
occupational therapists worked in community-based services, 40% in clinic-based services,
and one self-employed. Sixty per cent of the occupational therapists worked in metro-based
services, 20% in regional centres and 15% in rural locations. The physiotherapy sample
was predominately metro based (88%); one physiotherapist delivered seating services
within regional and rural communities. Sixty-three per cent of the physiotherapists provided
clinic-based seating services in hospitals or for government departments.
The larger occupational therapy group was a little younger; 40% within the 25–34 years while half the physiotherapy group was aged within a 31–40 age band. This age difference was also reflected in the two groups’ overall clinical experience, which was collected in five-year groupings, from zero through to 26+ years (refer to Figure 6 & 7).

As can been see in Figure 6, clinical experience was greater in the smaller but older sample of the physiotherapy group (N=8): 62.5% of the physiotherapists had 11 or more years of overall clinical experience; and 37.5% had 11 or more years of seating experience.

![Figure 6 Physiotherapists (N=8) by clinical experience and seating specialisation](image)

In comparison, in the larger group of occupational therapists (N=20): 50% had 11 or more years of overall clinical experience; and 30% had 11 or more years of seating experience (Figure 7).
Data identified within spinal rehabilitation—where wheelchair prescription is core business—manual wheelchairs were commonly prescribed by the physiotherapy department and the power chair prescriptions were the domain of occupational therapy. It was common to provide spinal seating services across both compensable and non-compensable systems in parallel. In some non-spinal health services the occupational therapist might be responsible for all wheelchair prescriptions. In smaller teams, often within the disability sector, complex wheelchair-seating prescriptions were commonly allocated according to individual skills and competencies, not by professional affiliation. Privately employed seating consultants (prescribing clinicians) provided both wheelchair and seating assessments and prescriptions across both compensable and non-compensable systems.

**The vendor group.**

The vendor group was defined by their technical service role in wheelchair procurement. In this study it consisted of three sub-groups: the wheelchair supplier, the
rehabilitation engineer, and the seating technician. In Australia, the vendor group was rarely responsible for the wheelchair and seating prescription, although the majority were involved in the seating assessment and all were engaged in technology recommendations.

The first vendor sub-group, the wheelchair suppliers, worked within commercial businesses to provide wheelchair and seating technology and services in retail, wholesale, manufacture, repair and maintenance. The suppliers provided wheelchair and seating technology either as part of a broader range of assistive technology or as specialist wheelchair service offering non-standard, ‘high-tech’ and sophisticated technology. The suppliers’ teams consisted of informed sales personnel and skilled mechanical, electrical or engineering technicians capable of customising wheelchair technology and integrating seating systems.

The second vendor sub-group were the rehabilitation engineers (known as rehab engineers). At the time of the study, there was no dedicated rehabilitation engineering undergraduate program operating in Australia, so the majority came obliquely to wheelchair and seating servicing via various combinations of post-graduate health science combined with undergraduate engineering degrees. The rehabilitation engineers provide an important problem-solving service, designing and manufacturing one-off bespoke wheelchairs and seating components.

The third vendor sub-group were the seating technicians. These were skilled mechanics and builders from a range of industry backgrounds including mechanical, construction, electrical, prosthetic or orthotic skills capable of building custom-made wheelchair and seating systems for individual needs.

The inclusion criteria for the vendor group were:
A technician, mechanic, supplier, manufacturer, engineer or rehabilitation
engineer who worked or had worked in the procurement of customised
wheelchair and seating technology, in Australia, within the past eighteen months

Those whose service role was to provide retail, technical or manufacturing
services in wheelchair and seating technology; or to supply technical support,
specialist resources or knowledge

Those who provided specific services associated with specialised wheelchair and
seating technology solutions for individual complex mobility and postural needs.

Of the 16 vendors recruited, 81% were male. Forty-eight per cent were aged between
25 and 40 years and another group within the 46–60 age band (52%) (see Table 1). Eight
vendors provided a metro-based service, five worked in regional centres, and three
provided state-wide services across metro, regional and rural areas. The majority were
recruited from Victoria (31%) with representatives from five states and one territory
(Figure 5). One vendor had worked in more than one state (see Figure 5); no vendor was
recruited from Western Australia. Nine were employed within the commercial sector; three
worked in disability, two in health and one in government; one was self-employed.

As Figure 8 shows, the wheelchair suppliers (N=8) were experienced: 62.5% had 11
or more years of seating service experience. Five were owner-operators of wheelchair
supply outlets and five also came into wheelchair retail because of a close relationship with
wheelchair occupant: a relative or friend who used a wheelchair. The suppliers came from a
variety of backgrounds, including rehabilitation or wheelchair-related backgrounds as well
as from non-disability related industrial trades such as building, mechanics or manufacture,
and food processing and sales. The suppliers acquired their specialist knowledge ‘on the
job’ (Vendors Tom; Millie; Sarah). Three were located in a metro centre (two pairs worked in the same two services), and five in regional centres less than two driving hours from a city. Half the supplier group provided a consultancy seating assessment (i.e. as specialist wheelchair suppliers); the other half of the supplier group stated the seating assessment was the prescribing clinician's domain. All suppliers were based within two driving hours from a metropolitan centre and all provided various types of outreach or mobile services.

The second vendor sub-group, rehabilitation engineers (N=6), showed an even spread of seating service experience (50% = 5–10 years and 50% =16–25+ years; see Figure 8). One rehabilitation engineer acquired had an international rehabilitation engineering degree, five had a combination of bio-mechanical or industrial engineering degrees with health science postgraduate degrees, as required to qualify as a rehabilitation engineer in Australia.

Eighty-six per cent of the engineering group were employed in clinic-based specialist seating services. Four were located in a metro-based service, one was regionally based and one had provided a state-wide service.
The third vendor sub-group, the seating technicians (N=2) acquired 11 or more years of seating experience. Both had acquired their experience while working in one single specialist seating service (see Figure 8). Like the suppliers, the technicians came to wheelchair supply and seating service sector with a variety of skills gained from the mechanical, construction and manufacturing trades. Both worked within a metro based clinic-based service.

**Participant location.**

Sixty three percent of the participants were metro-based (N=38), with 16 participants located in regional centres (27%); three who stated they were located in rural Australia and a further three who offered a state-wide service (across all three locations). By stakeholder group: 55% of the consumer group and 40% of the care provider group stated being located in a metropolitan city; 79% of clinician group and 57% of vendor group were metro-based.
Research Procedure

The research project was governed by two principles of ethical conduct. The first followed the formal national process according to the Human Research Ethics Committee (HREC) guidelines that addresses data management, informed recruitment and consent procedures (Kielhofner, 2005). The second followed an informal process whereby the author’s conduct was overseen by regular mentoring and supervision in accordance with HREC conduct requirements (Kielhofner).

Ethical Considerations

The research proposal sought ethics approval via the National Approach to Single Ethical Review of Multi-centre research (NHMRC, 2013). Approval was granted by Deakin University Human Research Ethics Committee (DUHREC) (Appendix A). The research conduct was guided by DUHREC requirements that ensured research participants were engaged sensitively, confidentially and consensually. The research data were handled and stored securely as per DUHREC guidelines. The participants were given pseudonyms to protect their identities.

Three interested organisations requested the research project be submitted to their internal ethical committees; two subsequently granted clearance for their members to participate if they were interested (Appendixes B & Appendix C). The third organisation (Appendix D), declined consent for their members to participate because of existing research commitments. This exclusion may in part explain the poor participant recruitment within Western Australia.
Sampling Method

A purposive sampling approach was applied to recruit key informants (Kielhofner, 2005; Minichiello, Sullivan, Greenwood, & Axford, 2004) across all Australian locations, according to the stakeholder inclusion criteria, as presented above.

A sample goal was of five participants from each of the four stakeholder groups (N=20) and by location: i.e. metropolitan, regional and rural areas was set (N=60). A sample of this size increases the probability of collecting empirical data of variations in the seating service experience within Australia (Punch, 2007), as advised for an in-depth case study (Simons, 2009; Yin, 2009).

A stratified sampling map was employed to guide the recruitment of key informants (Simons, 2009), by strata: by each stakeholder group, by location (metro, regional and rural) and from each Australian state. The sampling method (DePoy & Gitlin, 1998) was employed to avoid recruitment or refusal bias (Minichiello et al., 2004) and to enhance participant representation across the nominated strata: that is, stakeholder groups and location.

Data Collection Method

A qualitative study requires the collection of empirical data to enable exploration of the exclusive experience of participating in a seating service. This implied hearing the stories associated with seating service experiences (Higgs et al., 2007), so an in-depth interview process using open-ended questions was chosen to collect the service narratives. The strength of the in-depth interview provided an environment for the author to focus on gathering insightful data (Yin, 2009) required for understanding the Australian experience.
The principles of in-depth interviewing provided flexibility for the interviewer to delve deeply, to explore a specific topic of interest or to follow the flow of the interviewee’s narrative (Esterberg, 2002) in a relaxed non-hierarchical manner (Punch, 2005). The in-depth interview process also provided the participant time to verbalise their experiences freely, to share their stories and to voice their reflections (Minichiello et al., 2004). A free-flowing interview enabled the interviewer to explore the interviewee’s experiences reflectively for insights, opinions and perceptions of their service experiences (Esterberg, 2002). In doing this, the interviewer gained an experiential appreciation of the insiders’ seating service experiences (Stake, 1995). To facilitate gathering narrative-rich data, establishing a comfortable environment was essential; all interviews were conducted in venues of the participants’ choice, often their local cafes.

The interviewee was inducted gently (Kielhofner, 2005), commencing with a brief interview orientation (Simons, 2009) and a brief reiteration of the research focus and the interviewer’s background. This was followed by gathering demographical data, aimed at involving the interviewee early (Simons). These introductory activities were designed to foster trust and to begin to build rapport (Minichiello et al., 2004) in the interview relationship (Simons). Developing a trusting environment early facilitated a relaxed, free-flowing and open-ended conversation in which the informant felt comfortable sharing their experiences (Esterberg, 2002).

Each interview was conducted by the author, who adopted a style more as a conversation, shaped by open-ended ‘how’ and ‘why’ questions. The ‘how’ questions were aimed at enticing the participant to tell their stories, and the ‘why’ questions were aimed at teasing out their reflections and opinions (Yin, 2009). While endorsing its value, Yin
warned qualitative researchers that poorly formed questioning, poor interview technique, and response bias can weaken the interview instrument. The design adopted in this study was deliberate in addressing the question of research trustworthiness, and is discussed later in this chapter. The use of guiding questions (Appendix J) was aligned to the reliability of the data collected (Yin).

**Guiding Interview Questions**

Guiding questions strengthen the open-ended interview process (Yin, 2009). The range of questions was constructed using case-relevant concepts, constructs and processes informed by the literature (DePoy & Gitlin, 1998) and contextualised by Australian subjective knowledge (Simons, 2009). The inclusion of guiding questions (Appendix J) allowed for a relaxed interview process, while providing the interviewer with reference points to guide and focus the interview (Yin). Employing guiding questions was considered advisable given the range of participant groups, the length of the interviews (1–2 hours) and the anticipated complexity of their narratives (Polgar & Thomas, 2000). Responding to the literature critique, the interview guiding questions were constructed and aligned to the five research questions (Table 1). The interview process was informed both by the research questions and by the flow of each participant’s narrative. Each interview was guided by a discussion of experiences with wheelchair technology and seating services, with flexibility to explore the participant’s individual experiences. The aim of the process was to gather participants’ rich insider data.

**Recruitment of Participants**

Commencing in July 2011, an invitation to participate was placed electronically with the national peak bodies most likely to capture the attention of the stakeholder groups. The
invitation consisted of two documents: the participant’s invitation (Appendix D) and the study outline (Appendix K). An invitation was placed on the Australian Rehabilitation and Assistive Technology Association (ARATA) website twice in late 2011, with two follow-up reminders early in 2012. An additional invitation was placed in the ARATA newsletter in late 2011. Additional invitations were placed with service-associated networks, including Independent Living Centre–Australia and its state branches, the Assistive Technology Services Association (ASTA) and Rehabilitation Engineering (NCRE). These three networks were chosen for their linkage with all the potential stakeholder groups.

Further invitations were emailed to known seating services in each Australian capital city, to national and state-wide wheelchair and seating interest groups, purposively targeting prescribing clinicians. Invitations to participate were dispersed informally through geographically diverse professional, health and not-for-profit networks targeting clinicians, technicians and rehabilitation engineers. These networks were asked to broadcast the research invitation through their Australian networks.

To capture the vendor group, invitations were emailed to wheelchair suppliers, retailers and manufacturing networks, and to sponsors of wheelchair-seating training events. Known seating service providers were emailed by the author with a request that they circulate the invitation widely among their consumer cohort, either directly or through consumer noticeboards, newsletters, and other indirect methods. More invitations targeting the consumer cohort were emailed to known relevant consumer groups and disability-specific peer support groups, including organisations for cerebral palsy, multiple disabilities and mobility disorders, including the Para-Quadriplegia association, with a request for each to disseminate the invitation among their membership, service teams and associated
networks, both nationally and state-based. Invitations were also emailed to known care provider groups, care providers’ e-newsletters, and websites connected with Carer Australia and state branches. As there was slow interest shown by care providers, an additional specific invitation was designed to target care providers (Appendix E).

Publishing the research invitation in the professional newsletters of the National Occupational Therapy and Australian Physiotherapy Associations was considered but abandoned because of the prohibitive publication charges. Instead, a direct email approach through known and extended professional networks was employed to target specific seating-related professional networks.

All interested persons were invited to email the author. On receipt of interest, each person received a research information package relevant to the stakeholder group (Appendixes F, G, H or I) by return email or mail. The package contained a study information sheet summarising the research intent and a plain language statement with an accompanying consent form specific to the stakeholder group. Three interested persons requested a posted research information package, so a self-addressed stamped envelope was included for returning the signed consent form.

Approximately eighty expressions of interest were received via email or telephone. Over a twelve-month period, 63 interested participants returned the signed consent, of whom 60 were finally recruited. Three did not acknowledge subsequent correspondence with the author, so were not included. Participation in the research was voluntary. There were no participant withdrawals subsequent to participating in the interview process.

The recruitment process remained active during the data collection phase (2011–12). Despite strenuous efforts to recruit equal numbers across all four groups, this was not
achieved. The combined consumer and care provider group comprised 27% of the recruited sample. The recruitment process closed after twelve months when the 60th participant was recruited in late 2012.

**Data Collection Protocol**

Each interview was conducted by the author. Forty-nine one-on-one interviews were undertaken in person, mostly in local cafes. Nine interviews were undertaken by telephone using 1300 telephone recording technology, and two participants contributed via email, as requested, to accommodate their personal needs. The interviews were recorded to ensure accurate, full transcriptions that strengthened interview recall (Yin, 2009). The author took interview notes to capture unclear communication and in case of recording technology failure. Two transcriptions were provided in bullet form as interview summaries when technology failed or when recording stopped before the interview ceased. Dedicated field notes on observations or personal reflections were also taken after each interview (Yin) to bolster the author’s interview recall (McLellan, MacQueen, & Neidig, 2003).

The proofread interview transcriptions were emailed to each participant for confirmation. Each participant was invited to participate in a member checking activity (Stake, 1995) to add, edit or delete interview content as desired. This activity was aimed at confirming that the interview content was what the participant wanted to convey (Stake). To facilitate engagement in the member checking activity, each interviewee received a second abbreviated transcript loosely titled ‘preliminary themes arising’, showing the first stages of data coding where chunks of verbatim data were categorised under relevant headings (Simons, 2009). Sharing the abbreviated coded data with each participant was aimed at transparency during the initial data analysis phase (Higgs et al., 2007).
Forty-two per cent of the participants acknowledged receipt of their full transcriptions. Two participants provided additional clarifying information. No participant deleted information from their original interview transcriptions.

**Data Analysis Protocol**

The data analysis process was broken into two phases with five analytical stages. It was undertaken by the author and commenced with a thematic analysis.

**Phase One: Thematic Analysis**

All interview transcriptions were analysed thematically once they were returned after member checking or acknowledged by the participant (by email). Early analysis highlighted key elements (Green & Thorogood, 2004) and recurring themes were flagged for deeper investigation (Simons, 2009). The early appearance of these themes confirmed the data contained insightful narratives relevant to the case study. Analysis then proceeded in three preliminary stages.

**Stage 1: coding the data.**

Coding into descriptive and analytical categories was undertaken to manage the data (Stake, 1995). Categories were established from various sources, including those informed by the literature, known case-related processes, and concepts arising from the interview data itself (Stake). Segments of interview content were assigned to the categories verbatim, to keep participants’ language intact (Simons, 2009), to reduce the data to their most rich narrative and to gauge data saturation (DePoy & Gitlin, 1998). Saturation was achieved in all four groups.
Stage 2: theme-dredging.

The data were subjected to intensive theme-dredging aimed at identifying recurring themes (associated words and phrases) and patterns (DePoy & Gitlin, 1998). The data were subjected to intensive examination: each interview was read several times and audio recordings listened to for their unique nuances. Segments of interview text were scrutinised to ascertain key components, which were compared by aligning sections to highlight relevance within each text (Green & Thorogood, 2004). Common themes were identified when recurring patterns became evident across a number of sources or when a number of relationships overlapped, providing corroborating evidence of a common theme.

Concept mapping was used to display significant elements arising from the interviews, to pull apart and to reassemble concepts, to interpret meaning and make sense of the data. This mapping activity highlighted shared occasions, issues, thoughts and other elements that corresponded to patterns within and across each stakeholder group.

This intensive analysis was undertaken with each participant transcript, commencing with the eleven consumers. On completion of the process, common elements and anomalies within each stakeholder group were highlighted for additional exploration. Recurring concepts were scrutinised for their meaning as related to the stakeholder group’s collective experience, and common themes and patterns were compared with the relevant research questions (see Table 1), with the literature, and against the subjectivity of expected Australian experience (Yin, 2009). The quality of the analysis was strengthened when patterns or themes coincided with what was known (Yin).

Where concepts were less supported or did not conform, deeper scrutiny was undertaken to understand their relevance and case plausibility. When anomalies were
identified as novel, they were carefully studied against predicted or known service characteristics to determine relevance.

This process was undertaken for each of the four stakeholder groups.

**Stage 3: comparative analysis approach.**

The third stage was a comparative analysis of each stakeholder theme across the four groups. The approach focused on investigating similar and differing themes emerging from the groups (Neuman, 2011), revealing consistent themes and theme variations across groups and geographical locations. Further scrutiny of common and differing themes uncovered hidden relationships that impacted on the seating experience, both from a stakeholder perspective and according to where they resided.

Commencing with consumer and care provider groups, an initial comparative analysis compared and contrasted emerging themes and patterns to explore the service recipient experience for commonalities or differences. A second analysis compared themes arising from the prescribing clinicians’ and the vendors’ groups, to determine the commonalities and differences of service providers’ collective experience. This provided a deeper view of service provider’s perspective when compared to that of the service recipients.

A deeper comparative analysis was undertaken within the sub-groups of service providers. Among the prescribing clinicians, data from the occupational therapy and physiotherapy sub-groups were explored for common and conflicting themes. This allowed a deeper exploration of prescribing clinicians’ experience from differing professional perspectives. A similar analysis was undertaken with the three sub-groups of vendors. The data from the wheelchair suppliers, the technicians and the rehabilitation engineers’
responses were explored to compare and contrast the themes emerging from the differing vendor perspectives.

A concept map was drawn for each stakeholder group and sub-group to visually link related concepts and themes and helped make sense of the data (Punch, 2007; Simons, 2009) and to confirm the patterns associated with recurring behaviours or events (Ryan, & Bernard, 2003; Yin, 2009). Comparing themes and patterns helped to reconstruct parts, to make sense of the collective experience and to interpret the meaning of the experiences as a whole.

A peer review was undertaken during the thematic analysis to verify the study’s thematic findings and to affirm the interpretation of the data (Yin, 2009). This is discussed in detail later in this chapter.

To support the preliminary interpretations, further interrogation of the data from different analytical angles was undertaken. The second analysis phase was designed to delve deeper into the empirical data from differing perspectives, in line with the research questions (Yin, 2009).

**Phase 2: Second Data Analysis Process**

The second phase investigated the same data using two different lenses of analysis, aimed at strengthening the analysis. The first stage scrutinised the data to explore the decision-making processes connected with wheelchair procurement and seating services. The why and how components of the second, third and fourth research questions (see Table 1) were directed to the exploration of the decision-making process within wheelchair procurement and seating service experiences.
Stage 4: Exploring decision-making.

This delved into the same data from a decision-making perspective to understand the factors that influenced the making of decisions in wheelchair procurement and seating service provision. The descriptive Model of Wheelchair Delivery (Eggers et al., 2009) was employed to explore the decision-making processes within wheelchair procurement. The Eggers et al.’s model identified four domains: health care system; wheelchair service delivery; wheelchair appropriateness; and outcomes. These domains were used to compare and contrast the internal (human) and external (systems) factors that impacted on decision-making as experienced in Australia.

The four domains of Eggers et al.’s model assisted probe the data with purpose, to expose the factors influencing and hindering positive decision-making (2009). In addition, the components identified within the expanded first domain of the model (see Figure 9) were employed to compare with the findings from this analysis. The expanded first domain of Eggers et al. wheelchair service delivery process identified a ‘submodel of the potential influences’ (p. 1003) on the procurement process, identified as: consumer complexity, participation and capacity (yellow circles), facility policies and team approach (green), vendor motivations (orange) and prescribing clinician expertise and drivers (purple). These potentially influential elements informed the analytical lens to guide a systematic exploration of the data, to make sense of the decision-making process from an Australian perspective.
Figure 9 Submodel of potential influences on needs assessment

Source: Eggers et al., 2009, p.1003
Stage 4 of the analysis employed a pattern matching technique where emerging concepts, themes and patterns were scrutinised for overlapping relevance. Strongly supported patterns or themes were then matched against predicted or known factors derived from the literature. Elements that challenge the literature enrich the understanding of the complexity of decision-making (Yin, 2009). Scrutinising the close relationship between decision-making and seating service delivery factors supplemented the scant evidence of the Australian experience. The findings pertaining to decision-making are presented in Chapter five.

**Stage 5: exploring social justice.**

This final stage of data analysis investigated the scope of the seating service experience from a social justice perspective. This stage was informed directly by the how and why elements of the second, third and fifth research questions (see Table 1).

The John Rawls Theory of Justice (Buchanan, 1980) was chosen for its three guiding principles regarding access, equity, and equality of resources as these echo the basic elements of wheelchair procurement: such as fair distribution of funding, accessibility to specialist service and optimal match of consumer with wheelchair and seating technology. Rawls’ three guiding principles are prefaced below in Table 4, and are aligned with an abbreviated interpretation as relevant to seating service experience.

<table>
<thead>
<tr>
<th>Table 4 The three guiding principles of John Rawls’s Theory of Justice as they relate to the case study</th>
</tr>
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<tbody>
<tr>
<td><strong>1. The ‘Principle of Greatest Equal Liberty’ states that each</strong></td>
</tr>
<tr>
<td>From a seating service perspective, this principle resounds with the notion of equal access to customised wheelchairs and specialist services to all Australians with mobility disability,</td>
</tr>
</tbody>
</table>
Exploring the data from a social justice construct exposed the political, economic and social dimensions that shaped the Australian experience of wheelchair procurement and of seating services. The social justice findings are presented and the data analysis is discussed in Chapter six.

**Quality Control**

The two-phase analytical approach was aimed at enhancing research validity by interrogating the data from rival perspectives (Punch, 2007; Yin, 2009). The attention to consistency, dependability and confirmability, and a non-biased approach, should ensure the trustworthiness and reliability of the research (Yin).
Trustworthiness and authenticity.

Trustworthiness in qualitative research is concerned with authenticity (Simons, 2009) and plausibility (Hammell, 2002). Authenticity includes concepts of ‘fairness, respecting participants’ perspectives and empowering them to act’ (Simons, p. 128). Plausibility is a determination of whether the study methods of data collection, analysis and interpretation, and the findings are a credible fit (Hammell). In this study, research design protocols were designed to ensure research trustworthiness (Stake, 1995). An in-depth case study approach (Simons; Yin, 2009) aimed at strengthening the truthfulness of the case study as representative of the Australian seating service experience. The five research questions indicated a clear strategy for consistency of data collection, and the credibility of the analysis process was bolstered by reference to the evidence in the literature review (Hammell; Yin).

The purposive sampling ensured the participants represented key informants who held credible knowledge of seating service within an Australian context (Simons, 2009; Yin, 2009), giving the data authenticity. The in-depth interviewing process employed guiding questions relevant to the study focus, strengthening the plausibility of the data collected (Punch, 2007; Yin).

Conscious of response bias, the interviewer carefully considered both interview environment and protocol (Yin, 2009). The choice of venue was prescribed by the participants to empower them and ensure a comfortable environment (Kielhofner, 2005). In-depth interviews, informed by guiding questions allowed the author to listen to the participants’ narratives respectfully while staying case-focused (Simons, 2009; Stake, 1995). In seeking greater depth to the participant’s narrative, the guiding questions were
critically employed to dig deeper and to help them expand on their service reflections. The author, as sole interviewer, was conscious that undue interference during the participant’s narrative might unintentionally bias the information provided (Simons). Engaging each participant to check their interview transcription ensured transparency (Curtin & Fossey, 2007); this and the presentation of the condensed ‘Preliminary Themes Arising’ document ensured preliminary interpretation of data by the author was congruent with each participant’s service experience (Curtin & Fossey). These member checking activities were aimed at data authentication and fairness of interpretation.

**Data triangulation.**

Triangulation is used in qualitative research to validate findings from multiple perspectives to enhance trustworthiness (Kielhofner, 2005). In this study, data analysis triangulation and investigator triangulation were both applied, to confirm the study’s findings were a fair representation of the Australian seating service experience.

Data source triangulation describes ‘the use of multiple data sources in the same study for validation purposes’ (Hussein, 2009, p. 3). Collecting data from four stakeholder groups across three locations allowed the use of source triangulation to cross-check information from a number of differing but relevant sources (Stake, 1998). The in-depth interview process was also aimed at data source triangulation, by collecting rich descriptions from multiple perspectives to expose the breadth and depth of the service experience (Curtin & Fossey, 2007). Collecting both divergent and similar service experiences helped to authenticate both and to provide a holistic view of the Australian seating service (Curtin & Fossey).
Data analysis triangulation describes the use of more than one method of analysis for the same data source (Hussein, 2009). The multiple phased approach employed in this case study analysed data from three perspectives (Kielhofner, 2005). The first, a thematic analysis, identified commonalities and differences to make sense of the seating service experience, from the service recipient and service provider perspectives. The second approach delved into the same data from a decision-making perspective, and was followed by a third analysis of the same data which took a social justice perspective. The findings from each analysis were compared with the relevant literature for confirmation, and was subjected to further scrutiny if not validated in the literature (Yin, 2009). This rigorous multiple approach strengthened the interpretation as emergent themes were investigated from multiple perspectives, and triangulation confirmed the conclusions (Kielhofner; Hussein).

Investigator triangulation describes the process of using two or more individuals to analyse the same data independently (Kielhofner, 2005; Stake, 1995). Peer review was undertaken by three adjudicators: two academic supervisors and one expert mentor as part of investigator triangulation (Stake). Each was provided with two full interview transcripts for independent analysis. The first of two review sessions was undertaken with the two co-located adjudicators (supervisors). Their findings were revealed and discussed, then compared to the author’s findings. A second review was undertaken with the third adjudicator (expert mentor) a week later. Both reviews concurred with the themes identified and helped to bolster the consistency, rigor and trustworthiness of the analysis (Krefting, 1991).
Addressing subjectivity bias.

Research protocols were implemented to ensure the trustworthiness and critical subjectivity employed during data synthesisation (Simons, 2009). Transparent data analysis and interpretation credibility were addressed as part of the PhD supervisory sessions (Simons). Supervision was undertaken by two academics who brought with them over four decades of extensive research wisdom, while specific clinical knowledge was provided by an expert mentor with over 35 years of seating service experience, management and education.

The author’s prior knowledge was employed consciously during the design of the research guiding questions. The guiding questions were reviewed for neutrality by the academic supervisor and the expert mentor.

The lengthy interviews employed in this research allowed time to explore the participant’s experiences for perceived meanings, opinions or perspectives. The author engaged the participants in a familiar environment where they felt they could share their service stories and opinions of service participation honestly, in confidence (Krefting, 1991).

While the author’s prior seating service experience was acknowledged as vital in collecting qualitative data (Krefting, 1991), it had the potential to introduce researcher bias (Curtin & Fossey, 2007). To address this, the author practised a number of reflexive activities aimed at bolstering objectivity, including author logging, concept mapping, and regular supervisory sessions (Simons, 2009). The preparation of conference abstracts, and through study presentations and papers also offered opportunities to test researcher reflexivity (Curtin & Fossey). Throughout the course of the study, findings were
disseminated to targeted conferences, as a valuable strategy by which to present research interpretations honestly and transparently to informed audiences. Presenting the progressive study findings to informed conference audiences was valuable in enhancing interpretation and ensuring credibility (Krefting, 1991).

**Research reliability.**

Yin (2009) advised a well-planned research design enhances research dependability. In this study data collection and management protocols aimed at accurate interview recall (Yin). The interview protocol included audio recording and transcribing interviews in full, according to standardised transcription protocol (McLellan et al., 2003). Interview protocol also aimed to authenticate the data collection. The combined member-checking activities of the full transcription and ‘preliminary themes arising’ document were additional forms of ensuring transparency. The additional activities of recording field notes and author logging intensified data recall accuracy, which strengthened the reliability of the data collection process (Simons, 2009).

A two-phase approach to analysing the same data from differing theoretical perspectives was aimed at achieving theory triangulation (Stake, 1995) to boost research dependability (Yin, 2009). The research design strengthened the trustworthiness of the qualitative research method (Simons, 2009; Yin); both it and the adopted protocols could inform subsequent qualitative studies informed by an in-depth case study approach (Simons; Yin), and the data interpretations might be a fair case study of the Australian seating service experience during 2011–12.
Conclusion

Chapter three outlined the qualitative study informed by an in-depth case study approach to examine the Australian seating service experience from the perspective of four stakeholder groups across three locations (metropolitan, regional and rural areas). The research protocols applied to collecting data and analysing the data, via a two-phase, five-stage process were presented. The author’s role as an informed investigator and her potential bias during data collection, analysis and synthesis of the qualitative data were addressed. The multiple methods used in the qualitative study were discussed as addressing research trustworthiness.
CHAPTER FOUR:  
The Australian Seating Service from the Participants’ Perspective

This is the first of three chapters presenting the study findings. This chapter presents the three major impacts on seating servicing in Australia: delivery type, systems of governance and service provision. The factors that impact on each of these components provide, for the first time, an overview of the Australian seating service sector.

The study findings showed a seating service sector operating within a healthcare system and its governance influenced seating delivery and seating service provision by dictating service policy, funding and service scope.

Seating Service Components

The first major finding to emerge from the study’s two-phase data analysis is of the factors that impact on seating service delivery. The findings identify access to and provision of seating services are influenced by the stakeholders’ geographical location, which limits the type of seating service available and therefore service accessibility. Figure 10 presents three major components of Australian seating service: service delivery, systems of governance and service provision. Each of these components and their sub-components are presented below, commencing with the service delivery and its relation to the stakeholder’s geographical location. The first major factor in Australian seating service to be discussed, therefore, is service delivery in relation to the stakeholders’ location and its impact on service access and service type (see Figure 10).
Service Delivery in relation to Stakeholder Location and Service Type

The geographic location of the participant affects service access and the type of seating service available. In this study, participants and services located in the state capitals are referred to as metro-based. Regional participants and services were located in large commercial centres that serviced a regional area. Being regionally located implied a less populated region where, health related services were more generic with greater caseload variation (i.e. less access to specialised services). This was noted by this regional clinician who compared her past metro-based specialisation with her current regional generic service experience; ‘I had a close affiliation with the specialist services there, so when I really first started doing specialist seating out in the country [it was] really for many and varied clients’ (Clinician Bev). Rural participants who lived in remote rural towns and communities often had to travel to access or provide seating services, sometimes by
aircraft; more often by car often with carers, as much as four driving hours. Rural
participants, in the absence of specialised services, procured their own, often standard
wheelchair and seating technology independently of clinical services. As noted by this
remotely located consumer: ‘Nothing was specialised. No, I just got a [wheelchair] chair. I
had not a lot to do with therapists, I have to say’ (Consumer Christine). For fifty years,
Christine has self-funded her power chair technologies and specialised seating needs, with
minimal assistance from specialist services, due to a lack of locally based services in her
remote community.

Location is a major determinant of the type of seating service available, as is
explained later in this chapter. The study exposed nineteen specialist seating services that
delivered a dedicated specialist seating service, similar to the clinic-based service described
by Cooper (1998); the majority were located in ten Australian centres. The relevance of the
consumer’s geographical location to specialised seating service access is a recurring theme,
and becomes clearer when the services are located on an Australian map (Figure 11). There
are eight Australian state capitals. As noted on Figure 11, the study located sixteen metro-
based specialist seating services (red stars), located in seven state capital cities: Brisbane,
Sydney, Canberra, Hobart, Adelaide, Perth, and Darwin. At the time of the study the eighth
capital, the city of Melbourne did not operate a specialist seating service. Although not
specifically shown on the Australian map, the findings also exposed great variation in the
distribution of specialist services. For example Sydney hosts five seating services, Perth
three, Adelaide three, and Brisbane two. The study also identified two regional specialist
seating services (Figure 11, yellow stars): one in the large regional centre of Townsville
(Queensland) and another smaller regional centre, Launceston in Tasmania. Both operate a
clinic-based service. Finally, the study identified one rural service located in the remote centre of Alice Springs (Figure 11, blue star), 1500 kilometres to either its state capital, Darwin or to Adelaide (Distance Calculator, 2015). At the time of the interview, the Alice Springs SEAT Service, was for the first time operating with a locally based seating team. The unusualness of a local service in her remote community was noted by Consumer Christine: ‘Specialised seating is relatively new in Alice Springs’. This service was remarkable as prior to this, a visiting metro-based seating service delivered a case-by-case service from Darwin, approximately 19 driving hours away.

Figure 11. Location of nineteen Integrated Services in 10 Australian centres

Source: Google Images, 2014
As Figure 11 shows, there are substantial distances between the identified specialist seating services. For example there is 1357 kilometres between two Queensland based seating services located in Townsville and Brisbane (Distance Calculator, 2015). So location (where the participant resided) directly influenced service access and as a consequence the provision and choice of appropriate specialised wheelchair and seating technology. Those within easy access of a specialist service were better serviced, than those who either had to endure long travelling distances; or who had to seek an alternate, often less specialised service, because travelling distances were prohibitive.

**Type of Service Delivered**

The second major domain in Australian seating service, as noted in Figure 10, is the seating service type. The findings exposed three broad forms of services delivered as: the Integrated Service, the Vendor Clinic and the Networked Team (see Table 5). The first type identified in the study is the Integrated Service that delivered a dedicated service specialising in wheelchair and seating technology. These provided a comprehensive procurement service, and were staffed by a range of expert seating professions. Each Integrated Service operated exclusive services, as the two examples provided below begin to expose. Clinician Neve illustrated the complex business model that highlighted a structured service and team roles of the Integrated Service she worked within as a:

Fee-for-service clinic which consists of 4 business units (assessment/consultancy, manufacture, hire and maintenance). It is staffed by therapists, technicians,
upholsterers and admin support staff ... we are a branch of a not-for-profit residential care organisation.

By comparison, Vendor Matt’s description below provides some insight into the variety of service approaches, as the health funded Integrated Service of his employment required a flexible service approach to accommodate the different levels of service recipients’ experiences:

Some people use us as a service when they don’t have the expertise ... You get some therapists that prescribe to you what they want done ... it almost reads as if they could make it, they would [build it] themselves. We have therapists that we commonly work with ... collaborative approach. But, again, it varies on who you’re working with and where they’re from.

Nineteen Integrated Services were identified in the study. Each operated an independent and unique service, commonly aligned to a workshop team. Each was funded differently, and this influenced the scope of their service.

The second seating service delivery type identified was the Vendor Clinic (see Table 5), used here to refer to an expert vendor assessment–prescription consultancy service provided by a supplier service, with seating expert in a range of technologies. Vendor Sarah, a seating expert and wheelchair supplier, shows her extensive wheelchair-seating service experience through her confident application of non-complex to complex technology by constructing bespoke or one-of-a-kind technology: ‘It’s finding the solution that best suits that client whether it’s an off-the-shelf product or whether it’s a custom-made product’ (Vendor Sarah). Vendor Clinics delivered an expert vendor seating assessment
service as consultancy service (to assist the prescribing clinician). Four suppliers stated they provided a seating assessment service as Vendor Clinics (two were metro-based; and two regional Vendor Clinics were located within two driving hours each from their capital cities). The Vendor Clinic, located within the supplier’s commercial premises, operated a type of community-based seating service and some operated a mobile service as described by Cooper (1998).

The third major service type was delivered by the Networked Team (see Table 5), used here as a term for a loose team of service recipients and providers formed to deliver a both a wheelchair and seating service, on a case by case basis: that is, for an individual consumer. The Networked Team commonly provided services to varied caseloads as part of a broader service. The caseload diversity (complex and non-complex) was evident when Clinician Rocko, located regionally described his workload: ‘so we do heavy complex guys ... being the community OT in the district ... [We also prescribe] all the chairs for all the spinal guys [sic] ... [they are] a lot of the straightforward [wheelchair requests] ... The more complex ones we’d do with [a seating service]’. In this specific scenario, Clinician Rocko, an experienced seating clinician, accessed a regionally based Integrated Service to complement his Networked Team, on an as-needs-basis. The majority of Networked Teams contributing to this study were small teams commonly comprised of a locally based wheelchair supplier and prescribing clinician who worked with the consumer and carer/s in their local environment. The Networked Team was formed in response to individual seating requests or referrals, delivering a service according to individual consumer need. The findings identified a wide variety of services delivered by Networked Teams across metro,
regional and rural Australia. To the author’s knowledge, this service type has not been described in previous literature.

Table 5 Three seating service delivery types accessed in the Australian context

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrated Service</strong> (N=23)</td>
<td>A comprehensive specialist seating service provided by an expert team dedicated to wheelchair and seating procurement</td>
</tr>
<tr>
<td><strong>Vendor Clinic</strong> (N=23)</td>
<td>A consultant wheelchair-seating assessment service delivered by a vendor who is also a seating expert, as part of a full wheelchair and seating supply service.</td>
</tr>
<tr>
<td><strong>Networked Team</strong> (N=31)</td>
<td>An informal team formed by a primary prescribing clinician in collaboration with a consumer to procure appropriate wheelchair and seating system from a network of wheelchair suppliers.</td>
</tr>
</tbody>
</table>

Table 5 describes the three main delivery types of seating service as broadly identified in Australia. Each of these three service types delivered services depending on
caseload, cohort specifications (age/disability type), geographical location and funding source. These three seating service types are used throughout the thesis to describe a delivery type of service. As noted in Table 5, the Networked Team was the most accessed seating service (N=31). This is of relevance as the Networked Team commonly provided a seating service within a health or disability service, on a case basis, thus was less visible as a structured service.

**Systems of Governance and its influence upon Service Delivery**

The study exposed a system of governance that influenced disability policies and dictated service accessibility, delivery scope and technology provision. Governance in this context refers to a system of policies and protocols that influence the provision of seating services. This study exposed a system of governance that exerted control at a service funding level, at a consumer level (via a system of classification of funding eligibility), and at procurement level via wheelchair distribution protocols (see Figure 10).

The government sector was the dominant component of the Australian seating sector, in which contained a non-government and a commercial sector. The government sector was involved predominately in the health services (hospital, rehabilitation and community) that operated many of the Integrated Services. There was non-government sector was dominant in the non-for-profit sector operating disability services (including seating services), for instance for those with cerebral palsy, or for children with disabilities. The commercial sector was dominated by the services supplying wheelchair and seating technology. Vendor Clinics operated in the commercial sector. Many prescribing clinicians were employed either by government or by the non-government organisations, and provided either a
Networked Team or an Integrated Service. Service funding policy and protocols decided by the system of governance.

**Funding policies and systems.**

The findings revealed the scope of a seating service was determined by their funding source. Each seating service was funded uniquely by either government, non-government or commercial revenue. The identified Integrated Services were funded variously by government or non-government funds; the Vendor Clinics were funded by independent commercial businesses, and the funding source for Networked Teams was a blend of all three. The two members of the Networked Team (prescribing clinician and supplier) were funded differently: the prescribing clinician was commonly employed by a government or non-government organisations; while the wheelchair supplier was funded as a private commercial business. The consumer was funded by government, insurance or private funding. Service funding is explore in more detail now.

**Service funding: Recurrent or Intermittent.**

The findings show each seating service type received funding, either directly or indirectly. The method by which funds were supplied and the amount influenced their approach to service delivery, the scope of service and the technology availability. Service funding was provided as recurrent and intermittent funding. The optimal method identified was recurrent, which provides a regular, consistent flow of funds, in quantity and in timing. Recurrent funding guaranteed service predictability, enabling seating service flow and continuity of seating manufacture. A recurrent funding policy enables a predicable scheduled service flow, ‘So people just get seen, I guess, in priority and date order with their prescriptions’ (Clinician Tammy) and permitted clear service parameters.
Less efficient was identified as intermittent funding, also known as ‘bucket funding’ and ‘funding dumps’ (Clinicians Rocko; Tammy respectively) and was described by participants as irregular in quantity, duration and timing. The service impact of intermittent funding, as experienced by Vendor Walter was described as: ‘We had an interesting situation where [a funds program] would have no money for nine months and then would get funded from the government and so it would suddenly release you know $200,000 worth of equipment’. In this case, Walter described the adverse impact of funding uncertainty (insecurity of funding flow) on seating service provision and flow that caused service pressure. Service providers spoke of the difficulty and stress of managing a backlog of wheelchair requests once funds were released. Clinician Tammy shared her frustrations of coping with inconsistent funding access that affects service providers and consumers in differing ways.

I’d probably do a wheelchair assessment every two weeks and fill in prescriptions for these wheelchairs and sending [funding applications] through ... and nothing would happen ... Then all of a sudden ... the minister released ... money [for] everyone who has prescriptions from this date to this date. [Referrals] can go through seating clinic and then there’d be a massive wait for the seating clinic.

The above exposes the impact of intermittent funding policy on the clinician, the service and the consumer: the wheelchair referrals do not abate; the clinician continues to generate funding applications for the next funding release; the seating service has to manage the consumer backlog once funding’s released and the consumers have to endure wheelchair provision uncertainty, while they wait for funding and a seating service appointment.
In addition the service funding variation, the consumer endured funding discrimination informed by two funding systems operating in parallel. These are described below as funding at the consumer level.

**Funding Eligibility Classification: Compensable or Non-compensable status.**

The second funding system identified was at the consumer level: a two-tiered funding environment. Consumers were classified by their entitlement to a funding system: as compensable or non-compensable. The compensable system was privately funded (insurance-type systems). The non-compensable system was funded by the government. Five consumers fitted into the compensable classification; the remainder, and all the care providers, were located within the non-compensable system.

The two systems ran in parallel, and the difficulty of having two systems operating together was noted, particularly in those undergoing spinal rehabilitation. Participants spoke of the inequity experienced where a compensable consumer was provided with two non-standard wheelchairs and the non-compensable consumer was provided with a single, often, standard manual chair. Compensable Consumer Bea stated her insurance agent recommended the funding of two wheelchairs (a light-weight manual and power chair) following her spinal injury. Her non-compensable rehabilitation peer was provided with one wheelchair following his spinal injury. Both service access and wheelchair procurement were governed by the consumer’s classification as compensable or non-compensable. This influenced access to and provision of seating service and wheelchair technology. The four self-funded consumers spoke of selecting their seating service providers to acquire the most appropriate wheelchair technology, according to their individual needs. By comparison, the non-compensable consumer relied on government
funding, distributed according to each state-run funding protocols. Six non-compensable consumer respondents received a single wheelchair within a prescribed funding cycle. The funding cycle varied from between five to seven years, depending on the consumer’s age, disability type, service access and state protocols.

**Wheelchair funding protocols.**

The third funding system identified was at the level of wheelchair procurement. Each Australian state operated an independent state-funded disability program that dictated the distribution protocol for wheelchairs. There was no evidence of a universal method of distributing funding or in the provision of wheelchair technology. In some states the distribution of wheelchair funding was centralised, where a state body distributed funds to eligible individuals according to their wheelchair requests (based on a prescriber’s funding applications). In other states distribution of wheelchair funding was decentralised and funding committees or ‘equipment panels’ distributed according to the funds provided, caseload priority and service protocols.

How funds were disbursed by the consumer’s funding source impacted on the wheelchair they were provided. Carer Lenna stated having no choice as her son’s wheelchair was decided by her state-run funding program: ‘for this reason, I was restricted in accepting the wheelchair offered to my son’. Each state-funded program’s protocol determined who was eligible for funding, and for what services and technology. The three protocols identified in the study are discussed below.
**Wheelchair distribution protocols.**

The study exposed three funding protocols that predominately governed non-compensable wheelchair procurement (see Figure 12). In this thesis, the three funding protocols were titled ‘needs-based’, inventory-listed’ and ‘subsidy-scheme’.

- The first funding protocol was the ‘needs-based funding’ (Clinician Jon). The funds distributed via a needs-based approach dispensed funding according to the consumer’s established goals, to ‘suit individual needs’ (Clinician Catrina).

- The second funding protocol was an ‘inventory-listed’ system. The inventory-listed approach distributed wheelchair-seating technology according to an imposed ‘inventory-based’ (Clinician Talia) store of specified technology.

- The third funding protocol was the ‘subsidy-scheme’ (Clinician Jane). The subsidy-scheme approach provided funding according to cost units (i.e. based on individual items). The subsidy-scheme approach funded standard wheelchair technology for partial or complete purchase. The vendor experience of supplying wheelchair technology within a subsidy-scheme protocol varied. The protocol controlled the type of wheelchair technology provided for a non-compensable consumer and directly if inadvertently influenced how wheelchair seating was prescribed.

The terms: needs-based, inventory-listed and subsidy-scheme, listed below in figure 12, will be used throughout the thesis to describe the funding protocols accessed by the participants. Figure 12 provides an overview of the components of each of the each of the funding protocol and how these impact on service and technology provision. Each is now described in more detail, commencing with the needs-based system of funding.
Needs-based approach.

A funding program governed by a needs-based protocol dispensed funds based on prescribed funding applications according to consumer needs and goals. Clinician Catrina described needs-based wheelchair procurement as ‘focused on individual customisation … as in a person-centred approach’. A ‘person-centred’ or ‘client-centred’ approach as described by the participants referred to a focus on matching wheelchair and seating technology with the individual consumer’s specific mobility goals. Such an approach was aimed at enhancing the consumer’s ability through appropriate wheelchair mobility to actively engage in desired activities across all chosen life domains. A needs-based approach permitted the consumer's occupational and environmental needs (and wants) to drive wheelchair-seating prescription. A needs-based approach allowed flexibility in prescribing non-standard wheelchairs according to consumer goals: an intentional person-centred prescription approach. Prescribing for non-standard wheelchair technology required a
greater degree of seating service confidence and competence to justify the required
technology to be effective.

As previously noted, the only participating consumer, funded through an insurance-
based scheme (compensable) was provided with wheelchair technology based on a needs-
funded approach. Early in her rehabilitation, her insurance agent recommended Consumer
Bea procure two wheelchairs, customised seating and additional care support for
community access. To validate prescription competency, some funding programs running a
needs-based protocol supported an internal system of qualifying prescribing clinicians as
wheelchair-seating ‘needs assessors’ (Clinician Mia). This is not a universal practice. A
qualified needs assessor was endorsed according to a specific level of competence, as for
‘complex or non-complex’ wheelchair and/or seating assessment-prescriptions (Clinician
Mia). According to Clinician Mia, consumers with non-complex needs were provided with
less expensive, standard technology while complex needs required more complex and
expensive, non-standard technology with capacity to match more demanding postural
support.

A needs assessor, endorsed for complex prescription, was qualified to undertake the
assessment and prescription of non-standard, sophisticated (and costly) wheelchair
technology. Clinician Belle, who was an endorsed needs assessor for complex seating needs
acknowledged the needs assessor system helped standardise prescription competence based
on case and seating complexity, this validated the reliability of the wheelchair-seating
prescription and thus accelerated funding approval: ‘As long as it’s justified with the
assessment and the report ... it’s generally provided’ (Clinician Belle). As endorsed
complex needs-assessors, both Clinicians Belle and Mia provided clinical supervision to
their less experienced peers. In some regions, an endorsed non-complex needs-assessor may prescribe for less sophisticated technology independently, but required clinical supervision from more experienced clinicians (of which some may be endorsed needs assessors) for more specialised and or costly technology.

Although the needs-based funded approach provided appropriately prescribed wheelchair-seating systems, consumer demand outweighed available funds. Many consumers experienced a waiting period before being accepted into a needs-based funding cycle. Despite a wait, once accepted, the person-centred approach was linked to a positive wheelchair outcome.

*Inventory-listed approach.*

The second funding protocol identified was the inventory-listed approach. A program governed by an inventory-listed approach controlled wheelchair and seating technology distribution according to a restricted list of catalogued wheelchair-related technology (often purchased economically in bulk). In Clinician Talia’s experience, her inventory-listed system stocked and distributed technology by item categories, such as by ‘wheelchair; seating/posture and pressure care’; ranging from non-complex to complex technology. Each category contained two or three tendered items chosen by an equipment panel, at state or regional level. This was described by Clinician Nancy whose inventory-listed program categorised of technology according to an escalating scale of complexity, as:

Five or six categories ... [The] top of the range one has recline and tilt and has complex seating in it ... So they have two chairs in each category that fit into the requirements of what might be required by [complex needs] ... What [the equipment panel] did was go through and look at all the things that might be required. I think
they’ve tried to go Australian-made. They’ve looked at definitely standard-tested chairs and reliability.

The benefit of working within a pre-purchased inventory-listed system was clinicians knew what items were stocked: a prescribed listed item was provided relatively rapidly. Conversely, as specialised wheelchairs routinely required non-standard technology was rarely stockpiled in an inventory-listed system, specialised technology was procured on an individual basis. In Clinician Jon’s case, any request for a non-listed item was managed separately by an equipment panel. This extended procurement time and required considered clinical justification. As non-listed wheelchair technology was not usually stored as an inventory item, the panel review and purchase incurred considerable delay. This resulted in clinicians being more cautious, as noted by Clinician Jon: ‘You really have to think about your clinical rationale and how it is being done’.

**Subsidy-scheme approach.**

The third funding protocol identified was the subsidised-scheme approach. A program governed by a subsidy-scheme approach dispersed funds for technology according to set unit costs. The subsidy-scheme aimed at distributing funds equitably across consumer demand. It provided funds according to set ‘ceiling prices’ (Clinician Valerie) or ‘funding ceilings’ (Vendor Tom) per item within technology categories. For example, Clinician Valerie stated her subsidy-scheme funded according to discrete categories: ‘postural seating is a separate category and you get additional funding ... [then funding for] cushioning, pressure cushions’. To comply with protocols when compiling funding applications, clinicians spoke of following the subsidised list closely, to accrue available funding. Vendors Tom and Millie and Clinicians Laura and Jane, who worked within a subsidised
environment, spoke of using the costed units as per the subsidy-funding protocols when preparing wheelchair quotations, to attract maximum funds. This demonstrates that funding dispersed by a subsided-scheme approach directly influenced wheelchair-seating prescriptions, and technology selection was closely aligned with available funding.

Compiling funding applications to meet subsidy-scheme protocols according to cost items was ‘quite time-consuming’ (Clinicians Talia), but this service time was rarely visible in the wheelchair purchase cost. Furthermore, a subsidy-scheme rarely funded all specialised wheelchair and seating needs. Vendor Sarah estimated her subsidised-scheme funded approximately ‘75–80%’ of her paediatric wheelchair-seating systems. The gap was greater for adults, as noted by Consumer Hallie, whose self-funded ultra-lightweight manual wheelchair would have been only partially remunerated: ‘You only get $2,000 [subsidised funding]. ... I think this [titanium manual] chair was about $4,500 – $5,000 then, so it's probably about $7,000 now’. To manage the funding gap with her urgent need for lightweight manual mobility technology, Consumer Hallie initially self-fund a second-hand manual wheelchair while she raised the necessary funds to purchase an Australian-made ‘bespoke RGK rigid framed chair’: a bespoke ultra-light weight manual wheelchair was specifically required for her energy-sapping condition. Bespoke is a term commonly used to describe the construction of a one-of-a-kind wheelchair-seating system.

The funding gap for subsided power chairs also varied. Clinician Valerie stated that standard power chairs attracted subsidised funding of $6000; however, actual costs routinely were far above this, especially for complex needs: ‘the ones we’re dealing with quite often [the wheelchair needs] are up towards that $12,000–13,000 mark’. A further
example of the cost of non-standard wheelchair technology was supplied by Clinician Rocko: ‘A Quickie power base—quite a good one—you are at $15,000 before you stick a seating system [on]’.

Clinician Cath stated her subsidised funding program failed to supply adequate funding, as: ‘half [funds required] for those chairs that I prescribe. It’s pretty appalling, really’. The cost of specialised seating escalated further with the costs of the necessary specialised technical services: ‘You stick their [supplier] hours on and you end up at $25,000 very quickly (per wheelchair)’ (Clinician Rocko). Accessing additional funding to complete a specialised wheelchair procurement was a recurring theme.

Accessing additional or ‘top-up funding’ to bridge the gap between purchase cost and dispensed funds caused participant distress. Seeking additional funding to complete a wheelchair purchase was routinely handled by the prescribing clinician acting as the principal prescriber, and was commonly sought from an array of local, federal and private funding sources such as: ‘philanthropic trusts or charitable groups’ (Clinician Wendy).

Accessing top-up funding required considerable effort, time and networking to be successful. This required substantial effort to stay abreast of potential funding sources, thus adding to their workload: ‘a lot of work around trying to understand what happens now across all the [funding] schemes’ (Vendor Freda). Seeking additional funding increased the clinician’s contribution. ‘I feel for the therapist, because it’s generally up to them to find the extra top-up funding, and it seems like it takes a lot of their time and effort, hunting for money when they really shouldn’t have to’ (Vendor Tom). Seeking addition funding was identified as a hidden cost absorbed during wheelchair procurement, as a service cost and drain of resources. ‘[I’d] say, up to seven hours and then I’d want to allow another, say, two for any queries, so I’d say nine hours’ (Clinician Cath). The contribution made in seeking
adequate funding was identified as an invisible service cost. This was one of a number of
hidden costs identified in non-compensable wheelchair procurement.

The study revealed a multi-layered process to matching consumer need with
appropriate technology while complying with various funding protocols. Seating services
and providers expended considerable time estimating the costs associated with providing
technology and services. One example revealed was in the process and application of
modular technologies. The application of modular wheelchair and seating technology was
often procured within a more relaxed service model. Clinicians and their consumers
engaged in and trialled a range of potential technologies, often involving a range of supplier
services, in various locations and multiple service occasions.

Funding protocols routinely required a technology-trial evaluation process to
demonstrate (via the funding application) the clinical justification for all wheelchair-seating
prescriptions; however rarely funded the modular technology trial process. While the
supplier recouped pre-purchase services (associated with trials) if a purchase order was
activation, within the non-compensable system, the clinician’s services was rarely
remunerated. The prescribing clinician’s time in technology-related research, in the
technology-trial evaluation process and in the compilation of each funding application were
rarely included in a non-compensable wheelchair procurement. The failure to explicitly cost
these services into each wheelchair procurement was identified additional ‘hidden costs’
(Clinicians Jane; Sally). This was a noted problem identified by clinicians whose clinical
hours were absorbed by their employer’s service costs.

In comparison to modular technology procurement, custom-made seating solutions
required adequate funding to commence the construction of bespoke custom-made
technology. Therefore the funding of custom-made wheelchair-seating systems were formalised and overt. The funding application was undertaken before construction commenced, based on an estimate of costs. For example Clinician Catrina described her defined pre-service cost estimation process, prior to the first appointment, based on the referral data: ‘I make an estimation based on primary therapists’ referral information to estimate of total cost per request. This I send to the funding body for approval prior to first appointment’. Estimating provision and service costs prior to construction required considerable service experience (and trust in the referring agent’s information). Funding applications within a compensable system were comprehensive: that is, all clinical, technical service and technology costs were declared and recouped.

A number of participants stated their funding programs lacked transparency and this disenfranchised their control. This frustration was articulated by Clinician Wendy as: ‘I don’t know who is governing the ... bucket of money for you. Who’s making sure that they’re using it efficiently and well? And if they’re not using it all, where is that money going?’ Transparent funding processes were linked with timely wheelchair (and seating) procurement: by alerting participants early to plan in cases of funding shortfalls and allowed proactive vendor scheduling in anticipation, to speed the provisional sessions. The empowerment afforded by system and service transparency was embedded in the National Disability Insurance Scheme (NDIS) philosophy. The NDIS is presented in more detail in Chapter seven, however a brief overview is provided now, as relevant to funding, wheelchair procurement and service provision.
National Disability Insurance Scheme

At the commencement of the data collection period (October 2011 to November 2012) there was intensified interest in the Australian media to a government proposal for a unified funding approach called the National Disability Insurance Scheme (NDIS). It was speculated that this scheme would provide people living with complex needs with self-managed NDIS funded packages for consumer-directed procurement of services and technology, based on personal need. The NDIS environment proposed an open market in disability-related services, including wheelchair supply and seating service sector. This understanding was fuelled by media speculation, with very little supporting fact. The participants’ initial responses to the scheme were vague and highly speculative, but as the NDIS debate strengthened, the interview content increased as participants’ opinions began to take shape.

The preceding content has provided an overview of the funding policies and systems that operate within the Australian wheelchair-seating sector. The following section continues to define the Australian seating service environment, as identified in the study.

Seating Service Provision

The study findings expose a number of components to the provision of the Australian seating service environment. This included levels of seating services, its stakeholders and communities of practice (see Figure 10). Each influenced seating service provision and is expanded below, commencing with the stakeholders.

Stakeholders

The seating service team consisted of the four stakeholder representatives, divided into the service recipients and service providers. The service recipients are the consumer
and their care providers (who provide care and support during wheelchair procurement). The service providers are those offering clinical or technical services.

The clinical services were provided by the participating prescribing clinicians, as a seating consultant or as a primary therapist. The primary therapist provided a direct service (rarely seating specific) and in this study, was the principal prescriber responsible for the wheelchair-seating prescription. The seating consultants provided a seating service as expert consultants in support to the principal prescriber, employed in specialist seating services.

Technical services were provided by wheelchair suppliers, rehabilitation engineers and seating technicians. The rehabilitation engineers and seating technicians were employed by specialised seating services, whereas the wheelchair suppliers operated or were employed by commercial business. Wheelchair suppliers were further defined by the service they provided. They worked in dedicated supplier services offering sophisticated wheelchair and seating technology solutions (they are called ‘expert vendors’), or in a more generalist group of wheelchair suppliers who offered wheelchair and seating technology services as part of a retail service offering diverse assistive technology such as walking, lifting and hygiene technologies.

**Levels of Seating Service**

As noted in Figure 10, three levels of seating service were identified in the data: operating at a primary and secondary level, and as an outreach service. Most participating prescribing clinicians who were employed as primary therapists worked at a primary level, providing wheelchair-seating prescription as part of a diverse caseload. The primary therapist was not commonly employed as a seating expert, however as the principal
prescriber, they were required to have expertise in the assessment and prescription process. Their depth of seating experience was pivotal to the quality of wheelchair prescription provided. In reality, the principal prescriber was frequently employed as a primary therapist whose clinical role was to deliver a range of services. The primary therapist’s seating skill and confidence varied individually as informed by their caseload focus. This conflict of case focus was observed by Vendor Freda’s statement: ‘Obviously they’ve got their own caseloads, they’ve got their own priorities’.

**Primary service.**

The wheelchair procurement process commenced at the primary level of service. The primary service was commonly delivered by the consumer’s locally based service provider/s (see Box One). As this service initiated the seating process and provided services in the consumer’s home environment, it was the most commonly accessed seating service within this study.

**Box One Service Model 1: Primary seating service**

The primary seating service model initiated the wheelchair procurement process: commencing the wheelchair and seating assessment, prescription and procurement services. Within the model, the prescribing clinician was a primary therapist, acting as the principal prescriber for the consumer’s wheeled mobility and postural needs. The primary therapist’s seating experience varied depending on clinical motivation, competing caseloads and the employer’s scope of service.

The primary seating service model described a loose collaboration of (often locally based) service providers routinely comprising of employed prescribing clinicians from
health or disability services and commercial suppliers who together provided independent clinical and technical services; bound informally by a common focus on an individual consumer’s wheeled mobility goals (i.e. case by case). Clinical service hours were routinely absorbed by the budget of the employing service and not accounted for in the wheelchair costs. Clinical services were provided ‘for free’ (Clinicians Nancy; Betty; Nadia). It was common within the primary model for the vendor service hours to be accrued gratis on the promise of a wheelchair-seating procurement contract or purchase order: ‘We do a lot of [wheelchair] quotes. But if you get half of them, you know, you’re doing really, really well’ (Vendor Millie).

In general the individual wheelchair-seating request and/or referral initiated a seating service process. The primary therapist was responsible for coordinating the request (see Figure 13) and for deciding appropriate services for each consumer need. The primary therapist was responsible for undertaking the technology selection–justification process (funding application) to attract funding for the wheelchair and seating technology.

The primary model describes a Networked Team (see Table 5).

The primary seating service was routinely undertaken in the consumer’s home environment and comprised of the consumer (and carer where relevant), the primary therapist and invited vendor services. Vendor services may include one or a mixture of locally based wheelchair suppliers, wheelchair manufacturers and/or expert vendor suppliers or dedicated seating services. The selection of these services may be directed by the consumer’s experience, often based on past successful procurements. Where the consumer does not have a preferred vendor service, the primary therapist tended to
recommend suitable services, often based on the individual skills of a particular supplier or technician.

The approach evident in the primary seating service model tended towards modular technology: integrating a modular seating system with highly adaptable wheeled base. As such, this service may access expert seating consultation from a Vendor Clinic or a comprehensive seating service, such as an Integrated Service (if available).

The Networked Team within the primary seating service model was accessed most by study participants (refer Table 5). There was no way of quantifying the number of Networked Teams operating within Australia. These teams formed organically, were dictated case by case, defined by the consumer’s specific needs and ceased when the wheelchair-seating system was provided. These services commonly operated within the consumer’s home environment.

The seating skill of each Networked Team was ordained by the members’ collective wheelchair-seating experience and their access to specialised seating services. The benefit of a Networked Team was its accessibility: many are made up of locally based service providers. The weakness of the Networked Team was that its members’ seating expertise varied greatly, especially as the service was generally a single component of a diverse caseload. In some regions of Australia primary service teams could access assistance from a secondary source, such as a metro-based service. Teams operating in regional and rural Australia had fewer options available than metro-based service providers.
Consultancy service.

The second level of service was the consultancy level. As noted in Box Two, the consultancy seating service level was delivered by the two specialist seating services, the Integrated Service and the Vendor Clinics (see Table 5). The consultancy seating service model provided a secondary service to the primary seating providers, predominately the consumer and their primary therapist (as described in Box Two). Wheelchair suppliers had less contact with Integrated Services, as many consultancy services manufactured bespoke seating solutions.

Box Two Service Model 2: Consultancy seating service

The consultancy seating service model describes a secondary level of service providing expert consultancy to assist the primary seating service. The aim was twofold: to provide expert advice in seating assessment and prescription, and to provide custom-made seating solutions as a vendor service. The expertise provided by the consultancy service assisted in validating the wheelchair-seating prescription which was submitted by the primary therapist (who remained the principal prescriber).

The consultancy seating team consisted of specialist clinical-therapy and technical-workshop services. In the major of cases, the consultancy services focused on bespoke seating solutions, often custom-made on-site or outsourced to a manufacturer, depending on the seating approach. The data analysis identified the primary therapist as the dominant referral source. Referral requested specialist assistance to find solutions for consumers with complex mobility and postural needs; the consumer entered the consultancy service once the seating assessment had commenced. As a specialised service, the consultancy service
relied on the consumer’s primary therapist to provide all relevant bio-psychosocial, occupational, and environmental data, and postural goals (as part of their referral).

This consultancy service refined the seating assessment–prescription (provided by the primary therapist) for production–provision–fitting of the manufactured wheelchair and seating approach. The initial service confirmed the consumer’s seating function (as provided by the referral) by undertaking a comprehensive mat evaluation. Additional anthropometrical measurements for custom-made seating manufacture were taken and, where appropriate, a body shape imprint. The following provides one such example: ‘We have a first fitting, which is generally a moulding [customised seating employing] either the Shape System, the Acta-Back system … the Queensland Back system, and the Action Cushion systems and [the initial fitting] is when the initial things are taken’ (Clinician Belle). With this data, the cost of the seating technology and services were estimated: this technology quotation accompanies the funding application provided by the primary therapist. Once adequate funding was assured, manufacture commenced, including a series of scheduled provision-fitting sessions; for example ‘you might have a range of four or five fittings’ (Clinician Belle).

The consultancy service encourages the primary therapist to attend with the consumer to all consultancy sessions. Clinician Nadia noted the primary therapist’s knowledge is applied and enhanced by attending sessions: ‘the assessment and in all the fittings there’re more than a pair of hands. I want to be using them, educating them and also [the primary therapist] know the client much better than I do. So seeing what they think you know, and they know the client in different contexts, so they’re actually really helpful as well’.
The team configuration of a consultancy service depended on the seating approach (i.e. moulded or foam-on-ply seating manufacture). The provision and fitting process was the domain of the consultant seating service, with the consumer and primary therapist in attendance. The seating solution, once fitted to the wheeled base, was trialled at home as a prototype. The primary therapist and the consumer were responsible for this home-based prototype trial and evaluation. As the primary therapist was responsible for the trial outcome, their evaluation of the prototype trial was disseminated back to the consultancy service. There may be subsequent fitting sessions and re-trials before the completed wheelchair-seating system was optimised.

Once the wheelchair-seating system was discharged home, the consultancy service ceased and the primary therapist resumed responsibility for the post-provision review.

The study findings revealed that half the wheelchair supplier cohort provided a consultancy seating service. These expert seating vendors provided an assessment-prescription consultancy service in non-standard wheelchair, seating and electronics; as part of their Vendor Clinics. In comparison, the locally based wheelchair suppliers tended to provide advice in wheelchair technology, divesting the seating assessment to the consumer’s principal prescribers. The nineteen Integrated Services also provided a consultancy seating service and manufactured wheelchair and seating solutions. These were accessed for their specialist knowledge and advice, but could not directly prescribe for consumers funded through non-compensable or compensable systems. When external funding was requested the prescriber must be removed from the vendor source. Consumers who self-funded their wheelchairs purchased directly were not compelled to employ a
prescriber; however two consumers employed a prescribing clinician, while three worked directly with expert vendors (two with rehabilitation engineers and one with a wheelchair manufacturer).

The majority of the Integrated Services were metro-centric (except in Melbourne) and were thinly and inconsistently scattered across the nation (see Figure 11). This discrepancy in service accessibility was noted by Clinician Kay, who alluded to Melbourne’s lack of service, while service availability varied in other parts of Australia as:

In Melbourne, [Victorians] are stuffed really, yes, still 20 years behind on services [i.e. no service]. ... New South Wales obviously, a lot better resources, you’ve got a lot more choices to go through. ... Queensland, I think it’s okay. Adelaide, they’ve cut back a lot on [South Australian] services. I think. Perth seems to be reasonably well managed for Western Australians.

In the absence of an Integrated Service, Victorians relied on a small number of Vendor Clinics operating in Melbourne, including wheelchair manufacturers, however the number of manufacturers had diminished dramatically over the past decade. The Sibbings wheelchair was a favoured wheelchair manufacturer (by two Victoria participants), who had to find an alternative when this service closed their business: ‘the only reason why [my son] hasn’t got a Sibbings chair now is because they don’t make them anymore’ (Carer Ian).

As noted in Table 5, these two secondary services were accessed equally (N=23 each). The benefit of an Integrated Service and Vendor Clinic as dedicated service providers was these expert services had the capacity to manage complex caseloads. The weakness was these expert services were predominately metro-based, so ready access was
geographically determined. Furthermore, the limited number of Integrated Services (N=19) meant their service scope was defined by rigid service eligibility. The Vendor Clinics operated as part of a commercial business, were not eligibility confined (e.g. universal eligibility) and accepted all requests from consumers and the primary therapists appropriate for their mobility-postural needs.

It was difficult to quantify the number of Vendor Clinics operating in Australia. Their existence was dependent upon the number of expert wheelchair suppliers; this number was also unknown. However, the identified expert wheelchair suppliers participating in the study were located in or near metro-centres. They provided an expert seating assessment, (the mat evaluation), as part a consultant to value add their vendor service. A number travelled, providing seating assessment-consultancy services in the consumer’s home environment. The benefit of the Vendor Clinic was their service flexibility and accessibility.

The other half of the supplier sub-group were non-specialist wheelchair suppliers, or ‘equipment dealerships’ as described by Cooper (1998, p. 390). This group was more diversely located, some in regional areas and a number travelling to rural and remote Australia. These wheelchair suppliers considered the mat evaluation to be the domain of the prescribing clinician. This wheelchair supplier sub-group, providing equipment dealership services, was the most accessible, accepting seating requests based on their capacity to provide services for appropriate wheelchair and seating technology. The participating suppliers spoke of blending a compassionate customer approach with a commercial service model.
**Outreach service delivery model.**

The third level of service identified was a service delivering an ‘outreach seating service’ similar to that described by Cooper (1998). There were two types of outreach seating service noted: either as mobile seating (Box Three) or as an annual outreach clinic (Box Four). The mobile seating service was a service model used by a number of spinal seating services, delivering state-wide services throughout the year. By comparison, the annual outreach service provided a scheduled clinic-based service to a regional area, generally once a year. Some, but not all, Integrated Services provided an outreach service, either to regional centres or directly to regional dwelling consumers.

The mobile outreach seating service (see Box Three) tended to blend the consultancy services with the local primary services, where available.

**Box Three Service Model 3: Mobile seating service**

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<th>The mobile seating service model was delivered as an ongoing, year-round mobile service, to health services and consumers. The data identified the spinal outreach seating service. These operated as a specialised service commonly delivered as a ‘state-wide outreach service [operating] a calendar of planned clinics’ (Vendor Freda). For an example, Clinician Hanna described her mobile service as a small, multi-skilled team of experts who provided both a direct seating service: ‘We travel with one OT, one physio, and one speech [pathologist]... The technician then either drives with us, or he might take his own truck, and then it has like a mobile workshop in there’. The caseloads addressed by a spinal seating outreach service were complex. As modular technology was preferred, their degree of clinical-technical multi-skilling expertise</th>
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was exceptional: ‘Every client had multiple issues, usually about pressure sores, or just really, really complex seating needs that [local clinicians] couldn’t manage with any kind of off-the-shelf stuff, or at least the off-the-shelf stuff that those clinicians had access to’ (Vendor Freda). As Freda implied, her mobile service was a multi-skilled consultancy team with the capacity to provide comprehensive seating solutions for complex spinal cord injury. This service also acted as collaborative, consultant–educators to support locally based services and build local service capacity, case by individual case.

The mobile service liaised with regional services and networked with local providers to augment local wheelchair-seating servicing. As noted by two service providers, efforts were made to collaborate with the primary services, to attend to seating and pressure care early to ‘reduce hospital re-admissions’ (Clinician Laura), and the network consultancy services ‘link[ed] in with the local services’ (Vendor Freda) to build a local skill base. In general, it was funded by the host metro-based spinal service to provide mobile spinal services to consumers living within their designated constituencies.

The benefit of delivering a seating service to consumers’ home environment helped reduce the need for consumers to travel. Travelling time and distances over sometimes rough rural roads was recognised by Freda’s expert mobile spinal seating team, as a negative health determinant in spinal pressure care management:

The other thing was if they were medically unfit to travel, so if they had a pressure ulcer ... It’s not appropriate to ask them to travel one, two, three hours to see us when we tended to have the flexibility to go and see someone at home …
Generally if they’ve got more than one piece of equipment that we need to look at, so a power chair and a manual chair, or a power chair and a commode, or a manual chair and commode, it’s too hard, or impossible for them to bring stuff to [the metro-clinic]. It also doesn’t give us a chance to see their home environment, and to work through issues in the home environment (Vendor Freda).

Providing a home-based outreach service was aligned to the person-centred service approach. Mobile services encouraged the local service providers to attend, as joint service provision enabled knowledge exchange: ‘We are hopefully making a difference to people with a disability in the regional towns, by up-skilling the primary therapist in that area with the level of support that she needs’ (Clinician Hanna).

Another form of the mobile seating service model was provided by select specialist wheelchair suppliers with exceptional experience. Vendor Paul, an expert seating vendor of 20 plus years had accrued extensive experience and was considered a valuable resource in his state: ‘I don’t know everything and I’m not saying that I do, but I’ve done hundreds and hundreds of [seating] scripts for chairs and delivered hundreds of pieces of equipment and, you know, that’s got to count for something, I guess!’ Vendors Paul and Sarah each provided a mobile consultancy (that extended their metro-based Vendor Clinic service reach) to regional centres and directly into consumers’ homes. These two expert seating vendors collaborated closely with the locally based prescribing clinicians, who may or may not have wheelchair-seating experience. The service reach of these vendors was extensive; as noted by Vendor Paul: ‘69 therapists ... that I’d worked with in one year’ (Vendor Paul). As such these vendors provided an essential educational function: the capacity to
collaboratively share, exchange and transfer their seating skills, case by case, with locally based service providers. Expert vendor were a valued resource of a Networked Team.

The second outreach seating service was delivered as an ‘annual outreach seating clinic’ (Box Four). A number of metro-based Integrated Services provided this outreach service (see Figure 11).

**Box Four Service Model 4: Annual outreach seating clinic**

The annual ‘outreach clinic’ (Vendors Stuart; Matt) delivered a metro-based seating service to one regional centre for a limited time, e.g. ‘for one week’ (Vendors Stuart; Matt).

The annual clinic, routinely resourced by the metro-based host service, delivered a comprehensive seating service to a regional location. Most annual outreach clinics applied custom-made wheelchair solutions, usually moulded or foam-on-ply, that were manufactured on-site or fitted as bespoke seat inserts during a follow-up visit.

Locally based clinicians were encouraged to attend sessions with their consumers (with local service collaboration where available, and caseload permitted), however the annual clinic was driven by the expert seating team: ‘We do bring our own foam saws and those sorts of things, as well as toolboxes with our special tools. We also then get the raw materials either shipped there or we ship them with us from here [metro-base] and then we use a [local] upholsterer up there who’s fantastic’ (Vendor Matt).

A variation of the annual clinic was delivered by Vendor Walter as a vendor ‘mobile service’: as a trailer-mounted mobile workshop which delivered a seating service to multiple regional centres over a ‘six week period’ (Vendor Walter). This mobile service was delivered by an expert technical team (a rehabilitation engineer and seating technician),
who collaborated with local prescribing clinicians to solve, case-by-case, difficult seating needs. Seating manufacture occurred on-site in the mobile workshop and was fitted during that visit (several days duration).

The annual clinic operated in a number of different venues: for example ‘in a day a hospital, or a community centre, special developmental school’ (Vendor Sarah).

The annual outreach seating clinic was hosted by the consultative seating service and provided a comprehensive service delivered over a short, intense period to a select number of consumers within nominated regional centres. The annual clinic operated in a variety of venues: for example: ‘a day-hospital, or a community centre, special developmental school (Vendor Sarah) or a ‘district hospital’ (Vendor Freda; Clinician Nadia) and within ‘school classrooms’ (Vendors Matt; Walter). The annual clinics were staffed by the hosting technical–therapy teams (from the metro-based service) and they provided their own resources. The annual clinic was designed to alleviate some of the travel associated with attending metro-based clinics.

This outreach seating service provided particular benefit for bespoke wheelchair-seating solutions, not normally obtainable for consumers residing outside metropolitan areas. A variation of wheelchair-seating seating approach was offered by each outreach service: some manufactured on-site during the visit, others were manufactured by the metro-based service and fitted on a return visit.

The weakness of the annual outreach seating clinic was its intensity. The condensed process of assessment combined with on-site manufacturing of bespoke seating systems meant the days were long for the consumer and intense for the clinical-technical team. An
example of this service intensity from the service and consumer’s perspectives were shared as being:

A hectic trip ... The clinical team will see the family, the family will either wait around ... while [seat insert] is being made for a few hours. That can be hard because they’ve got nothing to entertain them other than what they may have brought with them. So they might spend five hours there, often without a backup chair because they can’t bring both and so they might be laying on the ground on a mattress, that sort of thing’ (Vendor Matt).

Funding annual outreach seating clinic was often externally sourced, for instance through collaboration among aligned services within the outreach clinic’s operational area. A number of wheelchair suppliers also operated outreach seating clinics, often in response to a request from a regional centre or rural community. These supplier clinics were internally funded by the supplier and where possible, scheduled strategically to capture multiple consumers, as noted:

We will travel ... just to do a one off prescription for a client and therapist. But wherever possible with those long trips where we’re travelling any more than say, three or four hours, we like, where possible to see if we can set up a clinic, so that um, all the therapists that have only got one child or one adult to seat can bring them in and [they] don’t feel that they’re asking us down there for a wasted trip (Vendor Sarah).

Wheelchair suppliers provided a more flexible outreach service and seven suppliers travelled extensively. Access to an outreach specialist seating service, for non-metro based
consumers was dependent on each supplier’s service motivations and their capacity to provide outreach services. Some seating teams had greater service capacity than others, dependant on their team composition.

**The Seating Team Composition**

Two types of team composition emerged from the data, the multi-disciplinary and the trans-disciplinary team. Each was defined by the service it provided, its size, and the roles assigned to each member. The multi-disciplinary team is described now.

**The multi-disciplinary team: defined team roles.**

The multi-disciplinary team comprised of a number of sub-teams working together on the same project within defined roles according to professional clinical and technical affiliations. The Integrated Services, especially those that manufactured wheelchair-seating solutions, tended to define discipline specific team roles as ‘multidisciplinary in terms of nursing, OT and engineering and technicians’ (Clinician Valerie). They presented as larger, on-site teams: for example, ‘two teams, the technical and the therapy teams’ (Vendor Shaun). Clearly defined roles were evident, as there was a ‘delineation between the tech and therapist [roles]’ (Clinician Sally), where roles were clearly defined, as noted this seating technician spoke of the therapy role: ‘they know what we need and we have a good sense of what they need’ (Vendor Shaun). In Shaun’s service the therapy team provided the clinical services such as assessment–prescription and technical services were provided by the workshop and manufacturing teams.

The therapy or clinical team generally consisted of occupational therapy and physiotherapy members, working as discrete sub-teams assigned to a specific component of the wheelchair-seating process. The clinical team focused on clinical assessment and
prescription (as will be described in Figure 13). In the study, the Integrated Service
generally employed a team with occupational therapists and/or physiotherapists. These
were seating consultants providing expert advice in ‘seating assessment’ (Clinicians Hanna;
Tracey) and ‘equipment prescription’ (Clinicians Sally; Belle). The therapy team liaised
closely with the consumer, their care provider and primary therapist. They also worked
closely with the technical team, problem-solving during provision-fitting process (see
Figure 13).

The technical team provided the technology solutions. It may consist of a
rehabilitation engineering team or technical team aligned to a ‘workshop team’ of
technicians (some with prosthetic–orthotic skills), depending on service scope. The
technical team focused on the design and manufacture of customised products, or on
provision and fitting process of the wheelchair-seating system. In some services, the
technical team contributed to the assessment process undertaken by the therapy team, but
its contribution was greatest in the manufacture, provision and fitting of the seating system.

The trans-disciplinary team was the other team composition noted in the study.

**Trans-disciplinary seating team: enmeshed roles.**

The trans-disciplinary team was a focused ‘multi-skilled team’ (Clinician Tracey) in
which skills and roles were blended, providing work flexibility and competency needed for
‘complex caseloads’ (Clinician Jane). ‘The trans-disciplinary seating clinic was the best
because you got the perspective from a physio and an OT and the engineering and the
technical’ (Vendor Walter), and that allowed ‘exchange of knowledge’ (Clinician Belle).
The individual skills were more important to a trans-disciplinary team, than was their
professional affiliation, as was noted by Vendor Robert:
It doesn’t really matter whether a person in this role is an OT, a ‘physio’, or a rehab engineer, as long as you’ve got the right individuals. That means [skills such as] initiative, willingness to work outside their particular profession, willingness to work with others from different backgrounds like technicians and occasionally the orthotists and [have] a good degree of practical, not expertise but technical skill.

The smaller multi-skilled teams worked collaboratively across all seating processes indiscriminately, and thus enabled transfer of professional knowledge and skill sharing. A multi-skilled team allowed for role flexibility and built resilience, much needed for complex caseloads. This kind of trans-disciplinary team was employed by mobile outreach services, and in the study was evident in the Networked Team and the Vendor Clinic. Blending team roles required strong coordination to ensure the best use of resources. A well balanced multi-skilled team could operate effectively even during a team member absence. Their ability to solve complex needs by adapting commercially available modular technology was a common practice in trans-disciplinary teams.

In summary, the type of service required decided where and how it was delivered. The primary level service initiated the seating service, and in general, delivered a home-based service, by a Networked Team. Consultancy seating services were delivered a clinic-based service, as described by Cooper (1998). The clinic-based service delivery approach was the preferred method of the majority of Integrated Services, and were commonly located within a health or disability-specific campus aligned to workshop facilities (metro-based). To extend service reach, two types of services were evident. The first, the annual outreach seating clinic hosted by a multi-disciplinary team delivered an off-site clinic-based service (e.g. by an Integrated Service). The second, the Vendor Clinic and the mobile
outreach seating service delivered a community-based service, operated by a multi-skilled team, as described by Cooper (1998). These smaller, expert teams delivered a flexible service into consumer’s home, as an off-site clinic or as a component of a Networked Team. The data revealed service approach influenced the team composition: the larger, multi-disciplinary teams tended to manufacture bespoke seating in clinic settings, while the smaller, mobile trans-disciplinary teams applied adjustable modular wheelchair-seating technology. The data also revealed the team type influenced how each team engaged in the seating service process, according to roles or skills, although the procurement process was consistent. The procurement process consisted of six seating service steps, these are described below.

**Seating process: six seating service steps**

The six seating service processes identified (depicted in Figure 13) were:

1. Intake,
2. Assessment–prescription,
3. Technology Selection (home-based trial),
4. Technology Evaluation (funding justification),
5. Provision-fitting and

The wheelchair procurement process commences with the request for a wheelchair-seating system, as a first acquisition or an upgrade. The need may be related to a disability associated with sudden onset (trauma) or to address progressive degeneration of mobility associated with a health condition. In this study, most wheelchair-seating requests are initiated by the consumer or a care provider. When external compensable and non-
compensable funding was involved, a medically endorsed referral was obligatory in Australia. A request or referral commenced the first step: intake.

**Figure 13** The six seating service steps

![Diagram of the six seating service steps]

*Non-linear, on-going process of matching person-centred goals with appropriate technology*

**Step 1: intake.**

The intake process manages incoming referrals and allocate resources. Half the consumer group in this survey chose a trusted prescribing clinician as their direct or primary therapist, based on past wheelchair successes: ‘I guess my first protocol would be going down to [my local community health service] and request [my OT] ... she was really
good’ (Consumer Sarina). Personal selection was not routine, and many healthcare systems allocated the prescribing clinician according to caseload demands. Three participating consumers returned to a known Integrated Service for wheelchair upgrades, and two regional consumers re-engaged the same wheelchair supplier for subsequent wheelchair upgrades.

The primary therapist was the first to receive the medical referral or wheelchair request, and was responsible for the ultimate wheelchair prescription. Host services employing primary therapists generally managed their incoming seating referrals as part of a centralised intake process. Referrals were managed based on case complexity, either ‘non-complex’ or ‘complex’. The more complex cases were allocated to an experienced primary therapist, if available. A community-based primary therapist commonly provided a seating service as part of a comprehensive service: these might include home modifications and hygiene technologies.

The Integrated Service, as a specialist service, receives a constant flow of complex seating referrals. To manage the volume, several services triaged incoming referrals based on case complexity, according to clinical risk, postural complexity and pressure care status. The consumer’s primary therapist was responsible for the majority of referrals received by an Integrated Service.

Case complexity identifies the consumer’s whole needs and goals. The degree of complexity was inclusive, for example: ‘in regard to posture, pressure and seating’ (Clinician Claudia), including ‘significant contractures and [muscle] tone’ (Clinician Mia) or compounding elements such as ‘multiple disabilities that required high level supports around seating’ (Clinician Jane). Prioritising referrals based on consumer risk considered
associated issues, such as: ‘difficulty breathing’ (Vendor Matt); the prevention of or attention to ongoing ‘pressure ulcers’ (Clinician Laura; Vendor Stuart) and acute ‘high pressure needs’ (Clinician Claudia). Complex referrals were prioritised above requests considered less complex needs.

The data show the intake process allocates the consumer’s referral to the most appropriate service according to complexity. The primary therapist may undertake the wheelchair request and collaborate with locally based service providers, as in a Networked Team. Where there are more complex needs the primary therapist may refer to a secondary seating service such as an Integrated Service or Vendor Clinic. Requesting the assistance of secondary seating services was dependent on the consumer’s location, as the majority of secondary services are metro-based, as depicted on the Australian map (Figure 11).

After the referral had been allocated to the appropriate service provider, the second seating service step began; this was the assessment and prescription process.

**Step 2: assessment–prescription**

Assessment–prescription process is a two-part needs assessment that informs wheelchair prescription. The first part, the assessment, was a multilayered process undertaken to establish wheeled mobility and postural goals. The second part, the wheelchair prescription, involves matching the consumer’s goals with appropriate wheelchair-seating technology. In this study the prescribing clinicians described a dynamic, non-linear assessment–prescription process as ‘multi-factorial’ (Clinician Rocko) and ‘interactive’ (Clinician Mia) process, coordinated by the prescribing clinician with contributions from all stakeholders.
The process commences with the seating assessment to collect vital consumer data from three processes: the consumer’s mobility-postural functional needs assessment, the seating interview, and an occupational–environmental evaluation. The assessment collects information on consumer and carer needs to establish goals according to clinical need, the consumer’s occupational requirements, and social and physical environmental demands. The establishing clear person-centred occupational goals helps to maintain focus on appropriate wheelchair-seating technologies.

The participating consumers reported ‘the assessment and face-to-face negotiations’ (Consumer Brian) took between an ‘hour or an hour and half’ (Consumers Vince; Hasina). For them, the seating assessment was a collaborative approach, as is inferred by the word ‘negotiations’. Setting collaborative person-centred goals required time, and Consumer Hasina noted a lengthy needs assessment was not always appreciated: ‘I hate it! I don’t like it. They take too long!’

Data show dissatisfaction with the seating outcome is directly related to inadequate time spent on seating assessment and prescription. Alluding to inadequate time spent during her assessment, Consumer Hasina stated her unsuccessful outcome was linked to her impatience, saying: ‘My big mistake with this chair; a big mistake! ... I chose the wrong chair’. With hindsight she vowed to allow adequate time for her next upgrade. Despite her expression of frustration, the time invested during the process was recognised by Consumer Hasina as vital to a positive outcome. Allocating time for it was a common theme. Consumer Ken, an experienced consumer form multiple specialised wheelchair updates, expressed its importance;
In research, took me about 12 months to come up with this particular chair, because it’s better to spend time in getting the right chair which you’re going to be using for many years than it is to actually rush into getting something that you think, Oh, that’s okay, I need a chair quickly, I’ll get that one.

The seating assessment information was supplemented with information gained from the seating interview.

**The seating interview.**

A seating interview was commonly undertaken with the consumer, initiated by the prescribing clinician. It provided an introductory insight into the consumer’s mobility—postural needs, social, recreational and occupational roles, and wheelchair usage and expectations. Seating interviews took place in the seating clinic, in the consumer’s home or work environment. When was undertaken in the consumer’s environment, a deeper understanding of the consumer’s occupational roles and environmental demands were obtained. The participating occupational therapist were often assigned the occupation—environmental needs assessment, so a home-based interview was common.

The seating interview illuminated the lived experience from the consumer’s perspective. Enough time was allocated to delve into the consumer’s life stories, to understand their individual life experience. Questions that helped gather the consumer’s psychosocial context are: ‘Where they live. Who they live with. ... How they transfer, in and out of cars, on/off toilet?—Things like that—we ask them about how they swallow and how they talk and if there’s problems with communication’ (Clinician Tammy). The consumer’s goals were illuminated by asking: ‘What the client likes to do in their chair. So
what their week looks like? What do they do during the day? Is there anything that the wheelchair needs to do to help them during the day?’ (Clinician Naomi). The consumer’s responses provided valuable insight into the range of occupational roles involved in their daily activities and environments. The data show understanding the complexity of the consumer’s wheeled mobility-postural demands assists in the appropriate prescription of a wheelchair-seating system.

A successful interview provided quality data, such as: ‘Knowing what the person likes to do. What their preferences are and making sure that any decisions that are made, as much as possible, aren’t going to negatively impact on the person being able to do those things’ (Clinician Jane). The interview also investigated specific complicating factors, such as pressure care management and pressure care regimes. ‘Have they had any history of [skin] breakdown before? Have they got any pressure care needs?’ (Vendor Saul).

Collecting specific consumer data and funding sources enabled an appropriate match of chair seating and the consumer’s bio-psychosocial needs.

The consumer’s primary therapist was an additional valued source of consumer data. The vendor group relied on the prescribing clinician’s knowledge of the consumer: ‘Listening to [consumer’s] prescribing therapist who’s probably seen this child once or twice a week or every day’ (Vendor Sarah) provided valuable consumer data. The care providers provided relevant insight into the carer’s role, in caring for, engaging in and managing the wheelchair technology, on behalf of their family member. Three care providers enjoyed a collaborative partnership with their respective sons’ service providers: ‘We ... utilised the knowledge of [my son’s] occupational therapist and physiotherapist at the time as well, but I also had a lot of input as well. They would listen to me’ (Carer Ian).
All the above qualitative information collected was added to the assessment of the consumer’s mobility function and capacity. This assessment was called the mat evaluation, and this may occur before or after the seating interview.

**The mat evaluation.**

The ‘mat evaluation’ (Clinician Talia; Vendor Sarah) describes a bio-functional assessment undertaken early in the assessment process. It assesses the consumer’s postural performance in lying supine (without gravity) and again in upright sitting against the effects of gravity. The evaluation (commonly abbreviated to ‘mat eval’) and according to participants is preferably performed on a firm, horizontal plinth. It is a functional assessment aimed to ‘look at pelvis, trunk and up and pelvis down, in terms of what’s happening and then what’s correctible in lying and sitting, particularly sitting, and what’s limited’ (Clinician Sally). It highlights the consumer’s ‘postural needs’ (Vendor Saul) and ‘the severity of their physical needs’ (Clinician Bev). The participants working in spinal rehabilitation took ‘20–30 minutes’ (Clinicians Laura; Claudia) to perform this evaluation; clinicians working with more complex postures take longer, ‘one to one and half-hours’ (Clinicians Mia; Neve). The prescribing clinicians working in spinal rehabilitation point out that the spinal cohort requiring wheelchairs commonly present with flexible seating needs, compared with the more complex postural needs associated with lifelong conditions such as cerebral palsy.

The mat evaluation was identified as a critical component of the needs assessment process that requires skill and competent clinical reasoning, acquired through accumulated hands-on practice. An ideal seating venue is one with ‘a plinth and ceiling hoist’ (Clinician
Nadia) that facilitates safe manual handling. The clinic-based spinal seating service was purpose equipped to facilitate the mat evaluation:

Our patient seating clinic happens ... because we recently got a new ceiling hoist in the gym on the wards, so now we have the facilities to be able to hoist people out of their chairs and onto the plinth and assess their posture in a more thorough way.

(Clinician Laura)

A clinic-based service dedicated to wheelchair-seating procurement was also purpose equipped to process complex seating needs. The more complex cases required more service time and resources; specialist services allowed for additional time as required. This was evident when complex referrals took time to assess, as noted: ‘Initial appointments rarely get completed in an hour and a half’ (Clinician Tammy). Not all participants had access to clinics or dedicated seating services, and so seating service is provided in the community.

The community-based clinicians, often working solo and in non-clinic environments such as consumers’ homes, stated a mat evaluation took between one to two hours depending on the consumer’s complexity. A mat evaluation undertaken in the consumer’s home, which was usually conducted on the consumer’s bed and with a mobile hoist, was less than optimal. The home assessment allowed greater insight into the routine occupations and environments of the intended wheelchair use and the stakeholders involved.

Understanding the environmental context was the third important component of the assessment process.

**The environmental evaluation.**

The environmental evaluation collects information on the routine environments in which a wheelchair was used. The most common of which were the consumer’s home and
community, including work, school and leisure environments. The home assessment (the domain of the occupational therapy participants) provided valuable information about the home and carer routines. As such, home assessments were allocated additional time for the assessment and travelling, for example: ‘I would allocate two hours [for assessment and] 40 minutes [for travel]’ (Clinician Betty). The home assessment was resource intensive, but provided relevant assessment for prescription.

A home-based assessment provided insight into how the consumer and carers interfaced of the existing wheelchair-seating system with other assistive technologies like lifting and hygiene equipment. This assisted in providing a holistic assessment of the consumer’s needs. The above three assessment procedures, the seating interview, seating assessment and environmental evaluation all provide essential holistic data for making a sound technology prescription. The prescription process is the allied component of the assessment-prescription process.

**The preliminary wheelchair prescription.**

The preliminary wheelchair prescription was based on the data collected above assessment component. The preliminary prescription initiated wheelchair and seating selection, narrowing the choices to the most appropriate options. The prescribing clinicians spoke of re-evaluating subsequent seating service steps against the preliminary wheelchair prescription: that is, comparing a selected wheelchair and seating technology against the prescription goals.

The third step in the seating service process was selecting appropriate wheelchair and seating technology.
Step 3: technology selection and home-based trial

The technology selection and home-based trial involved selecting wheelchair and seating technologies from an array of options. There are three parts to a wheelchair system: choosing a mobility base, adding a suitable seating system and accessories, and undertaking a prototype trial.

The mobility base selection.

The mobility base is the wheelchair or wheeled base. It and its various components such as tyres and castors are selected according to environmental demands and whether power or manual control are required. Three of the eleven consumers used self-propelling manual wheelchairs and the remainder operated power chairs. Selection of the wheelchair base was the domain of the primary therapist, consumer and wheelchair supplier; it involved consideration of repositioning options (e.g. tilt-in-space, recline, leg elevators/supports), seating system (e.g. seat insert, back and cushioning) and wheelchair accessories (e.g. trays, electronics).

Selection of the seating system and accessories.

The selection of the seating system and accessories was a process of choosing the seating approach most appropriate for the consumer’s postural needs. There were two major types of seating approaches identified: custom-made or modular. Custom-made seating required constructing a unique system for an individual. The manufacture of bespoke seating systems was carried out by an Integrated Service or Vendor Clinic, with access to a workshop team. There were two common custom-made seating approaches: the contoured moulded seat insert and the foam-on-ply, suitable for different degrees of complex postures. The customised contoured seat insert moulded around a posture to
support extreme postural deviation. The customised contoured moulded seating of choice was collected using an ‘Otto Bock shape system’ (Clinicians Kay; Belle; Sally; Naomi), and the ‘foam-on-ply’ (Vendors Ivan; Millie) system used the ‘Queensland Back’ (Vendors Paul; Shaun) assessment chair, to capture the required body shape imprint for a accommodating seat insert..

The German Otto Bock Shape System provided a body-contoured foam seat insert manufactured from a digital body imprint, taken from a ‘beanbag type of system where we evacuate the air ... digitising that as a [body] shape’ (Vendor Shaun). The beanbag system was lightweight and therefore portable. Portability allowed a body imprint to be taken in the consumer’s environment (as opposed to in the clinic). Capturing the imprint accurately required a skilled hands-on team and time to stabilise the consumer’s often challenging postures: ‘I get the client into the [bean]bag ... a lot needs to happen quickly, because of fatigue and [muscle] tone and everything ... I’ll do this with the technician’ (Clinician Candy). The manufacture of the contoured insert was outsourced in Germany, by Otto Bock. Otto Bock delivered a ‘raw seat insert … between 4 to 6 weeks’ (Clinicians Sally; Candy; & Vendor Shaun). The raw seat insert describes a seating prototype prior to final and permanent covering. Once fitted appropriately, the raw seat insert was permanently upholstered (two services upholstered on-site, other outsourced services).

The Matrix seat system was also used as manual body imprinter by one outreach seating service. The interlocking key-like Matrix system captured the body imprint of a single consumer (at home), this informed the manufacture of a contoured seat insert, built by their workshop and fitted on subsequent visits. This method extended the availability of moulded seating solutions for very complex postures of consumers unable to travel.
The second custom-made seating approach was the construction of a foam-on-ply seat insert. This described a seat insert made from layered foam and adhered to a seat back. The most common used the Queensland Back (Qld Back) assessment chair, a system of multi-probes that digitally imprinted the seated body shape used to direct the construction of a bespoke seat insert, manufactured on-site by the workshop team. On-site construction required an expert technical team but expedited manufacture. Fast construction was useful when urgently needed seating was manufactured for fitting as a raw seating prototype ‘within two days’ (Vendor Bert). The rationale for selecting a foam-on-plywood seating system was to accommodate appropriate postural support for less complex, older, fixed postures, such as with ‘only lateral scoliosis’ (Clinician Nadia).

The application of custom-made solutions required a high degree of cognitive capacity, as the consumer and care providers had to imagine what was to be constructed. The difficulty of predicting the completed system tended to alienate the service recipients from seating selection, as was expressed: ‘We didn’t really understand what was written in the quote apart from that it had specialised seating’ (Carer Wisty).

Custom-made seating was designed specifically for a particular posture at the time of imprint. There was little room for adjustment with growth or change. Custom-made seating solutions required extra fitting sessions to ensure the seating system was appropriately fitted, and this was applied by expert seating teams.

In contrast, modular wheelchair-seating was commonly selected to address less complex postural needs using commercially available modular wheelchair and seating technology. Modular technology was ‘off-the-shelf’ (Vendor Freda) commercial technology, designed with on-board adjustability to accommodate a range of postures, and
multiple users. The modular seating systems most used in this study were the ‘SPEX system’ (Clinician Mia; Vendor Sam), by products from ‘Otto Bock, Sunrise, Invacare’ (Vendor Millie), the ‘Matrix system’ (Clinician Catrina) and the ‘Jay systems’ (Vendors Winn; Millie). The wheelchair and seating ‘Mulholland’ (Vendor Sarah) system was used in paediatrics.

The use of modular seat systems reduced assessment time, as the design allowed for ongoing in-situ adjustments. The assessment process was calculated by one participant as: ‘Often three quarters of an hour, but the measuring up is usually only five to ten measurements’ (Vendor Dave). The modular system was adjusted (or tweaked) as needed to suit consumer comfort and support changes after purchase: ‘Most of the time we can do that by just tweaking things’ (Vendor Millie). A modular system could be adjusted to accommodate postural changes over time during the funding cycle, a particularly useful feature for accommodating children’s growth. ‘Kids tend to grow up too quickly ... we’ll normally try to get five years out of a seating system’ (Vendor Shaun).

The relative ease of assembling off-the-shelf wheelchair and seating prototypes for trial was a bonus. An appropriate prototype guaranteed a good wheelchair outcome. Providing a ‘scripted wheelchair’ prototype was of particular importance for consumers with complex postural and mobility goals. ‘With your complex clients, it’s really beneficial to mock something up that they can try for a couple of weeks’ (Vendor Sarah). Modular technology allowed greater consumer involvement, as the product could be taken off the shelf, trialled, and adjusted in real time. Experienced suppliers were keen to provide realistic prototypes for wheelchair trials before purchase:
Even if you’re not going to get the sale at the end of the day, not that you know that at that time, but from our point of view then we know what that [wheelchair] is going to cost us [and] how that’s going to work for that client (Vendor Sarah).

An appropriate trial prototype informed the vendor of the specific technologies, to quote accurately, and a near complete prototype shows the consumer the end product.

A number of specialist suppliers blended custom-made and modular technologies to craft seating solutions for individual consumers, aiming ‘to get the optimal solution for the client’ (Vendor Sarah). A blended seating approach may include ‘a commercial back rest and a custom moulded [seat] base’ (Clinician Candy): that is, a modular back support coupled with a custom-made cushion.

The participants spoke of an evolving seating practice in response to innovations in modular seating technologies. The New Zealand SPEX seating system, an adjustable kit box of components, and the new edition of the Matrix system (a reusable, adaptable key-like system for postural contouring), were two approaches being adopted instead of traditional custom-made systems. The innovative SPEX and the Matrix systems have the capacity to accommodate complex postures: ‘There has been a gap in the market for a long time as far as modular seating. But it is being filled with, you know, customisable commercially available equipment like SPEX and other seating systems’ (Clinician Candy).

Providing and fitting modular seating systems for complex postures required expert seating skill and competence. In addition to this, participating clinicians noted accessing newer modular seating systems for pre-purchase wheelchair trials was challenging, whether in metro, regional or rural Australia, and vendors said they had trouble meeting demand.
The study reveals a practice of re-issuing refurbished items, of recycling used wheelchair and seating technology. A number of seating services and funding programs carried inventories of refurbished items, commonly wheelchairs, seating and accessories that have been abandoned, some ‘practically brand new’ (Carer Lenna), and components of seating and wheelchair technology that have been restored or ‘refurbished ... [so] it could be re-issued to somebody else’ (Clinician Mia). The practice of reissuing refurbished items was evident across all age groups, locations and funding programs. A refurbished inventory meant restored technology could be accessed cost effectively and time efficiently, for assembling trial prototypes, as a second (often unfunded) product or for urgent issue.

**The home-based trial.**

The home-based wheelchair trial was the final component of the technology selection step. This described a longer trial (than the short demonstration) of a wheelchair prototype by the consumer in routine environments, and was acknowledged as one of the most important steps in wheelchair and seating procurement. The modular wheelchair-seating trial was undertaken before purchase, but the custom-made wheelchair-seating trial occurred after construction of the seating prototype (upon funding). The home-based trial was overseen by the primary therapist but commonly driven by the consumer, who was empowered to assess the appropriateness of the wheelchair-seating prototype for their occupational and environmental demands. The trial evaluation was the responsibility of the primary therapist; it validated the funding application.

As the home-based trial of modular wheelchair-seating home-based trial occurred pre-purchase, the cost of supplying and assembling the loaned technology was borne by the wheelchair suppliers. One supplier described assembling each modular trial prototype as
challenging and resource-intensive, taking: ‘three or four hours, which we don’t have the time or the manpower (sic)’ (Vendor Millie). Unless the supplier wins the supply contract, the resources and costs associated with wheelchair trials were supplied gratis. This was an impost on wheelchair supplier services and helped explain why participants complained accessing non-standard prototypes for home-based trial was difficult: ‘You can never ever get a demo chair that’s a scripted chair’ (Vendor Paul) for real-life trials ‘at work and at home’ (Clinician Rocko) for ‘a trial over a weekend ... or a couple of days’ (Vendor Freda). The ideal trial time for a modular wheelchair prototype was between three and seven days, but trials of modular technology were often shorter as ongoing adaptations can be made after purchase. The home-based modular wheelchair trial was resource-intensive but critical to successful wheelchair-seating prescription. One consumer stated time spent trialling technology was invaluable: ‘I would say the ideal is to trial it for a week’ (Consumer Hasina). The cost of service input prior to funding application approval was not explicitly listed in specialised wheelchair procurement. The availability of a custom-made wheelchair-seating prototype for home trial was easier as the trial process was a budgeted component and the prototype was the actual system constructed for the consumer.

The custom-made wheelchair-seating trial was often lengthy as the fitting needs to be precise because there was little inherent adjustability. It was common for multiple home-trials between re-fitting sessions: each home trial was longer, at least two to four weeks’ duration for each trial. In general these were accounted for within the wheelchair estimate. Again, the primary therapist was responsible for any home-based trial and trial evaluation.

The trial evaluation and technology rationalisation were often undertaken collaboratively between consumers, care providers, vendors and clinicians. The trial
evaluated the appropriateness of the prototype to the consumer’s occupational goals. Successful home trials validated the appropriateness of the wheelchair and seating prescription and this was used to justify the wheelchair prescription. A successful home trial and critical evaluation was linked to a positive outcome.

After the home-trial evaluation, the fourth seating service step was to justify the wheelchair and seating technology prescribed.

**Step 4: technology evaluation and funding justification.**

The technology evaluation and funding justification step describes the process of justifying the wheelchair-seating prescription based on the trial outcome. This fourth step was the domain of the consumer’s primary therapist, ‘as they are responsible for funding application’ (Vendor Graham) for the ‘clinical justifications’ (Clinician Patty). The funding application report was a common technology evaluation activity.

While a good funding application report clearly justified the appropriateness of the technology prescribed, there was no consistency to funding application formats. Participating prescribing clinicians tended to follow the relevant funding protocols. The time between submitting an application and receiving approval varied: an excellent response was approval within several months, the average wait was longer, ‘9 to 12 months’ (Clinician Talia). A wheelchair purchase was activated upon funding approval.

The extended funding wait period was concerning. Long wait times impacted on consumers whose daily occupational lives depend upon excellent wheelchair performance. Long wait times also impacted on the currency of the assessment–prescription data. Re-assessment was common after a long funding wait period to update anthropometric data. Experienced consumers spoke of planning their upgrades well before the next funding cycle
to avoid delays; and expert vendors provided a preliminary estimates, and confirmed assessment data once funding was approved, to avoid double assessments.

Once adequate funding was assured, the fifth step of provision and fitting of the wheelchair and seating system commenced.

**Step 5: provision-fitting.**

The provision-fitting step describes the ordering, construction, assembly, or interfacing of the wheelchair, seating technology and electronics for the system set-up to be fitted to the consumer. While the sequence of the six steps in the service process may vary depending on the seating approach, provision-fitting occurred in earnest only after funding approval. Wheelchair suppliers reported a gap of approximately six to eight weeks between activating the purchase order and having the first prototype ready. This time was extended if waiting for international technology. 'Once order is placed it may take 6-12 weeks for the wheelchair to arrive (dependant of availability)' (Vendor Graham)

The study exposed a multi-phased provision-fitting process. In general, the first fitting commenced once the wheeled base was interfaced with the raw seating insert. This first session took between one and three hours, depending on the technology involved. The application of modular technology meant the system could be set up and fitted simultaneously:

Definitely an hour, sometimes two hours ... because of customised pieces and definitely ... two hours, because you’re putting it together, effectively doing a second trial as part of that first fitting to make sure you’ve got it right. (Clinician Jane)
The provision and fitting of modular seating was interspersed with technology adaptations, re-evaluation and consumer training to ensure the match of the chosen technology with the prescribed goals. Once the seating team and consumer were satisfied with the wheelchair and seating fitting, the supplier completed their work and the wheelchair-seating system was discharged home. By comparison, the process of custom-making seating provision was drawn out. The fitting sessions were longer, ‘between three to four hours’ (Clinician Belle). There might be a hiatus between first and second fittings of four or six weeks, waiting for the outsourced raw seat insert to arrive (e.g. Otto Bock).

On-site manufacture of foam-on-ply seating systems expedited the provision-fitting process. Manufacturing a foam-on-ply seat insert was estimated at ‘20 technical hours’ (Vendor Shaun) and ‘approximately one week’ (Vendor Bert). Once the custom-made raw seat insert was ready, follow-up fitting sessions were scheduled either ‘weekly’ (Vendor Bert) or ‘fortnightly’ (Clinician Tracey) until the prototype was ready for the first home-based trial.

Fitting custom-made seating required intensive adaptation over ‘four or five fittings’ (Clinician Kay) to shape the raw seat insert to the consumer’s posture. ‘There’s often quite a little bit of chopping and changing’ (Vendor Shaun) required to shape the seat insert for an accurate person-to-technology fit. Once the prototype was home-trialled successfully, it was upholstered. Upholstery was often outsourced to ‘auto-upholstery’ services (Vendor Paul), although two wheelchair suppliers employed ‘in-house upholsterers’ (Vendors Millie; Dave).

The completed wheelchair and seating system was discharged home and this activated the final sixth seating service step, the review process.
Step 6: post-provision review.

The post-provision review was an evaluation of the appropriateness of provided wheelchair-seating system after it has been used it at home for six or eight weeks. The primary therapist was responsible for this review as principal prescriber, and to ensure the wheelchair was being used appropriately and safely by consumers and carers, within their environmental context.

The post-provision follow-up was acknowledged as providing important feedback, but it was rarely costed or resourced, so the review practice was inconsistent:

If you follow up, you’re going to find things that aren’t right and you have to have the capacity to be able to do something about it. It’s not very ethical to ring somebody up or contact somebody and find out that something’s not right and not be in a position to be able to address it (Vendor Stuart).

To manage limited resources, stretched service providers relied on the consumers to proactively seek out post-provision services as needed. ‘They tend to be a reasonably articulate group and they have a very clear idea of what they want to do. So when things aren’t going well, they’re happy to tell you’ (Vendor Stuart). Some prescribing clinicians managed busy caseloads by empowering their consumers. ‘If it’s a fairly straightforward one ... I give people my phone number and I just say, Look if you have any concerns whatsoever please get back to me’ (Clinician Nadia). Others managed complex caseloads by not discharging certain cases so they could actively monitor any change: ‘If it’s your Multiple Sclerosis type clients, I tend not to close those clients down, because they just change all the time’ (Clinician Wendy). Closing a case meant a new referral if a consumer’s needs changed.
The evaluation of a provided wheelchair-seating system was undertaken informally and formally. An informal approach was defined by consumer’s qualitative feedback.

‘What I love about my chair is ... it allows me into a social space’ (Consumer Bea), and was often unregulated:

I tend to leave it a couple of weeks at least before I absolutely discharge them, and I’ll do a couple of quick phone calls and just say: How’s it going? Everyone happy with it still? It’s all looking good? (Clinician Wendy)

A formal review was regulated: ‘We keep a database ... and then once the twelve months are up, we will contact them and just go and see them and see if the equipment needs a service or a review or a replacement’ (Clinician Jon). The evaluation process also applied evidence-based satisfaction outcome measures including the Quebec Users Evaluation Satisfaction Test (QUEST) and the Canadian Outcome Performance Measure (COPM). ‘In four weeks’ time I’ll give them a call and send out the QUEST ... and when we get that back and there aren’t any huge problems, then we close the client ... with a discharge letter’ (Clinician Candy). Clinician Paula used the Individualised Prioritised Problem Assessment (IPPA) as more appropriate for her consumer cohort, who used augmentative communication technology and who relied on carer input to evaluate wheelchair appropriateness: ‘The IPPA’s nice just in the sense that we can do it with the carers’ (Clinician Paula) while ‘The Wheelchair Outcome Measure and the Functioning Everyday with Wheelchair are for adults who are using it and [the outcome measures] are not as flexible for people with communication issues like our clientele’ (Clinician Paula).

Concern was raised about collecting service evaluation from known caseloads. One service ceased collecting service evaluation data because of time pressure and
confidentiality concerns: ‘we had satisfaction surveys ... I actually didn’t continue them because of time pressures but also I wasn’t happy with the survey form because I thought we didn’t have enough clients to make it anonymous’ (Clinician Tracey).

The post-provision review was the last of the six seating service processes identified in this study. Despite being presented in an order in this study, the process was not always linear, but was determined by the requirements of the particular seating service approach. Participants spoke of a cycle of assessment, reassessment, evaluation and re-evaluation of personal goals, preliminary prescription and technology expectations with the performance of the wheelchair-seating system during the procurement process.

The above confirms the participants’ statements that the seating service process is complex. Their caseload needs are complex and require competent and proficient services, and participants used their networks to stay abreast of seating service practice and remain current in technology innovation. The study exposes knowledge and experience are essential factors for improving the procurement outcome, thus confirming the similar findings of Mortenson and Miller (2008). The study also highlights the lack of formal seating education means the service providers sourced their knowledge informally from their communities of seating practice, again confirming similar findings by Williams and de Jonge (2010). Communities of seating practice provide essential stakeholder knowledge, extend networking and currency on technology innovation.

**Communities of Seating Practice**

Communities of seating practice are networks accessed by participants to stay informed of wheelchair technology innovations, seating services and service practice. The study shows most networking is informal, via the assistive technology peak bodies,
informal peer groups and practical case-based knowledge exchange. These communities of practice are significant in the absence of a formal seating education program.

**Assistive technology peak bodies.**

At the time of data collection there were three national peak bodies active in the Australian assistive technology sector: the Australian Rehabilitation and Assistive Technology (ARATA, 2007), the Assistive Technology Suppliers Australasia (ATSA, 2013), and the National Committee on Rehabilitation Engineering (NCRE). While all three exist within the umbrella assistive technology sector, all were involved in specialised wheelchair procurement. At the time of the study, there was no specific peak body dedicated to complex wheelchair and seating technology, seating service provision or research.

Participants spoke of actively engaging in activities run by these bodies, such as conferences and technology exhibitions. Conference attendance enabled knowledge exchange and access to current technology: ‘We’ve got ATSA, its really the voice for ... to bring people together ... We organise shows, one year it’s here and the next year it’s in Sydney, which just brings people together’ (Vendor Sarah). Conference presentations provided an opportunity to mix and share seating practices with peers: ‘I presented papers at the first three ARATA conferences I went to. The professional bodies were engaged in some professional development activities, but these were rarely dedicated to specialised wheelchair procurement.

Added to the peak bodies, two advocacy groups have risen to lobby government funders on behalf of the assistive technology community in Australia. In Victoria, a grassroots advocacy group, the Aids and Equipment Action Alliance (AEAA, 2007) formed to
‘lobby the [state] government to say, look, these ceiling limits that you’re putting on this equipment have been like this for 20 years. You know, something’s got to change’ (Vendor Sarah). At the national level, the National Aids and Equipment Reform Alliance (NAERA, 2010) has lobbied on behalf of the assistive technology sector in anticipation of the implementation of the National Disability Insurance Scheme.

The data show an urgent need for a national approach to seating education. There is a need for leadership in research, and for best practice support and mentoring within specialised wheelchair procurement and seating services, providing foci for wheelchair provision and seating service excellence. The majority of the Integrated Services in this study worked within a microcosm, with only one participant who engaged in service cross-referencing. Pockets of service excellence were noted in a handful of exceptional wheelchair suppliers and manufacturers scattered across the nation. The data expose a bottom-up exchange of knowledge, where transfer was evident at the service level—that is, case by case. There was evidence of a range of special interest group activities occurring independently across metro, regional and rural areas, but no evidence of a coordinated approach to capture their networking, knowledge or expertise generated by these activities.

**Professional development activity.**

While pockets of training and education activities occurred independently across Australia, irregular training opportunities were the norm: ‘We do workshops ... we’ve had a workshop which we are now looking at reviewing because we’re trying very hard to fit into a more contemporary model of training and development’ (Clinician Paula). Paula alluded to the need of universal educational access to the same information no matter the participant’s location. While isolated and irregular professional development opportunities
were evident, attempts to deliver education electronically were evolving: ‘We have teleconferences, like, quite frequently. And then twice a year they try and run professional development days’ (Clinician Mia). Specific special interest groups operated independently and in isolation, as noted by two clinicians:

I recently went to a Seat Spot Day, and I’d say 60% of the day was confirming that what we are doing is right, but then there were other bits that I came back and kind of said, we need to think about this. (Clinicians Belle)

Not a formal sort of a reference group. If it was someone that I thought that I needed a little bit of assistance with, I could call upon one of the disability service OTs. He’s very good and part of their role is supporting us generic OTs (Clinician Talia).

Some of the clinicians enhanced their professional development through extensive international networks or participated in education events electronically. Attendance at the irregular vendor-sponsored workshops was used to upgrade technological knowledge and skills: ‘We usually get the big importers like Sunrise Medical, Invacare. They will bring in experts from around the world, and they’ll do seminars and lectures, and I’ll always attend’ (Vendor Tom). International seating experts were invited: ‘Bengt Engstromm Courses, a physiotherapist form Sweden with seating expertise and product design’ (Clinician Catrina). These educational and training opportunities operated in isolation; there was little evidence of a coordinated approach to professional development, or that the content provided for all levels of professional development need.
Self-directed learning.

Self-directed learning was actively practiced. Clinicians Candy and Sally accessed prescriptive texts: ‘There’s a text book from Zollars which is, sort of, the foundations which I do refer back to sometimes, especially when we’re writing, training and just to go right back to the basics’ (Clinician Candy). As an experienced clinician, Clinician Paula’s self-directed learning approach was methodical:

I downloaded all of the information available through like the ARATA and RESNA conference papers. I emailed those writers or presenters if there were questions that I didn’t understand and I went through all of the commercial vendors and all of the education and training that they offer and found as many shared presentations as I could and I did that for probably a three month straight period and then obviously putting that into practice and networking as much as possible with different peers.

Evidence based activity.

A few participants were involved in research projects, but most were immersed in direct case-based service provision and procurement. Any seating research and best practice activities occurred in isolation, and if dissimilated, results were shared most often with small networks or at workshops or, less commonly, as a paper at a national or international conference. Attending national and international conferences was not well practised as work commitments, travel costs and travel time competed. Clinician Belle acknowledged that time was a problem, but team collaborations provided extra impetus to attend:

Myself and one of the other therapists here, are looking at writing a paper presentation for the International Seating Symposium. Just to have the opportunity to do that is amazing. It makes you more passionate about your work. I never had the
time, I never had the opportunity, and it would never have been suggested in my past role that that be done.

Participants agreed they should be more involved in best practice activities, research and leadership roles in education. They stated that demanding daily workloads interfered with actively pursuing research and education. With the absence of any ongoing national educational forum, prescribing clinicians were left to develop their own professional training. In general, they worked independently within their own personal silo of excellence, a danger that was recognised succinctly:

It’s so easy to get set in your own ways and if you don’t have students coming through or you’re not attending conferences and you’re not moving with the changes, how are you offering the best outcomes to your clients? (Clinician Mia).

The majority of the participants were excellent networkers, as such were capable of seeking knowledge as required.

**Seating service networking.**

The service providers acquired seating skills through practical experience, case based. The prescribing clinician’s group relied on their networking to proactively maintain their professional skill, competence and knowledge. The extent of the network informed the quality of their knowledge accessed therefore acquired. By comparison, the vendor group was more widely networked, with greater access to a vast international network of wheelchair manufacturers and suppliers which exposed them to best practices across the globe.
The study exposes the Australian seating service sectors has many pockets of excellence, but little leadership. There is an urgent need for a coordinated approach to developing consistent standards of seating excellence within the Australian sector.

Chapter four describes, for the first time, the Australian seating service sector. There are three major components that impact on the sector: service delivery, systems of governance and its impact on service provision and wheelchair procurement. The various funding systems noted within each Australian state means the seating service sector is fragmented, under resourced and metro-centric. The importance of experience and knowledge are highlighted as important factors in successful wheelchair procurement. However, in the absence of a national seating educational approach, professional development activities occur informally, in silos of seating practices with little evidence of coordination.
CHAPTER FIVE:
What Stakeholders Are Saying: Stakeholders’ Themes

Chapter five is the second of three chapters presenting the study’s findings. It presents the stakeholder themes that emerged from the first thematic analysis. The themes identified from each stakeholder group are presented, followed by common themes across all the stakeholders’ data. Figure 14 presents the themes from each participant group.

Figure 14 Themes emerging from the data by stakeholder group

WC = Wheelchair

Four major consumer themes emerged from the data provided by the eleven consumer participants (see Figure 14). These are the personal meaning of the wheelchair, on being a connected consumer, their service expectations and measuring the wheelchair
outcome. Each is discussed below, commencing with the personal meaning of the wheelchair.

**Personal Meaning of the Wheelchair**

Under this theme, three sub-themes were identified, these are: the lived wheelchair experience, wheelchair performance, the wheelchairs as a reflection of self-image and one wheelchair is not enough.

The consumers were confident communicators, an asset when they described their wheelchair and its meaning within their daily lives. Of the eleven, only two were new to wheelchair mobility, following spinal injury. All were active participants in their wheelchair and seating upgrades.

**Lived wheelchair experience.**

Nine consumers drove power chairs for daily community participation. They spent all their waking hours in their wheelchair: ‘I spend in my [power] chair from about 8.15 this morning to 9.30 tonight [and] It’s me in the chair 12 to 16 hours a day’ (Consumer Vince); ‘I only go to bed do I get out of my [power] wheelchair’ (Consumer Brian). The power chair as an enabler was poignantly described as ‘not negotiable’ (Consumer Sarina).

Three consumers self-propelled their manual wheelchairs. The use of manual wheelchairs varied widely from ‘two to 16 hours daily’ (Consumer Hallie), or used ‘for work days’ (Consumer Joe). Despite fluctuations in daily use, manual wheeled mobility was evidently important. Consumer Mae described his lightweight manual wheelchair as ‘my main mode of transport in getting around [as] I have to rely on the wheelchair’. The manual wheelchair, although used intermittently by the three participants, was described as enabling their community access.
Consumers used a blend of carer assistance and assistive technology to manage their pressure care regimes. Technologies included wheelchair pressure cushions and back supports, hoists, prescribed mattresses and adjustable beds and vehicle transport technologies. One consumer drove his van from his power chair. Additional technologies were used to assist with seating repositioning. Consumer Vince used tilt-in-space repositioning to manage pressure care during his long working days. ‘I have a lot of work commitments, it’s more difficult for me to get in and out of the chair and rest’. Tilt-in-space repositioning was, however, not useful for all, and one consumer stopped using hers when she experienced back pain and discomfort. Two consumers used seat elevators to lower access, enabling them to fit under benches and car controls, or to elevate for socialising and reaching elevator and pedestrian buttons. Two consumers used custom-made bespoke tray accessories for ease of access: a ‘powered tray raiser’ (consumer Brian) and a ‘lightweight tray cover’ (Consumer Ken). All these technologies enhanced the consumers’ daily occupational performance and reduced their reliance on carers.

**Wheelchair performance.**

The performance of their wheelchair-seating system was important. Consumers measured their wheelchair by speed, to ‘Go fast!’ (Consumers Vince, Hasina) and manoeuvrability, ‘Something’s light, it’s nice, it steers right’ (Consumer Mac). They appreciated a wheelchair that was ‘easy to use’ (Consumer Hallie) and enhanced ‘my independence’ (Consumers Ian; Bea). One consumer pointed out that a good wheelchair outcome provided quality living, as noted in this statement: ‘You get your mobility [right], the world’s your oyster!’ (Consumer Christine).
While function, comfort and wheeled performance were all important, the consumers spoke of their wheelchair as being more than a wheeled mobility enabler. The chosen wheelchair needed to perform well, be lifestyle-compatible and aesthetically pleasing. Aesthetics were noted among the younger members of the group, who wanted their wheelchair ‘to look good’ (Consumers Bea; Brian), while being functional. ‘Simple, simple, simple! But it’s got to look good. A simple design for an everyday wheelchair [that blends] ... being aesthetically and lifestyle compatible’ (Consumer Mac). An aesthetically pleasing wheelchair that was also lifestyle-compatible implied a successful wheelchair outcome that also positively defined their self-image.

The wheelchair as an expression of self-image.

The consumer’s attitude to their wheelchair was personal. The personalisation of one’s wheelchair was exemplified when a power chair was referred to as ‘she’ and described as ‘my baby!’ (Consumer Sarina). The strength of personal connection was more evident when her wheelchair’s performance was faulty on her return journey:

So it’s like, just get me home! ... I knew she didn’t sound right. I was like, please, just do it! You know, because I always talk—people must have thought I was nuts, but I don’t care—I talk to my chair. I was going, please, just get me home! Just get me home! (Consumer Sarina)

The social meaning of the wheelchair was linked to a personal sense of identity. The wheelchair needed to fit and reflect a personal image: ‘You want something that’s going to reflect you and who you are, your colours and stuff like that’ (Consumer Mac). For one, it was viewed as a wearable, albeit unwanted, fashion accessory: ‘I used to wear designer fashion and then all of a sudden to be thrown into an accessory that you don’t really like’
The wheelchair, as an unavoidable reflection upon the occupant’s image, needed to reflect who they were as a social being: ‘It’s kind of ridiculous, but you want something that’s going to look cool but comfortable’ (Consumer Mac).

The look of the wheelchair was also aligned to social stigma. One consumer stated her power chair appearance and size intimidated the general public: ‘These [power] chairs are a floating city and little kids ... are intrigued but they get a bit freaked out by you, you know and it’s not helped by the look of them I don’t think’ (Consumer Bea). Consumer Mac advised future wheelchair prescribers and funding agents to consider wheelchair aesthetics as an important wheelchair feature aligned to match appropriateness.

**One wheelchair is not adequate.**

The consumer group noted one wheelchair was inadequate to meet all their occupational needs. This was evident as a second wheelchair was used by a number of consumers, either daily or for special occupations, or for wheelchair transport. One power chair consumer preferred to transfer to her manual wheelchair for home use, ‘to maximise my mobility and help me get around too’ (Consumer Sarina). Another transferred from her outside power chair for a compact power chair ‘made for indoors’ (Consumer Hasina) more suitable for inside her home. Two consumers, both power chair occupants, used a second wheelchair for travelling; one used lightweight manual chair to fit into ‘the boot of my fiancé’s car’ (Consumer Bea) for carer handling and another used a specifically modified power chair for aircraft travel, as: ‘I needed another chair to take away with me because ... you need the right ones these days for the right [airline] policies for Qantas’. Finally, a young active consumer proposed matching the wheelchair to intended occupations, likening a sports wheelchair to sports apparel and arguing that active users need: ‘a variety of chairs
[as] when you’re in one, I think you need a good chair and an everyday chair’ (Consumer Mac). Consumer Mac implied a ‘good chair’ was required for formal occupations such as work, and an ‘everyday chair’ for casual activities where incidental damage might occur, as: ‘you can go a bit harder in it ... it might get scratched up a bit’ (Consumer Mac). In all cases, their second wheelchair was privately funded. Government-funded programs rarely fund wheelchairs for leisure or sports, although some allowed the retention of an obsolete power chair upon an upgrade, as a fall-back in case of breakdown.

The second major consumer theme identified pertained to the participating consumers’ networking skills.

**On being connected: consumer networking.**

The consumer theme on being connected includes sub-themes: their personal capacity to engage, network and access to adequate support systems. All consumers were strongly connected within their disability service sector, through voluntary and paid employment as: a ‘disability outreach advocate’ (Consumer Christine) or member of ‘an advisory committee’ (Consumer Max), or as a ‘disability professional’ (Consumer Vince). These networks were employed to access seating services, engage with wheelchair peers and benefit from associated resources. Good networks enhanced these consumers in independently gather relevant information to stay abreast of new wheelchair technology, relevant research and service practices.

These consumers were active independent researchers and employed both informal and formal networking links. The formal networks they used, such as the spinal network, assisted them with service and technology currency: ‘I’d phone Spinal Cord Injuries, Australia’s information service, and ask them to give me a list of mobility aid suppliers’
(Consumer Ken). Others were associated with research projects to improve their knowledge. Consumer Mac, a novice wheelchair occupant, capitalised on ‘my research work with the spinal cord association’ to network with peers and stay current. The technology display floor of the Independent Living Centre was a valued source for independent research and for trialling wheelchair technology devoid of vendor pressure.

The consumer’s informal networks gave them access to more experienced peers who provided insightful lived-experience knowledge: ‘Those guys have been in their chairs for 20 years’ (Consumer Mac). Informal interaction with peers helped novice consumers acquire necessary skills. As a novice, Mac acquired and developed knowledge and skills ‘in the gym for spinal cord injuries so I see a lot of people in their chairs’ (Consumer Mac). Peer networks were an important consumer resource. The four consumers eligible for spinal services enjoyed lifelong access to specialist seating services, such as ‘for the rest of my life’ (Consumers Bea; Mac) and ‘for about 20 years’ (Consumer Max). These consumers valued the enduring access to spinal services, as the continuity of care ensured them positive spinal health and good wheelchair outcomes.

By comparison, consumers with other non-spinal related health conditions were not as well connected as their peers within the spinal network. Four participating consumers accessed generic services as their only option, through either their local community health or the regional disability services. A fifth consumer accessed a specialist seating service provided by a metro-based disability service. A sixth regional consumer, who required home-based services, was unable to access any local specialist services because of travel challenges.
Not all consumers were connected to seating service networks. Consumer Hallie was ineligible for government funding as her fatigue-sapping health condition of eleven years was not recognised as a permanent disability. She was therefore ineligible for disability services or wheelchair funding. ‘[When] you don’t fit the box, you’re not eligible!’ (Consumer Hallie). Her funding program ineligibility meant she was also poorly networked. ‘Unless you’re in the system somewhere, you don’t get the information about various services. People who don’t really know fall through the cracks. They don’t know about different facilities or services that are available to them’ (Consumer Hallie). Being poorly networked meant Hallie was deprived of a peer group and relevant services, and was not privy exchange of vital information with people with similar experiences. Being connected provided access to service networks and peer social groups. These were viewed as vital to staying connected and in sustaining their wellbeing.

The findings showed support was received through external support systems such as paediatric or adult services. Care support was received through formal care attendant services, and more commonly, informally from family. Their support was important in sustaining wheelchair performance, vital to remain physically and socially connected.

**Considering the carer’s interface with technology.**

How the carer engaged with the wheelchair technology emerged as an important factor in sustaining the consumers’ function and in maintaining wheelchair performance. As noted in Chapter three, care provision was embedded in all but two activities of the consumers’ daily lives. Carers were involved in ‘shopping, showering, personal care, community access, doctors’ appointments’ (Consumer Sarina). As the carer contribution was vital, these consumers proactively considered the impact upon their care-givers when...
introducing wheelchair technology: ‘My common-sense tells me ... to consider your carers as well’ (Consumer Christine). Introducing new wheelchair technology into the carer’s daily routine required careful consideration, for example in manual handling, in loading for transport and in daily maintenance. Consumer Mac received no formal care support, however he implied all his manual wheelchair use relied on informal support: ‘When you have to rely on your wheelchair, you’re relying on other people [for] my freedom and my independence’. As such, consumers built reliable and accessible supportive networks close to home, for example: ‘I’ve got a very handy neighbour down the road [and] ... I’ve become his project’ (Consumer Ken). Ken's neighbour provided emergency tyre changes and built a bespoke lightweight wheelchair tray cover that enhanced his functional independence and therefore his productivity.

Family carers provided essential regular maintenance tasks such as ‘pumping my tyres’ (Consumer Bea) and ‘fixing my wheel’ (Consumer Vince). Daily maintenance like battery charging and cleaning, provided by family and carers, kept wheelchairs operational: ‘Mum and Dad or my paid carer plugs [my power chair] into a charger at night after they get me into bed’ (Consumer Brian). Regular battery charging was linked to wheelchair performance longevity.

The consumers spoke of external systems that provided structured support. The degree of support was most obvious when the system ceased operation. A common system breakdown occurred in the transition from school to adult services. Poorly managed transition or lack of services on leaving school-based therapy programs caused difficulties: ‘It’s really hard for me to get an occupational therapist, because I’m not in [the school] system any more’ (Consumer Sarina). Moving from metro-based services to rural Australia
also caused service breakdown. Consumer Christine, a polio survivor, experienced complete service breakdown when she transitioned from a city-based children’s institutional care in the late 1960s to her rural home, which was devoid of services:

There was a perception at one stage that I wasn’t capable of driving a [power] chair, so no therapist ever prescribed one for me. [My first power chair] was given to me by the Quota Ladies [Charity] ... A physio friend took me under his wing ... so when life got a bit difficult for me ... he went looking for a job for me because he could see that I was getting quite depressed in my later teens (Consumer Christine).

The third major consumer theme identified was the consumer’s expectations of wheelchair and seating-related services provided.

**Expectations of service provision.**

Under this theme were three sub-themes: consumer’s expectations, accessible locally-based service providers, and ready access to after-sale service. All but two consumers were experienced wheelchair occupants with numerous wheelchair upgrades; their accrued service experiences informed their technology and service expectations. They expected their service providers to take time to understand their consumer’s needs, to be good communicators, and to knowledgeable, reliable service providers.

The service providers with empathetic skills and provided flexible service delivery were appreciated. A responsive service was described as: ‘the person you speak with is personable, understanding of your needs as well as what they can provide for you and accommodating, because they came out here’ (Consumer Hallie). The consumers described supplier excellence with accolades such as: ‘He’s ridiculously good’ (Consumer Brian) and ‘A bloody genius!’ (Consumer Max).
Quality inter-service networking was considered a service bonus. Consumer Hasina perceived the working relationship between her occupational therapist and the coordinator of funding program coordinator an example of quality networking: ‘[My OT] is known by the [funding program]. Yes, yes and she knows all the people that work in there!’ Such close inter-service networking helped work through any obstructions that might delay funding approval.

Established supplier-consumer relationships were linked with positive wheelchair outcomes. The reliance on experienced service providers was evident. Inexperienced Consumer Mac, praised his wheelchair supplier as being: ‘A can-do man that looks after me. He fixes me up! ... He’d tell you exactly what you need to do and ... they are straight! ... That experience is really, really valuable’. Novice consumers were more vulnerable to supplier bias, so honesty and reliability were noted as necessary service attributes. Consumer Bea, an experienced therapist, was new to wheelchair mobility following spinal injury and despite her own clinical experience, she relied on her spinal team for wheelchair advice: ‘because I am new to spinal injury. I did actually take their word for a lot of things’. Acknowledged expert advice was vital during the seating service process, as, ‘there’s lots to go wrong’ (Consumer Mac).

All consumers acknowledged that wheelchair procurement was a lengthy process, therefore access to timely service provision was a noted service bonus. Locally-based service providers enhanced ease of service access.

**Accessible locally-based service providers.**

The consumer’s location relative to their local service providers was significant to accessing seating services in a timely manner. Those who resided within easy access of a
metro-based seating service stated an ideal travel distance was between ‘10 to 25 minutes’
(Consumers Vince, Max). Timely service access was described as service on ‘an as-needed
basis’ (Consumer Max). Access to locally based service providers meant continuity of
wheelchair service, and in maintenance and repairs, with a minimum of disruption to the
consumer:

We also wanted to go with a local provider so that if I needed any repairs or anything
done on the chair, I didn’t have to send it inter-state or overseas to get it done because
I want to limit the amount of time I’m away from my chair (Consumer Vince).

Consumers who lived in regional and rural Australia experienced obstacles to
accessing specialised services. Regional Consumer Hallie had trouble finding
knowledgeable service providers within her local health service: ‘I didn’t feel that they
really understood wheelchair users and their needs, so how would they even really
understand the difference between the different wheelchairs, and what would be suitable for
you?’ As a result, regional consumers relied on specialised services that travelled. Access
to regionally based seating services was rare, but some regional services did employ seating
expertise. The first case example (Table 6) describes a rural consumer’s experiences in
accessing two specialist services, from a metro-based service and as a locally-based service.

Table 6 Case example 1: Consumer Christine on comparing her two differing service
experiences as a rural consumer.

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<th>Table 6 Case example 1: Consumer Christine on comparing her two differing service experiences as a rural consumer.</th>
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<td>At the time of our interview Christine lived and worked in rural Australia. She was employed full-time and, as such, deemed ineligible for her state-funding program. Christine has self-funded multiple power chair upgrades to accommodate her complex postural needs</td>
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associated with polio and post-polio conditions. Her rural health service operated a seating service, but operation was spasmodic because employing and retaining seating expertise was difficult. This case example describes her typical scenario: travelling to a metro-based service; and compares her experience of receiving a specialist seating in her home town.

Typical experience: Travel to a metro-based specialist seating service.

Christine’s routine procedure for each wheelchair-seating upgrade was to fly to a metro-based Integrated Service. As she was self-funding, she chose the most suitable metro-based Service according to her seating needs, at the time.

Christine’s usual modus operandi was to identify her seating needs and goals. As a pre-appointment process she described her wheeled mobility and postural needs by phone to her selected metro-based specialist service. She would then attend with her power chair base for a condensed specialist service including assessment, provision and fitting of the preliminary seating system, over several days of clinic-based appointments. The final, completed seating system was couriered to her rural home some weeks later.

Attending condensed metro-based appointments was intense and required considerable pre-planning as the service relationship with the team was brief. As Christine’s postural requirements were complex, the seating outcome was not always satisfactory. Christine stated many metro-based services had poor understanding of her specific environmental needs, because she lived in a hot, arid and remote region: ‘When [the seating insert] came it was worse than what I had. It was a horrible mess, it was so hot, yes, and you couldn’t survive in that’.

In comparison to her routine wheelchair upgrade, a novel seating service experience is now described.
Novel experience: Access to a locally based specialist seating service.

At the time of the interview, a seating service was operating from her rural health service. Access to this meant that Christine and her team had ongoing interaction throughout the entire process (i.e. ‘being part of a team to look at the same issue’). In addition, her local service providers were familiar with her environmental needs. Ongoing face-to-face dialogue allowed her to make collaborative changes: ‘I’ll go and see him and say: We’ll talk roughly about what I want’. The wheelchair-seating outcome was successful. For the first time in fifty years, Christine participated in a complete wheelchair-seating upgrade in her home location.

Shortly after our interview the seating service closed. While the technician could provide some after-sale servicing, the locally based seating service found retaining seating expertise challenging in its rural location.

This first case example demonstrates the value of having accessible locally located service providers as ease access enables active team participation throughout the seating service process, ensuring a positive outcome. These are similar findings to those of Kittel et al. (2002) that show consumers who proactively participated in their upgrades enjoyed greater wheelchair satisfaction. Timely access to after-sale service also enhanced wheelchair performance.

**Ready access to after-sale service.**

The consumers noted that access to quality after-sales service was essential for optimal wheelchair performance. Locally-based after-sales servicing often meant the repair agent was familiar with the consumer’s lifestyle needs and their wheelchair demands:
They did know the chair really well. They know her history, and they knew what was going on with her [and].... They knew my situation and they have the repair parts.

(Consumer Sarina)

If something went wrong with the chair that I would need them to fix it, I would simply ring them up and [they] say: When can I come and do it? (Consumer Max)

Juggling wheelchair maintenance with competing occupational roles was, however, challenging for some. Consumer Vince, a self-employed man, expressed difficulty in juggling essential wheelchair maintenance with his busy work schedule:

Yes, that’s one thing that I’m finding difficult at the moment, is ... can [the repairer] fit me in at a time that doesn’t affect my work? But obviously I also have to be careful too because if my chair breaks down, I can’t go to work.

The significance of locally-based repairs became apparent when one state-run funding program replaced local services with one central repair agency. When the centralised repair system was implemented, the known local repair person was replaced by several unknown repair persons. Multiple repair persons meant poor knowledge transfer of relevant wheelchair’s history, which meant the history had to be explained many times. Unnecessary service repeats were not appreciated. ‘It really sucks! I find the most annoying thing is when they do come out, you’re spending 20 minutes telling them about the history again’ (Consumer Sarina). In addition, centralised repair scheduling was not responsive to consumer needs and this caused delay and associated angst: ‘I almost missed my birthday dinner because the person ... to fix the chair for me [arrived late]’ (Consumer Vince).
Close family or friends filled service gaps, such as providing emergency assistance: ‘Dad had to drive down and come and get me’ (Consumer Brian) and ‘my first port of call would have to be my dad if he was available, and then I am also lucky that I could ring my wife if the chair broke down’ (Consumer Vince). Regional and rural consumers were creative in making up for service gaps. Local networks provided wheelchair adaptations under this consumer’s instructions: ‘my brother-in-law or whoever I could get, and [I would] say Now, look, chop this off and do this. I’ve even asked [town] engineers [to undertake seating modifications]’ (Consumer Christine). Employing generic services to provide specialised tasks required seating experience and confidence. The consumers’ accrued wheelchair-seating experiences were employed to decide how, when and whom to engage and how best to utilise available services.

The participating consumers showed strong support for a very small Australian-made wheelchair sector. There is a scarcity of Australian-made wheelchair technology, however its contribution to wheelchair procurement was raised by a number of consumers. The reasons for using Australian-made wheelchairs were based on pragmatic, logistical, and emotional factors, as noted: ‘Wheelchairs should be locally manufactured so the parts ... if there is anything that goes wrong then it’s less hassle to get fixes and repairs’ (Consumer Hallie) so ‘I wanted a chair made in Australia’ (Consumer Hasina). The local trusted manufacturer delivered, as: ‘I know them and I trust them [and] ... I’d had three wheelchairs from Sibbings ... and they were all brilliant’ (Consumer Vince). However, access to Australian-made wheelchair systems was in decline and reliance on imported technology escalated.

The fourth major consumer theme identified
Measuring wheelchair success.

A successful wheelchair-seating outcome is linked to sound goals established during the assessment–prescription process (Phillips & Zhao, 1999). The more experienced participating consumers were clear and confident when evaluating the suitability of wheelchair and seating technology against their needs. The following demonstrates the confidence of one experienced consumer, during his latest wheelchair procurement:

There was queries and just checking and stuff like that about a week after I got the chair, just making sure everything was okay. We had some decisions to make about whether I was going to use a JAY or a ROHO as well. So that took a little while longer after I got the chair (Consumer Vince).

Measuring the wheelchair success was layered, commencing with comfort, stability and enhanced function that enabled occupational performance. Enhanced occupational performance enabled greater social inclusion and community participation. The link between optimal wheelchair mobility and enhanced quality of life was a common theme that emerged. The second case example (see Table 7) highlights how transitioning from manual to powered mobility enhanced one consumer’s quality of life. Powered wheeled mobility appropriately matched with Consumer Sarina’s capacity enhanced her occupational performance and quality of life.

Table 7 Case example 2: Consumer Sarina on enhanced quality of life

| At the time of our interview Sarina worked as a young active regional disability advocate, a job that required considerable public transport travel. She also lived independently in a unit; powered mobility had transformed her life. |
Prior to her powered mobility, Sarina’s life was very different.

She lived in supported accommodation, and as a manual wheelchair occupant was dependent on a carer to help her access her community for all activities. She experienced significant progressive shoulder and elbow pain after twenty years of manual wheelchair propulsion, and her occupational therapist recommended an upgrade to powered mobility. This recommendation was not endorsed by Sarina’s general practitioner, and without medical certification, government funding access was not possible. Without adequate funding, Sarina’s power chair upgrade languished for ten years. During that time she endured restricted community participation and total carer dependence when accessing her community, and therefore could not work. Finally her application for a powered mobility upgrade was medically endorsed and funding was approved.

Supplied with a Quantum Q600 power chair, supportive training and sensitive encouragement from her Networked Team, Sarina was finally able to access her community independently. Within six months she was confidently travelling on commuter trains and buses. Public transport allowed her to work, to move into her own unit and become a proactive participant in her community. Her care attendant hours were reduced to a social activity, that of weekend shopping.

Sarina’s quality of life was directly enhanced by the appropriateness of her powered mobility. Her degree of community participation was best described by her mother’s reaction now her daughter was no longer at home:

[Mum] used to like it when I was in the manual [wheelchair], because she always knew that I was home, or I was with the carer, or whatever. But now! It’s like I’m out and
about, and accessing the world, and [my mother’s] like; Oh, God, she’s not at home again. Where is she?

This second example demonstrates the link between powered mobility, enhanced occupational performance, and purposeful community engagement. This finding confirms that of Evans (2000, p. 547), where powered mobility enables ‘greater opportunity to participate in and control occupation’ within the consumer's community.

Complex wheeled mobility requires service provider support as well as sophisticated wheelchair solutions. Sophisticated or ‘high-tech’ wheelchair technology including electronic accessories were described by the participants as cutting-edge. High-tech solutions that specifically addressed complex occupational-environmental needs enabled greater occupational performance: ‘I am driving a lot more with this chair than any of my other chairs previously [and can] ... drive myself to my mum and dad’s now!’ (Consumer Vince). Enhanced occupational engagement in meaningful occupations, as described above transformed lives. This finding is consistent with that of Chan and Chan (2007), who link enhanced quality of life to wheelchair performance and consumers’ satisfaction with their ability to participate physically and socially as desired in their community.

Sophisticated technology is expensive and requires greater service resources, but when appropriately matched with a consumer, it transformed their lives and saved resources in the long term. The third case example (Table 8) illustrates the link between enhanced occupational performance, consumer control, and sophisticated high-tech technologies.
At the time of our interview, Brian was a young university student. He controlled his self-managed care package, an unusual occurrence. He was a life-long power chair occupant and lived at home with his parents. A progressive spinal disorder meant that he was dependent on six hours of daily attendant carer support for all self-care and community access. As his post-graduate education was terminating, his overall goal was for independence in spontaneous community engagement, to travel and work.

Brian’s stated goals were to socialise with his standing peers (i.e. eye-to-eye) without causing neck pain, to independently reach elevator and pedestrian buttons without attendant carer reliance, and to access the contents on his wheelchair tray using his available arm movement. His technology solutions were: an after-market powered seat elevator (≥$2500) fitted to his existing Australian-made power chair, to raise his seated position to approximately standing height; and a custom-made powered tray elevator that at the time of interview was being built to his design (≥$2000).

Brian funded these two high-tech solutions by redirecting some of his attendant care hours.

Brian’s wheelchair outcome: The after-market wheelchair seat elevator provided Brian access to elevator and pedestrian buttons. This reduced his reliance on attendant care for community access. His ability to power raise his seated position meant he could socialise with his peers in noisy social venues with ease and in comfort.

The supply of the customised wheelchair tray elevator enabled Brian to raise his tray to a useful height. This allowed him greater upper limb function so he could independently handle items on his tray such as food, books, phone and door opener.
For the first time in his adult life Brian was able to socialise and travel like his peers, spontaneously, without a care attendant. He no longer needed to scrutinise unknown community venues prior to a social event, knowing access to elevator buttons was no longer a barrier. He described becoming a spontaneous social being fitting with his peer group: ‘I think getting places to socialise and being able to go somewhere I haven’t been before and meet someone and knowing that [I’m] able to press any traffic light and elevator buttons. I don’t have to scout that out before time, knowing I’ll be able to do that spontaneously. It means I am more likely to go to new places and say yes to things’.

Technology effectiveness: On receipt of both items of wheelchair technology, Brian moved from the family home to live independently in his own unit. He has two part-time jobs that he travels to independently, and he engages in all work and leisure occupations as desired without attendant care. His two high-tech solutions have reduced his carer budget by one third: ‘by 30%; I need four carer hours a day instead of six’.

The third example demonstrates the impact sophisticated technology has on the ability to engage purposefully in one’s community. Consumer Brian’s enhanced occupational performance transformed his life and saved valuable resources: in the form of care attendant hours and wages. Brian controlled his life transformation by judicious fund management and flexibility which enabled the selection of after-market technology. Such discretionary spending and access to self-managed funding was not universal in the consumer group.

The dominant themes that emerged from the consumer’s data highlighted the meaning of the wheelchair as personal; that the consumer's peer network provided valuable
wheelchair knowledge; consumer's lived experience enhanced their participation in the wheelchair procurement process and access to timely services and appropriate wheelchair and seating technology enhanced the quality of consumer's lives. The role of the care provider was also acknowledged by the consumers as vital to successful wheelchair procurement.

The major care provider themes are presented now.

**Care Provider themes**

The care providers made up the smallest stakeholder group and consisted of one male and five female carers. Each care provider supported a family member: four sons have been supported since childhood and one spouse following spinal injury in adulthood. All these participants were experienced carers with 14 years or more experience. At the time of the interviews, three provided full-time care-giving support and two provided part-time support.

Four dominant themes emerged from data analysis (see Figure 14), these were: on being a family carer, family carer knows best, carer’s perspective of service provision and the carer’s interface with wheelchair technology. The first theme describes the family care giving role.

**On being a family carer**

To understand the carer’s role, three sub-themes were identified as: the daily carer’s role, parental care-giving role changes over time, and travelling and the care provider’s role.

The care providers provided full-time care-giving assistance, advocacy and protection to family members in the home, or part-time support to family members who had left the
Two care providers were sole care-givers and the others augmented their support with formal care attendant services, which were provided as an in-home service or undertaken in a care facility outside the home.

The full-time care-giving role was constant and intensive. Full-time care was described as care-giving ‘100%’ (Carers Lenna; Donna; Cara) across all life domains. These activities included: ‘hoist transfers assistance’ (Carers Donna; Ian), ‘wheelchair transport’ and ‘loading wheelchair’ (Carers Lenna; Wisty) into a family vehicle or taxi. Daily care-giving roles included personal care and hygiene: ‘I do three of the showers and I look after his teeth and nails’ (Carer Donna); ‘It’s a two-person job every morning and it’s a two-person job every night for a little bit of it’ (Carer Cara). The role as family care-provider was daily impost.

*The daily care-giving role.*

The impact on the carer’s quality of life was noted, as full-time in-house care-giving was physically and emotionally intense: ‘I’m the second carer in the morning, every morning ... there’s times when it’s a one-person job, but when it’s a two-person job, I’m the second person, like managing the chair and stuff’ (Carer Cara). Care provision was also outsourced to assist with the 24/7 nature of full-time care-giving: ‘He needs one-on-one care 24 hours a day’ (Carer Cara). Care providers juggled care-giving with other roles and activities associated with daily life, such as employment. One set of parental care-givers juggled full-time employment with full-time care-giving: ‘I do dinners and lunches if it’s weekend and breakfast on the weekend. [My husband] does breakfast and lunch through the week’ (Carer Donna).
The care-giving role intensified during times of illness or deteriorating health, such as airways suction: ‘If he’s got a cold he needs [airways clearance] every ten minutes, sometimes for 11 to 20 days, like every ten minutes for the whole time but for the first few days definitely and nights’ (Carer Cara).

The care provider’s role changed during the life of the person they supported. Some of them commenced as care providers when their sons were born, and their carer roles transitioned as the boys grew up.

*Parental care-giving role changes over time.*

Parental care-givers recognised a defining phase when care-giving altered from being a maternal role to a shared parental role, related to the child’s growth as the child became too heavy to manage solo: ‘[My wife] is only small. In the early years when he was lighter, she used to be able to do a lot of his care work, but as he got older I was doing 95% of his care work’ (Carer Ian). The need for greater physical capacity meant physical roles were delegated to stronger members where possible: ‘My husband does that. The car track system isn’t the best and it’s easy tangled and messed up. So I kind of leave that to him’ (Carer Donna).

The care provider’s role dominated the family routine. Safety concerns were a common reason for the family’s close monitoring. Carer Donna described the need to monitor her son’s safety in his wheelchair harnessing as he ‘jumped his wheelchair’ when bored or distressed. Therefore: ‘we’re never far away and there’s times where he’s very active in his chair. He jumps a lot – A LOT!’ To ensure her son’s safety, 24-hour caregiving was shared by both parents, who switched roles as full-time care-giver or full-time primary income earner, in response to their son’s needs and available employment
opportunities. Carer Donna noted that being intermittently engaged in work disrupted both parents’ career trajectories.

The care providers juggled care-giving with parenting tasks. The burden of care-giving as a parent was illuminated by Carer Cara. In her rural location, she had a twice-daily drive to collect her school children from the nearest rural bus stop. Her husband did not join the bus run, because of the roughness of the rural roads: ‘He’s got no trunk muscles ... so if he goes over a bump he just gets flopped wherever the bump throws him’ (Carer Cara). As a result Carer Cara left him at home: a half-hour hiatus in attendant care.

Cara’s stress was magnified by intermittent cell phone connectivity:

Mobile phone didn’t work a lot of the journey, so we didn’t quite know, but I’d ring him all the time. All the time I got into mobile phone range, I’d ring back and make sure he was okay but if he wasn’t, it was still a half hour drive to get back to him.

The care providers who transitioned from full-time to part-time support stated their roles became less physical. Carers Ian and Wisty stated that when physical care-giving was transferred to their sons’ care attendant teams, their role morphed into supporting leisure activities. Releasing carer control was not easy. Carer Wisty, who acted as principal advocate for her non-resident son, acquired legal guardianship so she could stay in control; and Carer Ian voiced his disquiet when he handed over wheelchair maintenance to his capable son: ‘Sometimes I think my son doesn’t like to rock the boat, whereas if he’d been living at home, I would have had [his wheelchair] fixed. I don’t know why he chooses to keep on doing it the way he is’.

Travelling and the care provider’s role.
As the majority of specialised seating services were metro-based, travelling distances was a theme that emerge strongly among the regional and rural participants who ‘had to travel’ (Carers Ian; Cara). The long distances to metro-based seating appointments were costly and disrupted family routines: ‘the only thing that was hard [was] getting to all the appointments for all the fittings ... [it was] expensive for accommodation and everything’ (Carer Cara). The metro-based carer providers also expressed difficulties in travelling to the numerous appointments with suppliers and manufacturers located in outer suburban industrial estates.

Travelling for leisure was not undertaken lightly. Carer Donna offered why their family preferred stay-at-home holidays:

I mean you can’t have a holiday. You can’t fly because you couldn’t get him onto the plane, you couldn’t get him in and out of his seat. What if he goes to the toilet as soon as you get in there? What are you going to do? You’re stuck! So all these things are very restricted in life, it would be nice to have some more options (Carer Donna).

The care provider’s intimate knowledge of the consumer’s mobility, postural and wheelchair needs were intuitive. They were keen to be heard during wheelchair procurement.

**The family carer knows best**

The care providers clearly stated their knowledge of their family member was grounded on lived carer experience. Their credentials as parents were declared. Carer Ian, a father asserted his son and he collaborated closely: ‘He and I are so close. I knew what he wanted to do and I could see what wasn’t working in the old chair and [so] try to improve the new chair’. Carer Wisty, a mother declared her advocacy role on behalf of adult son, as:
‘I suppose him and I are pretty close, because it’s always been me’ (Carer Wisty). Daily immersion in care-giving meant they were well informed, attuned to their needs: ‘Because I sit him in the chair every day I know how his legs sit and how hard the pressure is under his thighs’ (Carer Cara); ‘That’s why I go. I think it’s important that I should go because I know him probably better than anyone; and make sure that we do get what we want’ (Carer Wisty). The participating care provider’s contribution to their family member’s wheelchair procurement was considerable.

The care providers were clear about their role in wheelchair procurement. The primary therapist was considered the clinical ‘expert’ (Carers Ian; Donna), but the carer was the expert of their family and lifestyle needs: ‘[My son’s therapist] is the expert, not me. She knows what’s available. I know what I want. So it’s a matter of getting the two to work together’ (Carer Wisty). Clear communication was a significant factor in a collaborative ‘working relationship’ (Carer Wisty). Care providers wanted responsive service provision and timely responses, for example to their phone calls. Frustration was noted when service providers were ‘shocking at returning phone calls or emails’ (Carer Cara).

To maintain wheelchair performance, the care providers wanted responsive after-sales service. Carer Lenna stated that her son’s wheelchair ‘technician availability and response [was] excellent’ during business hours, but there was ‘no service available weekends and public holidays’. The carers viewed regular maintenance as vital in keeping the wheelchair functioning well, and all the participating carers were involved in the seating service experience.
Carers’ perspective of the seating service experience

This theme describes the seating service experience from the carer’s perspective. There were three sub-themes identified as: working together for the same outcome, after-sales service and optimising the wheelchair performance, and unsatisfactory service outcomes not rewarded with return business.

Care providers who acted as their sons' advocates stated they needed to be particularly ‘assertive’ (Carer Cara); to advocate ‘with more authority’ (Carer Donna) on behalf of their sons to ensure their needs were considered. As the principal advocates representing their family member’s needs, their contribution was as vital to wheelchair procurement as the consumer was.

The carer’s engagement in seating procurement process was considerable. For example: ‘We were there for about three hours, so it was a really in-depth fitting, and we discussed everything’ (Carer Wisty); ‘I’m very mechanically minded and always put my two bob’s worth in as well’ (Carer Ian).

Not all seating service experience was positive from the care provider’s perspective. Staff changes and associated communication breakdowns severely hampered timely wheelchair procurement. The care provider’s displeasure with poor service or an unsatisfactory wheelchair outcome were expressed by implicating all team members. Case example four (see Table 9) summarises the care provider’s service experience, to show how poor service team communication resulted in her son’s unsatisfactory wheelchair outcome.
At the time of our interview, Wisty was a mother of a 39-year-old son living with cerebral palsy. Her son had relocated from home to a care facility ten years previously. Wisty became her son’s legal guardian when she disagreed with decisions being made for her son by the care facility.

As principal advocate, Carer Wisty and her son attended his first appointment to upgrade his manual tilt-in-space wheelchair at the manufacturer’s factory. In attendance was her son's prescribing clinician, seating technician, facility carer, mother, and son. According to Wisty, the wheelchair supplier had been selected by the prescribing clinician, based on the technician’s reputation and his ability to meet the son’s complex postural needs.

Wisty stated the initial three-hour appointment was successfully conducted by the experienced technician: ‘We told them exactly what we wanted and we measured and we talked, because [my son] is very unique. Even though he is in a wheelchair permanently all the time, he actually has learnt quite a lot of mobility ... he moves and swivels quite a lot’.

Wisty’s initial appraisal of the first assessment-prescription appointment directed by the technician was positive: ‘He was going to do a good job’. Her son’s seating needs were assessed and discussed; seating solutions were agreed upon and wheelchair prescription generated.

Shortly after the wheelchair quotation was dispatched, the initial seating technician left the business: ‘He left, didn’t he? That’s where the problems started’ (Carer Wisty). Neither the prescribing clinician nor the care provider were notified of the technician's change until they arrived for the second appointment (seat fitting), conducted by a different
seating technician. From a successful first appoint, the seating team dynamics had changed on the second appointment: ‘He just had that didn’t care attitude’. The second appointment was poorly planned and not successful: ‘We had a whole new person. It actually wasn’t a fitting. It was one measurement. He took us all the way out to [outer metro-suburb] for one measurement, and so we went again. That was all right [as] they told me that we would have [son’s wheelchair] before Christmas’.

The seating service process began to unravel from the second appointment. It was clear there was no communication between the first, second or subsequent technicians: ‘we went for our next fitting ... well after Christmas ... and we saw another person. This other [technician] ... at that point, the chair was partially made and [my son] could sit in it. There were quite a few issues of that chair that weren’t what we asked for ... one other thing was that it had to lay back because, to get [my son] in it ... The chair had to lay back [tilt-in-space]. It was one of the main issues [for pressure care management]’.

There was no evidence of communication with subsequent seating appointments, conducted by a third, then a fourth technician.

The care provider and the primary therapist discussed changing the wheelchair supplier, but as the son’s existing wheelchair was failing, they decided to continue rather than restart the entire procurement process with yet another supplier.

The care provider and clinician endured four unannounced technician changes in 18 months. The fractured communication between the technicians and the carer and clinician produced an unsuitable wheelchair outcome. The supplied wheelchair was minus the prescribed angle for the tilt-in-space repositioning feature, essential for the son’s pressure care regime was one among other concerns.
The carer’s displeasure with the service provided and outcome was noted: ‘It just dragged on and on and on, and we didn’t get what we wanted, and the new [technicians] really didn’t care .... [my son was] stuck with a chair that really is not suitable for him’. Poor team communication and an uncaring service attitude were directly linked to an unsatisfactory wheelchair outcome: ‘in the end, we ended up with a chair that’s totally unsuitable for [my son] and we’ve had to [top-up] pay $2500 towards it. ... There were three big issues ... [insufficient] reclining it was one of them ... the pommel [discomfort another] ... he got a pressure sore from the pommel ... it wasn’t the pommel that was on the quote ... It was a cheaper one. So we really got done left, right, and centre’.

The outcome reflected poorly on all the service providers, as the carer’s displeasure was disseminated globally: ‘I would never recommend anyone to go there again [and] ... If I was paying a therapist out of [my son’s] funding? Probably not! I probably wouldn’t, because it would be a waste of some of his funding’. Unsatisfactory outcomes do not win return business, including, in this instance, for the prescribing clinician (who was considered too passive).

Post-provision outcome: The son’s wheelchair was adapted with reasonable success by a competitor wheelchair service for extra cost: ‘There were a lot of issues that I had to have addressed through somebody else, and it cost me another $600 to have it brought up to a reasonable standard’.

The fourth case example demonstrates that poor team communication was linked to a negative wheelchair outcome. An unsuccessful wheelchair outcome implicated all the seating team and none would receive return business from this participant.
Lack of control or choice of service was noted: ‘One wheelchair seating service ... obviously does restrict choices with suppliers and seating products’ (Carer Lenna). The majority of care providers declared their family member had no choice. Their funding programs dictated the selection of service and service provider: ‘You have to go with the ones that they’ve chosen which might be just one central one’ (Carer Cara), so ‘we don’t really have a choice ... they sent an occupational therapist out’ (Carer Donna) and ‘I just go wherever I’m basically told to go’ (Care Wisty).

The lack of choice in service providers is concerning as the care provider’s interface with wheelchair and seating technology is notable. This is the fourth carer theme identified: the carer’s wheelchair interface.

**Carer’s wheelchair interface**

Under this theme, two sub-themes were identified as: defining wheelchair success from a carer’s perspective, and matching wheelchair technology to the carer’s occupational needs.

*Defining wheelchair success from a carer's perspective.*

From the carer’s perspective the goals for a successful wheelchair outcome focused on comfortable seating support and stable, reliable wheelchair performance. Carer statements verified the need for supportive comfort: ‘Something that was comfortable’ (Carer Wisty) and ‘supportive’ (Carer Donna); ‘It’s comfort and support, yes, obviously’ (Carer Ian). Wheelchair stability was important: ‘he can go up steep stuff and it doesn’t tip backwards’ (Carer Cara) and ‘It’s stable’ (Carer Wisty). Implying wheelchair manoeuvrability was important, care providers highlighted handling difficulty when the wheelchair was too heavy to manoeuvre: ‘It’s quite heavy and wide if pushing’ (Carer
Lenna), and ‘He’s too heavy to push around’ (Carer Donna). A positive evaluation came when the wheelchair provided enhanced consumer performance, such as: ‘[The wheelchair] looks robust, you know, and did all the things we wanted and ... He said it felt comfortable, it drove really well’ (Carer Ian).

When the wheelchair transformed the consumer’s life, this was taken as a measure of success. Carer Ian spoke of when his son’s life, as a toddler, was transformed by early introduction to powered mobility: ‘Oh, it was a new lease of life! It was his freedom and you definitely could see him grow, you know. As far as he could choose where he wanted to go and it was fantastic!’ As powered mobility enabled his toddler to move, explore and play, it enhanced his son’s quality of life. Enhanced quality of life was also implied (playfully) by Carer Cara, who enjoyed a leisurely drive with her husband in command: ‘It’s good! I get dragged around town on my skateboard. I hang onto his [power chair] handlebar!’

Considering wheelchair procurement from the carer’s role and tasks were highlighted.

**Carers’ occupational needs.**

The carer’s involvement in selecting suitable wheelchair technology was influenced by previous experiences. Some with prior positive wheelchair procurement returned to known service providers. Metro-based care providers reported having a greater options when selecting both wheelchair-seating technology and suitable supplier services for their family member. By comparison, participating carers living regional and rurally experienced more difficulty accessing an appropriate range of wheelchair technology, as their access local supplier/s were less likely to be specialised wheelchair vendors. Limited access to suitable technology was linked to poor outcomes. This was noted by Ian, a care provider
living regionally stated a lack of wheelchair choice meant his son was ‘only provided with two of the same company’s chairs’ (Carer Ian). His son was provided with an unsatisfactory wheelchair system, unable to perform at the required level, this care provider linked poor technology options with his son’s poor wheelchair outcome.

However, lack of wheelchair choice or control of selecting specialist seating services did not always result in a poor outcome, as noted in the fifth case example (see Table 10).

Table 10 Case example 5: Carer Lenna on service access and wheelchair choice

In a follow-up email, Lenna qualified her most recent seating service experience. As principal decision-maker and mother, Lenna stated her adolescent son required an urgent wheelchair upgrade associated with changed health needs.

Access to a suitable Integrated Service was determined by the state-run funding program that also selected her son’s wheelchair technology from a predetermined inventory-listed stockpile. Although the choice of service and wheelchair was outside Lenna’s control, her experience was positive, as she wrote:

‘When my son was ready to go into his first motorised wheelchair, and when he was due to upgrade to a larger chair a couple of years later, on both occasions I was lucky enough for our community equipment scheme ... to have available a motorised wheelchair (both practically brand new) available for my son to use ASAP without a cost being incurred to me.

Obviously minor modifications were required but this was done very quickly by [my son’s seating service] and did not impact my son’s health while waiting for the modifications.'
For this reason, I was restricted in accepting the wheelchair offered to my son and therefore did not have an opportunity to choose a specific type of wheelchair. Having said that, I have been very happy with the wheelchairs offered to us; i.e. function, colour etc. and do not think that being given the opportunity to choose a specific wheelchair is as important as having a wheelchair available at the time required.

So many children here ... are unfortunate enough to require a wheelchair ASAP due to their medical condition but are unlucky in that there are none available that suit their needs when required; and therefore their families have to undertake fundraising to pay for a wheelchair for their child, which as you know is extremely expensive.

[In Lenna’s town] also only has one wheelchair seating service which obviously does restrict choices with suppliers and seating products, but I am very happy with [my son’s seating service]. Their staff have been amazing and have gone out of their way to assist us in anything that we have required for our son.

I do not have any suggestions or recommendations for an improved seating service as I believe that the one available here ... is outstanding and covers all the needs required'

The fifth case example demonstrates that quality service provision can overcome a lack of consumer control and choice. This case shows clearly that both the care provider and her son were considered as the service consumers.

Carer Cara, a rurally-based participant, described her positive outcome was linked to successful technology choice backed by responsive service delivery. A lengthy wheelchair demonstration was required to validate a pre-purchase wheelchair selection. The wheelchair supplier obliged and provided a home trial: ‘The [supplier] really nicely brought it down to
give us a proper go ... and we had it for a whole day, so that worked out really well’ (Carer Cara). Real-life non-standard power chair trials in less than standard environments, such as their rural environment, was an important carer–consumer recommendation: ‘We eventually tried it [at home] and it was better. It went up one of our really steep ramps and didn’t tip backwards which other ones tipped backwards; so it passed that test’ (Carer Cara). The importance of trialling technology in all routine environments was essential for their successful wheelchair purchase. Not all carer providers’ experiences with home-based trials were positive.

The sixth case example (see Table 11) shows the impact on the consumer’s family lifestyle when the wheelchair provided does not account for the carer’s occupational needs.

Table 11 Case example 6: Carer Donna on attending to carer’s occupational needs

| At the time of our interview, Donna and her family had relocated from a small regional township (across state borders) away from a nurturing regional disability service which had assisted her son from his birth. Donna was her now-adult son’s advocate, and on behalf of her son had specifically requested an attendant drive power chair for outdoor mobility. The request was based on the very hilly local terrain and their primary goal: to propel her very tall son to the local parkland, which was a ‘20 minute walk away’ and of interest as her son enjoyed the accessible wheelchair swing. For the carer, wheelchair access to the wheelchair swing was the primary leisure goal for mother and son. The request for powered mobility technology was to enable her access to the parkland across the hilly terrain, too difficult to push her son and wheelchair. Her son was dependent in all activities, including indoor and outdoor manual wheelchair mobility. |
Donna stated her son’s first (and only) home trial was poorly prepared and therefore destined to failure. In a misrepresentation of the expressed carer goal for community access, the wheelchair trial was undertaken inside the home as if for home access. Furthermore, Donna recalled feeling the wheelchair trial was sabotaged as the prototype was not adequately assembled for a fair trial: ‘We just had to kind of walk like a remote control behind it and they gave us a go of [a power chair] and it was kind of just to prove that we couldn’t use one in the house basically. I mean we got a five-minute go and they were saying things like, so you can see it’s very difficult to use inside. I mean you know!

In this service, the care provider was the client, as the adult son was dependent on attendant propulsion. Despite the carer’s stated occupational goals, her son was provided with a heavy duty manual wheelchair to last for a funding cycle of 5–7 years. When the son was seated in it, the load proved too heavy for Donna to push. The primary carer goal, carer-propelled wheelchair access to the park’s wheelchair swing, was ignored. The outcome: both son and mother were housebound.

The inappropriate match of wheelchair technology, stated goals and the carer’s performance capacity resulted in a poor wheelchair outcome. It affected the whole family. To her despair, as the primary care provider, Donna could not manage the heavy wheelchair and the primary carer role had to change. Donna’s husband was forced to resign from paid full-time employment to take over his son’s full-time care. Donna re-entered the workforce as the sole breadwinner.
The sixth case example exemplifies the impact on family dynamics when an inappropriate wheelchair was provided. This example shows the importance of including the carer’s occupational needs as part of the wheelchair prescription. Matching complex wheeled mobility needs with the psychosocial environment is linked to appropriateness of wheelchair provision, as noted in the literature (Scherer, 2005; WHO, 2008). Contextualising all factors of the consumer’s life is vital to ensure appropriate wheelchair and seating appropriateness, thus confirming the contextual factors highlighted in Scherer’s framework of Matching Person and Technology (2008) and by the International Classification of Health framework (Üstün, 2002).

The dominant themes that emerged from the care providers’ data highlight their essential contribution they bring to the wheelchair-seating service process. Their intimate knowledge of the needs of their family member and their carer’s occupational needs are vital in achieving successful outcomes. Carers’ contribution to the seating service effectiveness, requires considered time to ensure their involvement in wheelchair selection is as valued team member (Demers, et al, 2009).

The emerging themes and sub-themes identified from the consumer and carer thematic analysis provide essential rich data, some confirming existing evidence, much new to add to scant Australian evidence. This data provide a deeper understanding of the service recipients’ experiences of Australian seating services and in specialised wheelchair procurement. These are essential data for an in-depth case study exploration into the Australian experience, from the recipients’ perspective. The following section describes the themes to emerge from the service providers’ data, commencing with the prescribing clinicians.
Prescribing Clinician Themes

The largest stakeholder group, the prescribing clinicians, consisted of eight physiotherapists and 20 occupational therapists, representing both seating consultants and primary therapists. The prescribing clinicians voiced enthusiasm for the study, saying the interview process provided them with reflection time: ‘It’s been really good to be able to review the seating services that I’ve worked in. What’s worked well and what hasn’t’ (Clinician Wendy); ‘I think it’s fabulous that you’re doing this ... because it’s an opportunity to reflect. You know, you don’t ... because you’re always on the hop’ (Clinician Betty).

Four major themes arose from the prescribing clinicians’ data (see Figure 14). Each is described below, commencing with the first theme: wheelchair prescription is complex.

Wheelchair prescription is complex.

Under this theme, two sub-themes were noted: consumer wheelchair experience is valued and experienced consumers are good sources of technology knowledge.

The first major clinician theme to emerge was that the role of the wheelchair-seating prescriber. This viewed as complex and resource-intensive: ‘Complex seating is a sort of an intensive therapist thing ... in my department there is [sic] two therapists plus me, so there’s a lot of resource going into it’ (Clinician Fran). Clinicians estimated their involvement in specialised wheelchair-seating procurement was ‘around 30 to 35 hours’ (Clinician Kay); and ‘35 hours of time’ (Clinician Jon). Custom-made seating required even greater clinical time: ‘on average, it’s probably about 38 to 40 hours of a therapist’s time to prescribe a wheelchair’ (Clinician Jane). For many specialised wheelchair procurements, this clinical time was not visible in the overall wheelchair-seating costs. The therapy services costs of
(as prescribing clinicians) were absorbed into host service budgets rather than presented as a seating service cost.

The time taken by the clinician’s contribution was explained by their involvement across all seating service processes. The prescribing clinician’s role in prescription involved intermittent evaluation throughout: ‘Assessment, prescription and procurement of the trial item and then liaison during the trial period’ (Clinician Neve); ‘providing equipment advice; then selection, trial and prescription for ... seating in wheelchairs’ (Clinician Betty).

The wheelchair and seating prescription required competent skilled assessment of ‘postural, pressure and wheeled mobility focused at the higher rehab end’ (Clinician Catrina) and this challenge was ‘exciting’ (Clinician Catrina).

The challenge was linked to complex caseloads: ‘the client group’s nothing that I’d ever come across before coming here. So yes, I just thought it’s a good opportunity to work in a totally new kind of environment’ (Clinician Cam). The variety of the seating work was exciting. ‘You never get bored in this job. You can never know everything. Every client you pick up, no matter if you’ve been here one day or ten years, they’re always challenging’ (Clinician Tammy). A successful wheelchair outcome was rewarding, and getting it right was gratifying for consumer and clinician, as: ‘big satisfaction out of seating people well or seeing people seated a lot more comfortably’ (Clinician Fran). To meet the challenge of the seating challenge the clinicians learnt from their consumer’s lived experience of being a wheelchair occupant.

**Consumer wheelchair experience is valued.**

As noted in Chapter four, the assessment–prescription process (see Figure 13 for an overview of the six seating service steps) was the role of the principal prescriber,
undertaken collaboratively with the consumer and their carer (if appropriate). Their lived experiences were valued contributions. ‘Some of my clients are in their chairs 18 hours a day’ (Clinician Bev) and this was personal knowledge of technology only a consumer could provide. In addition, collecting the consumer’s perspective of daily occupational demands and the carer’s roles contextualised the wheelchair’s usage. This was a relevant contribution to the wheelchair assessment–prescription process. The assessment–prescription process was an ongoing reflective revaluation process, as clinicians: ‘Relate it back to posture, the seating and making sure that we keep them as functional as possible by maintaining good posture. One goes in hand with the other’ (Clinician Jon). A person-centred occupational approach was apparent as clinicians proactively employed their consumer's knowledge as a crucial resource in the procurement process.

**Experienced consumers are good sources of technology knowledge.**

Clinicians valued the consumers' lived experiences as a clinical resource. Sharing the lived experience of their consumers enhanced their clinical knowledge and assisted them in understanding the nuances required to fit appropriate technology with each consumer’s specific goals. Clinicians also learnt from their consumer’s independent research. ‘They know their gear very well ... They know what’s on the market. They know what’s coming on the market ... They basically drive the process’ (Clinician Rocko). Consumers were personally driven to stay abreast of technologies, and the clinicians actively harnessed this collective knowledge. ‘The best resources really are our patients. So we’d be doing ourselves a disservice if we didn’t listen to them and take notice of what equipment they’re using and how they found it’ (Clinician Laura). While not all consumers were experienced, an informed consumer was a valuable resource.
The seating interview between the clinician and the consumer provided essential data. It allowed the clinician to understand, experientially, their consumer’s daily postural–mobility–occupational goals and demands. To ensure the consumer’s perspectives were collected, adequate interview time was allocated. ‘I’d spend a reasonable amount of time on the interview because I just always found that was the most complicated thing’ (Clinician Kay).

The mat evaluation, undertaken prior to or after the consumer interview process, was a vital assessment, needed to understand the bio-functional capacity of the consumer:

We would have a bit of a chat and then generally I’ll do a full mat evaluation ... I’ll do a sitting evaluation, so in their current wheelchair, checking the pelvis position, ticking—just a quick tick box—are they abducted, adducted, scoliosis? I’ll take down the details of their mobility base because I might be interfacing something onto that later. (Clinician Mia)

The participating clinicians noted that while most primary therapists were confident in prescribing an appropriate wheelchair base, there was less confidence in conducting a mat evaluation for prescribing and fitting appropriate seating technology. These primary therapists were more reliant on their expert services for mat evaluation assistance. The preferred site for undertaking a mat evaluation was on a plinth. The primary therapists who worked in the community stated their working environments were not always conducive to undertaking an ideal mat evaluation. ‘I’ve done them on people’s beds, sometimes ... in the wheelchair. I really do everything I can to get them out of the chair, but sometimes you’ve just got to do what you can do’ (Clinician Jane). Cautious judgement was required to
ascertain clinical safety when transferring consumers from their wheelchairs, especially in non-clinical venues such as the home.

This first identified theme: the wheelchair prescription is complex, confirms previous known Australian evidence (Kittel et al., 2002; Di Marco et al., 2003) and internationally (Kenny & Gowran, 2014; Mortenson & Miller, 2008; Plummer, 2010; White & Lemmer, 1998). The second theme identified was pertaining to the clinicians’ role.

**Clinicians are dedicated but the role is challenging.**

Under this theme were four sub-themes: the prescribing clinician’s passion for the job, the prescribing clinicians’ core skills, personal resilience as a core professional requirement, and clinical experience and resourcefulness.

Prescribing clinicians’ entry into specialised wheelchair-seating service varied. Several were exposed as early-career clinicians through their spinal or acute neurology rehabilitation practice. Others entered the wheelchair-seating sector for ‘the challenge’ (Clinicians Valerie; Nancy) and stayed as they ‘enjoyed the challenge’ (Clinician Naomi).

The occupational therapy cohort noted the lack of wheelchair-seating skill content in their Australian occupational therapy undergraduate programs. When asked, the occupational therapy group response was definitive: ‘Oh god no! No we did nothing about seating!’ (Clinician Betty). If wheelchair technology content was presented, they recalled, their student response was superficial: ‘we were more interested in playing with the actuators, the [wheelchair] reclines and the flash technology’ (Clinician Mia) than in seating skill acquisition. The smaller physiotherapy cohort implied their core professional skills equipped them better ‘to do the mat assessment’ (Clinician Cath), although ongoing seating experience was essential to hone competency.
The clinicians’ wheelchair and seating technology knowledge and skill were acquired from clinical practice. Their seating assessment skills were acquired working with seating peers and consumers, on the job, for example working closely ‘with a physiotherapist for two and a half years’ (Clinician Betty). The mat evaluation was learnt through practical experience as with ‘[The physio] and the OT would see them, like I’d do the mat assessment, [the OT] would do more that high-based kind of functional assessment and then together we’d recommend’ (Clinician Cath).

Practical skill was acquired more quickly when working with specific wheelchair-seating caseloads such as within spinal rehabilitation. Specific seating caseloads expedited skill acquisition: ‘to become productive and more confident to take things on-board much quicker’ (Clinician Nadia). For the clinicians working with caseloads involved in non-spinal related caseloads, where the wheelchair-seating prescription was one of many therapy services rendered, seating skills developed more slowly.

The clinician’s caseload demands dictated the speed of the clinician’s skill development. A greater caseload demand required more clinical experience: ‘It was quite a busy caseload, huge catchment areas, complex clients ... that just comes with experience and exposure and, you know, once you’ve done it five times, it’s a lot easier’ (Clinician Valerie). Skill proficiency developed with practice as, ‘you do things more, you get better at them and I was doing assessments ... every day. You get the feel for it and so a lot of it was hands on’ (Consumer Kay).

Just short of half the participating clinicians worked as seating consultants in dedicated seating services, while the majority were employed as primary therapists by non-specific seating service providers. A primary therapist’s seating role was quantified as ‘30–
40% ... seating’ (Clinician Valerie) and a seating consultant service role as ‘100% ... seating and wheelchairs’ (Clinician Valerie).

The clinicians who worked as seating consultants in a specialist seating service spoke enthusiastically about working in supportive skilled teams: ‘They’re a pretty well established seating clinic and workshop and I spent three years working with them, and during that time learnt a lot more about seating and sort of like customised the abilities for modifying customised equipment’ (Clinician Cam). The specialist seating service delivered a dedicated seating service in which clinicians were part of a nurturing seating team, such as an Integrated Service.

By comparison, the primary therapists who collaborated with a range of service providers, as in a Networked Team, described greater variation in team support and seating skills. The team members’ experiences determined the skill level within any Networked Team. Despite the apparent variation in team support, the prescribing clinicians were universally enthusiastic participants in the seating service process.

**Prescribing clinician’s passion for the job.**

The prescribing clinicians strongly expressed a passion for working in the specialised wheelchair procurement and seating service sector. Comments like, ‘I just fell in love with it’ (Clinician Jane), and ‘I really enjoy it actually. I wouldn’t give it up for the world!’ (Clinician Naomi) were testaments to their passion. The wheelchair-seating work was interesting. ‘I always had a special interest, I guess, in seating and so it was an area I always enjoyed doing’ (Clinician Candy). The clinician’s job was enjoyable: ‘we like our job (Clinicians Naomi; Claudia) and ‘the work is very interesting’ (Clinician Patty). The challenge of the seating role was clinically satisfying. ‘I really get a big satisfaction out of
seating people well or seeing people seated a lot more comfortably’ (Clinician Fran). The clinician’s role required competent core skills.

**The prescribing clinicians’ core skills.**

The qualities prescribing clinicians looked for in their peers were personal reliance, resourcefulness, and proactive lifelong learning skills. Suitable attributes were: ‘ability to relate to people’ (Clinician Fran), ‘good communication skills, personal skills ... [and] somebody who had a bit of confidence’ (Clinician Nancy). Successful prescribing clinicians could think ‘outside the square, or outside the box’ (Clinician Hanna) and creative thinking required proactive self-directed learning and quality networks. Clinician Cath declared her innate curiosity and thirst for knowledge drove and validated her clinical reasoning: ‘I do lots of reading ... attend lots of different courses run by the suppliers ... I’ve worked with some really fantastic therapists [and] ... I’ll go and ask questions and kind of annoy people in some ways’ (Clinician Cath). Life-long learners were motivated to seek knowledge, and recognition of an ‘ability to not necessarily know it all from the word go but certainly to know where to get the information from or where to get the support’ (Clinician Nancy). A life-long learner developed personal and professional resilience to cope with complex caseloads.

**Personal resilience as a core professional requirement.**

Personal resilience was indicated as a core professional requirement: ‘Working with some of these clients who are quite difficult—unless you’re really cut out for that job—it’s quite hard’ (Clinician Nancy). Personal resilience was required when working with high expectations ‘because the client group, our parents are getting far more demanding’ (Clinician Betty). While all clinicians wanted to work with an expert technician, a versatile
prescribing clinician needed: ‘to be handy’ (Clinician Betty), to use tools to set-up, adjust and ‘tweak’ wheelchair equipment independent of a technician. Independent multi-skilling was so essential in Clinician Mia’s team, that she was required to demonstrate her skill before her technician would take over: ‘For me to set a [seat] back up, it might take me two hours and it might take the tech 15 minutes; so as long as I could demonstrate that I knew where all those parts had to go … then our techs would be fine to do it [instead of me]’ (Clinician Mia). Technical capability was a versatile clinical skill and when exercised proficiently demonstrated professional competence and confidence.

The secondary consultancy service provided an important role in up-skilling less experienced or confident prescribing clinicians’ seating skills. As seating skill was learnt on the job, the seating consultants routinely worked alongside the primary therapist and consumer in joint appointments. These provided close expert tutorage, and access to timely supervision ensured clinical skills and reasoning were sound. The secondary consultancy role helped to build clinical reasoning, seating skill and therefore team capacity.

**Clinical experience and resourcefulness.**

Experienced clinicians spoke of bringing their range of clinical experience to bear on the role as a prescriber of specialised wheelchair procurement. The following participant bought his extensive knowledge to revitalise a languishing rural seating service: ‘[I bought] skills and the experience from my previous jobs to a clinic that hadn’t had someone full-time for almost three years’ (Clinician Cam). Clinician Laura described being energised when a consumer’s quality of life was enhanced by a successful outcome: ‘People calling you saying, you’ve changed my life! I feel like I’ve got legs again! Or people being able to get on with their lives, to be independent and do things they haven’t been able to do’. Such
comments implied a link between enhancing consumers’ wellbeing and elevating the clinician’s sense of professional purpose.

**Wheelchair outcome feedback develops clinical reasoning.**

Clinical reasoning, as stated by Unsworth (2001), is acquired through practical clinical experience where clinical outcomes are tested against clinical expectations informed by theoretical knowledge. The clinical reasoning process was evident as participating clinicians evaluated their wheelchair prescriptions against home-based wheelchair trials and again during post-provision reviews. Clinical feedback from successive wheelchair procurements validated their wheelchair prescription and associated clinical reasoning. Amassed feedback from both successful and not so successful outcomes developed clinicians’ bases of knowledge.

While post-provision review provided valuable feedback, busy primary therapists stated difficulty in attending to all post-provision follow-up. To manage large caseloads and their follow-up reviews, prescribing clinicians spoke of using clinical judgement to identify consumers who might need close attention: ‘I guess making sure my clients know that I am available and [for] ... doing a follow up ... any issues, or any concerns. Sometimes people do have issues and it’s all correctable by adjustments’ (Clinician Nadia). Peer networks and clinical review processes also assisted clinicians to gain consumer-technology feedback over time. Clinician Claudia employed the spinal review process to capture any consumer wheelchair feedback via ‘their 12 to 24 monthly review ... [with] OT and physio’. Active networks assisted fill service gaps and busy clinicians.

A satisfactory outcome was linked to supportive, comfortable and purposeful function. Clinicians evaluated a successful wheelchair outcome by the consumers’
improved ‘quality of life’ (Clinicians Patty; Paula; Cath) as measured by enhanced consumer occupational capacity. ‘She could get up, she could do all this sort of stuff she needed [to do]’ (Clinician Rocko). The clinicians developed extensive service skill individually and as a team, to focus on addressing the consumer’s occupational needs and wants.

**Professional development and building resilience.**

This is the final theme to emerge from the clinicians’ data. The clinicians identified specialised wheelchair procurement as a distinct clinical speciality. As such, prescription required specific skills, competencies and clinical practices, acquired over years of practice. Clinician Kay, a self-employed clinician with twenty years’ experience, stated her seating skills were very specific to her caseload: ‘I’ve got a very narrow and deep skills set ... that’s very narrow’. Developing and strengthening seating competencies and clinical reasoning skills was an ongoing professional responsibility.

Skill acquisition was predominately learnt on the job, in the absence of formal seating education. The prescribing clinician group constantly sought knowledge on best clinical practice and checked the currency of their technology knowledge. Wheelchair and seating-related ‘workshopping’ (Clinician Betty) was one method employed for this. The clinicians stated they needed education in clinical seating skill and in technology knowledge: ‘We did actually recently have the supplier people come down and they did quite a good workshop for us on power wheelchairs and it was not just on their product. It was actually quite good on seating [skills] too’ (Clinician Talia). These wheelchair workshops were usually sponsored by wheelchair suppliers and provided access to new technologies.
Workshop attendance as an early career clinician was an accepted professional development (PD) activity and assisted in developing a seating network. The experienced clinicians, however, stated they needed more challenging education than was available for their very complex caseloads. ‘I’m needing more stuff [related to] what’s actually going on bio-mechanically for this person; and it can be really challenging to find PD that fits that sort of level. I’m working in a fairly specialist field’ (Clinician Jane). To meet their needs, clinicians relied on their peer networks for knowledge exchange, transfer and to validate their clinical practices: ‘We learn off each other but also teach others’ (Clinician Hanna).

As most prescribing clinicians were time poor, some used electronic media to access peer support remotely. ‘We might be Skyping or emailing or telephone calling each other and then there might be face to face visits and back up that with Skype, teleconferencing’ (Clinician Paula).

There were a number of innovative knowledge transfer activities using electronic media. Webinar technology was used by Paula, a state-wide clinical educator. ‘In Webinar you can preload the platform to allow for everything from discussions, everyone’s sharing and doing drawing on a white board, all the educational tools that you need for interactivity’ (Clinician Paula). These innovative educational activities were internalised and therefore not broadly known. The study shows professional development activities occurred in silos of seating practice.

Timely supervision, clinical support and access to expert role models were employed for developing robust clinical reasoning and professional skill. Co-joint seating servicing, at induction and ongoing for validation, was recognised as a cost-effective method of expediting professional development:
I’m working with a person who has a long history of working in a seating clinic and so he’s been a great resource for me ... he initially worked beside me with assessments for the first few months and then that sort of gradually tapered off but he was always there and I still actually use him a bit from time to time as a resource.

(Clinician Fran)

Timely supervision built confident clinical reasoning skills. Access to timely supervision within a supportive seating environment assisted in nurturing professional growth: ‘[We have a] strong collegial culture here and mentoring culture and coaching culture; so right from the start that becomes an acceptable part of your induction’ (Clinician Paula). Early supervision groomed the quality of the professional thinking and reasoning. Access to peer mentors and peer exchange also strengthened professional skill development: ‘I had good management that was supportive and willing to mentor and do joint appointments and talk through issues and things’ (Clinician Valerie). Attentive mentoring was equated to ‘swimming with a lifeguard’ (Clinician Paula), thus expediting sound reasoning, by checking and amending practices early.

Working in regional and rural services, clinicians’ access to specialised wheelchair and seating services, commonly metro-based, was however limited. Recruiting prescribing clinicians with little or no seating experience was common in regional and rural community and health services. These early-career clinicians needed timely supervision; but accessing this in regional and rural practice was challenging. Team leader Clinician Jane employed electronic technology to solve the dilemma of providing cost-effective supervision in real time. Her community-based service provided their clinicians with a laptop computer and
webcam technology. Real-time webcam recordings of at-home seating assessments were streamed to Clinician Jane while she sat in her office, as noted:

[Therapist] was doing a mat assessment and following through on some of the things and I was watching on video conferencing and giving her hints and tips at the same time and helping in real time ... I was able to provide just as good support as if I was actually there. (Clinician Jane)

Supporting early career clinicians was highlighted as problematic but essential in building competence and confidence: ‘To retain staff and avoid fatigue associated with complex caseload’ (Clinician Catrina). Busy complex caseloads with inadequate supports were linked to worker stress. Two clinicians had dealt with stress related to heavy workloads, not helped by elevated consumer expectations: ‘I have burnt out before’ (Clinician Cath); ‘I had a period of ill health, kind of stress related through work’ (Clinician Belle). Solo clinicians stated timely clinical support was critical in managing workload complexity and in dealing with caseload stress.

The dominant themes that emerged from the prescribing clinicians’ data highlight the clinicians’ passionate contribution, despite the complexity and challenges specialised wheelchair procurement presents. Nurturing seating team cultures, informal seating networks and proactive self-directed professional development activities strengthen their professional development, clinical reasoning and work resilience. The clinicians’ data show a discordant clinical seating sector in need of unification, as numerous silos of seating practices exposes a need to capture and disseminate clinical seating knowledge more broadly to build workforce capacity. The clinicians’ themes raise the importance of clinical
leadership and universal education, currently absent, are vital for building a robust wheelchair-seating sector.

The final stakeholder group is the vendor group, and their themes are presented now.

**Vendors’ Themes**

The group of 16 vendors consisted of eight wheelchair suppliers, six rehabilitation engineers and two seating technicians. The vendors were an experienced cohort with seating services extending over many years. Four main themes emerged from the vendors’ data (see Figure 14) these are: the vendor’s commitment; the vendor’s job inspires; the vendor as technical expert and the vendor’s contribution as a team member. Each is described below.

**Vendor’s commitment.**

Under this theme were three sub-themes associated with each of the vendor roles: the wheelchair suppliers, the rehabilitation engineers and the seating technicians.

A number of vendors commenced their wheelchair-seating career early, either ‘after leaving school’ (Vendor Paul) or via an ‘internship’ (Vendor Walter). Some of the vendors came to wheelchair procurement and seating servicing via ‘rehabilitation’ (Vendors Sarah; Sam; Dave); while others’ entry was less planned, such as: ‘an accidental introduction’ (Vendor Graham) or ‘literally stumbled into it’ (Vendor Freda).

The vendor’s role as wheelchair supplier, rehabilitation engineer or seating technician dictated their contribution to wheelchair-seating procurement. The largest vendor group consisted of eight wheelchair suppliers.

**The wheelchair suppliers.**
All the participating wheelchair suppliers worked in commercial businesses, half as owner-operators with extensive service experience. A number came from engineering, industrial, manufacturing and mechanic backgrounds; some bought construction and prosthetics skills and others came from a rehabilitation or seating service background (e.g. experience with an Integrated Service). A number had close personal relationships with wheelchair users who were family or friends.

The wheelchair supplier businesses sold, manufactured and provided assistive technology, technical service and advice. Their direct customer service base included consumers and prescribing clinicians. Vendor Graham described his supplier role as: ‘providing equipment knowledge, providing advice on matching the right product to the customer’s needs [to meet] environmental demands, providing advice’. Vendor Tom said, ‘we concentrate on equipment, so we know the [technology] inside and out’. As vendors, suppliers provided technology advice and acted as technology consultants: ‘I give them my opinion, what can or can’t be done with the equipment or if there’s a better suited product I’ll recommend’ (Vendor Tom).

Half were expert suppliers, focused on sophisticated or high-tech wheelchair sales, those involving sophisticated wheelchair, seating and related electronic technology. The other half wheelchair suppliers supplied aligned assistive technologies for hygiene, pressure care bedding and hoists, among others. Most suppliers customised wheelchair seating according to individual needs, using commercial products. Two manufactured bespoke seating systems and one manufactured Australian-made, individualised wheelchair-seating systems.
The wheelchair suppliers worked within strong technical teams formed over time: ‘It’s working as a team ... So that the end user is getting exactly what they need’ (Vendor Winn). Team cohesion was based around regular on-site training, as noted: ‘a training session every week ... that’s something I’ve done for the last 20 odd years’ (Vendor Sarah). Commitment to providing reliable technology and service expertise were evident: ‘We don’t sell anything that we’re not trained in’ (Vendors Sarah) and ‘we try not to sell anything we can’t service’ (Vendor Millie). They worked closely with prescribing clinicians, mostly primary therapists within a Networked Team and within clearly defined roles. The supplier group was an experienced cohort, their contribution to the seating service process was considerable and many were sought by industry peers as mentors.

The supplier group contributed extensively as exhibitors in conferences hosted by Australian Rehabilitation and Assistive Technology (ARATA) and as presenters in the suppliers’ peak body, Assistive Technology Supplies Australasia (ATSA).

The second vendor cohort consisted of six rehabilitation engineers.

The rehabilitation engineers.

The rehabilitation engineers were the second most numerous group within the vendor sample. Seven of the eight came from bio-medical, manufacturing and allied industrial engineering degrees augmented with postgraduate health science, as required to practise as Australian rehabilitation engineers. One held an internationally acquired rehabilitation engineering degree. The group were active contributors to the wheelchair-seating industry in Australia and abroad, with two involved on international wheelchair standard committees. The engineers extended their knowledge through their national peak body, National Committee on Rehabilitation Engineering (NCRE) and aligned international
engineering events. All worked (or had worked) in cohesive Integrated Services, five in service leadership roles.

The rehabilitation engineers were proactive in self-directed learning and reflexive scrutiny of work practices, much of it in non-work time. Like their clinician peers, this group found accessing relevant seating-specific education difficult, as evident:

I’ve found, in my little bits of flurry into reflexive practice and reading journals, is it’s very hard to get access to, even to do journaling, or journal clubs, because unless you have access to a university library or an academic library, and you [are] again limited to really what’s in the conference literature. (Vendor Freda)

Rehabilitation engineer’s professional backgrounds blended clinical and technical skills: ‘I’m like a clinical-engineer … We do both client assessments and chatting to people. But then we have the mixture of design as well as the actual manufacture’ (Vendor Matt). They advised on ‘postural management and seating assessments and how to assess somebody for a certain piece of equipment’ (Vendor Sam). The blended clinical–engineering skills assisted in the design and construction of wheelchair and seating systems for the consumer's individual needs.

While most stated they designed and constructed custom-made wheelchair and seating systems, some rehabilitation engineers mixed custom-made with modular technology. One, for example, ‘also modified off-the-shelf equipment’ (Vendor Robert) and another worked ‘in configuring a chair with a whole lot of add on off-the-shelf components’ (Vendor Freda). Their passion for finding person-centred solutions was evident, as: ‘making something that might be a bit more attractive to them rather than just purely functional, because I enjoy making things look nice. I also like to think that I
integrate people into the process as much as possible’ (Vendor Matt). The engineers’ passion for the job was noted.

The last and smallest cohort within the vendor group were the seating technicians.

**The seating technicians.**

The smallest vendor group consisted of two seating technicians. These two technicians were defined by their role in constructing bespoke technology, such as: ‘customised seating mainly ... and headrests, harnessing’ (Vendor Bert) and in adapting and integrating powered and manual seating systems. Both worked in multi-disciplinary seating teams. Their skill was much admired, and was described as being an ‘artisan' (Vendor Walter) in the craft. Vendor Shaun stated providing customised seating solutions required technical skill supplemented by their acquired intuition to solve and fit tricky postures: ‘You need to build up a little bit here perhaps or take away a little bit there, so ... a good sense of how to work a bit intuitively I think’ (Vendor Shaun).

The technicians came to complex wheelchair-seating with extensive construction skills, including industrial manufacturing and creative arts. They enjoyed the challenge their job provided: ‘solving the unsolvable’ (Vendor Bert) tasks and ‘personally enjoy the work. It’s always different. Each job we do is an individual sort of journey, so I quite like it and I like the people that we work with [and] we’ve got a really good team’ (Vendor Shaun).

Their extensive experience and long careers (10 or more years) within a single service each were testament to the technicians’ commitment to the seating sector. In general, technician staff changed infrequent: ‘We’ve only employed one person here in the last ten years’ (Vendor Bert). Team stability was a positive, as technical experience accelerated
their collective problem-solving and strategic thinking capacity based on accrued seating experience: ‘I’ve got all that years of experience that tells me to do things certain ways ... My experience tells me that we can make certain things, but other things are just out of our realm’ (Vendor Bert). Accrued knowledge and experience expedited their problem-solving capacity.

Vendor Bert, however, shared his despondency that as a long time employed seating technician; there was no career pathway available for him in his seating team, despite its rewarding work. In addition, Bert was a principal contributor to his multi-disciplinary team’s induction training, but felt his contribution was poorly recognised. The remuneration was not reflective of his twenty years of seating experience, as noted: ‘the pay’s a bit crap!’ (Vendor Bert). The lack of career opportunity was more acute as Bert watched less experienced clinicians, he had inducted, progress upwards in his seating team, while his career was stuck.

Despite the above negatives, the vendor cohort spoke passionately about their rewarding jobs and differences their solutions effected.

**The challenge of the job inspires.**

Under this vendor theme were four sub-themes: love of the job, on-site training; finding the solution that best suits and evaluating wheelchair-seating success across the life span. The first is their love of their vendor job.

**The love of the job.**

The vendors’ primary role, as supplier, rehabilitation engineer or technician, was in providing: ‘customised solutions’ (Vendor Walter) as ‘a supplier of customised seating [and] a supplier of modification to equipment’ (Vendor Robert). The vendors stated their
role in specialised wheelchair procurement was engaging. The variety of the work provided an ongoing challenge: ‘The problem-solving and being able to make a difference to people who needed that type of assistance. Just seemed a perfect job and I still think it is’ (Vendor Stuart); ‘It makes your job a lot more fun because it’s good. I love the job and I love the work and I love seeing the end result’ (Vendor Millie); ‘I like the mix, it’s just nice to have the mix’ (Vendor Matt). No one case was the same as the next referral.

The vendor’s long-term commitment was a positive, but they also expressed concern at the loss of expert knowledge when an expert vendor retired: ‘The guy that just retired, he took 22 years knowledge with him’ (Vendor Bert). The loss of so much expertise was significant within a small seating sector. In response, they expressed concern regarding the absence of any proactive succession planning: ‘This industry is not good at passing on knowledge. There’s probably five or six people in the industry who have an enormous amount of knowledge but once they’re out of it, they’re gone! There’s nobody following them around’ (Vendor Sarah). While knowledge exchange and transfer were best undertaken on the job, for commercial businesses the joint appointments (peers working together) were resource-intensive and therefore opportunities were confined to induction training (within the first year).

The data show a seating sector not actively encouraging ways of capturing expert knowledge for the upcoming generation. Lack of a formal educational approach, scant Australian evidence-based research data and poor coordination of the few pockets of seating research compound the seating sector’s lack of workforce planning and threatened future work capacity. Instead vendor education was delivered within and by their service teams.
On-site training.

The suppliers spoke of being involved on-site induction training. A scaffold (bottom-up) approach to training new supplier staff was evident: ‘We like to train someone from the ground up, so they understand the whole, from the basic [technology] like walking sticks to scooter to basic manual wheelchair, understanding the basic principles’ (Vendor Tom). On-site peer supplier training and tutorage, especially during the induction period, was evident. Peer activities such as ‘joint visits’ (Vendor Tom) or ‘peer shadowing’ (Vendor Sarah) were employed as initial training during the first three months to a year. Supplier joint appointments were rare after induction, except when consumer complexity dictated.

The group acknowledged that specialised wheelchair procurement was challenging. These cases required hands-on skill, confident problem-solving skills and experience to quickly evaluate the person–technology interface, their needs and difficulties. Therefore at this level of vendor service, technical skill and creative thinking required additional ‘personal attributes’ (Vendor Millie), listed as being intuitive, creative problem-solvers. To develop such personal attributes required self-directed, proactive learners, as evident with the following vendor requirements as:

It takes months before you get someone confident enough to send them out on a [anthropometric seating] measure by themselves; and then they generally keep learning the entire time. The good ones realise what they don’t know, and try and learn more. (Vendor Dave)

While some vendors participated in conference events, the bulk of the vendors' education was provided internally though on-site training. The vendors were a group of proactive researchers and they enjoyed the being creative problem-solvers.
Finding the solution that best suits.

The vendors acknowledged the primary therapist was responsible for the wheelchair prescription and funding application, but their own expertise was a valuable resource during assessment–prescription: ‘I can’t call myself a prescriber, but I can recommend equipment’ (Vendor Tom). The technology expertise bought to the assessment–prescription process was further qualified by knowing the limitations of the technology and of their technical skills, as recommended: ‘to be the expert in their products and knowing—I think one of the important things for a supplier to know—is the limitations of their product’ (Vendor Freda). Honesty and delivering what was promised were reaffirmed when vendors accurately evaluated the technology’s capacity within the contexts of the consumer’s goals and environmental demands. The value of vendor honesty is pertinent when linked to previous findings where inexperienced participants (consumers and clinicians) relied on their technology knowledge for best person-with-technology fit. Vendor honesty builds team trust.

The vendors collaborated with therapy co-workers or with external clinicians to find solutions. Working within a seating team, the vendor group relied on the prescribing clinician to provide holistic client goals according to the occupational–environmental demands: ‘It’s cooperating with the clients’ own physiotherapist or occupational therapist and assessing the child’s needs and coming up with a plan of how we’re going to address them’ (Vendor Bert).

The vendors’ involvement and intensity in the wheelchair and seating process varied. As members of a Networked Team and in blending modular with custom-made technology, the wheelchair suppliers’ early and ongoing engagement was pivotal:
I was there from the very first appointment to the very last appointment. We were the guys that followed everything right through, through from sourcing trial equipment, scripting, demo-ing it, doing temporary fill ups, temporary upholstery, doing the foam work—obviously alongside the clinicians ... From the very, very first wheelchair assessment at the hospital. (Vendor Paul)

As implied above, the application of hi-tech modular wheelchair-seating technologies required technical and electronic skills. Integrating and fitting sophisticated modular technology intensified the assessment–provision–fitting process, and the participating vendors were intensely multi-skilled. As previously noted, half the wheelchair suppliers operated as expert seating vendors offering a Vendor Clinic service. An expert supplier was a bonus within a Networked Team; as the vendors noted, the expertise of each primary therapy varied from clinician to clinician.

While the Network Team seating expertise varied, the skill and expertise of the clinician-vendor team delivering an Integrated Service was more balanced. These Integrated Service teams had limited access to the wheelchair supplier group as seating solutions were constructed in-house. The Integrated Service dealt with challenging caseloads as described: ‘generally our clients are the more difficult ones’ (Vendor Bert). The vendor’s engagement occurred once the consumer’s wheeled mobility and postural goals were established, by the primary therapist on their referral. The referral goals instigated the choice of vendor.

Working intuitively, being technically skilful and knowing the limitations of the technology were important skills; however, to be effective the vendors who constructed seating solutions needed to understand the bio-psychosocial context of each consumer. This
meant they needed to attend to the consumer needs closely to gather data to augment that supplied by the prescribing clinician. These expert vendors needed good listening and observation skills, as well as expertise in technology. To ‘build the right thing from the start’ (Vendor Dave) meant understanding the consumer’s bio-psychosocial needs comprehensively. Vendors collected necessary data with questions such as: ‘Have they done a pressure care assessment? What’s the risk here? What’s the history here? Do they live in their own home? Do they feed themselves?’ (Vendor Dave). This level of enquiry alerted vendors of health risks, informed their technology selection, and guaranteed greater success in matching wheelchair technology with consumer needs and the environments of use.

The vendors acknowledged the value of carer’s input as providing invaluable insight into the use of the wheelchair. The carer’s insightful knowledge was valued, as: ‘They often have a really good insight into how that person is 24 hours a day, or a good 12 hours of the day’ (Vendor Sarah). In conjunction with the prescribing clinician, these experienced vendors supported early education of the consumer and their care providers during wheelchair selection and evaluation. ‘Informally, I often will be explaining to parents: this is what we intend on doing. This is what it’s likely to look like, [we’d bring] a partly completed wheelchair ... to explain what we’re saying’ (Vendor Robert). Better-informed consumers and carers were more likely to set realistic expectations of the technology they were procuring. Realistic technology expectations were linked to greater outcome satisfaction.

Vendors recognised the carers’ occupational needs changed over time. Parents of young children differed to those caring for adult children. Wheelchair manual handling was
a compounding factor in wheelchair procurement for consumers, their families and carers, especially as carers aged, for example: ‘an elderly attendant carer needed to be able to operate the equipment as well [as the consumer]’ (Vendor Sarah). A carer’s intimate understanding of the consumer’s environmental parameters impacted on wheelchair appropriateness and lifestyle fit. The carer’s appraisal was illuminating: ‘Oh, that looks great, sitting beautifully! Then the carer says, but I can’t get him into the room, or I can’t get him into the car!’ (Vendor Tom). As principal advocate, the advocate carer’s contribution was of particular importance as conduit between consumer and vendor.

Working directly with a consumer’s care provider was not uncommon when servicing complex wheeled mobility requests: ‘Our client base varies so much, and a lot of our clients are un-cognitive’ (Vendor Dave) and as such, collecting carer information helped build a clear image of the consumers’ lifestyle needs and the carer occupations. ‘I think that listening allows us to provide a product that works for 98–99% of the people and their carers’ (Vendor Sarah). Participating vendors spoke of allocating time to capture essential information across all relevant stakeholders, for the best person-with-technology match.

**Evaluating wheelchair-seating success differed across the life span.**

A successful wheelchair-seating outcome was measured by the vendor group in several ways. Comfort and enhanced wheeled performance were foremost measures of success: ‘They’re comfortable in whatever they’re sitting on; and then the functionality of that equipment in their home environment, or in their everyday life’ (Vendor Sarah). A comfortable, functional wheelchair-seating system meant its daily use was assured. Vendors found balancing stable, comfortable posture with functionality a common challenge: ‘Posture, because you’re always going to have that old argument of posture
versus function, [e.g.] posturally; we can get somebody sat absolutely beautifully, perfect, textbook 99.9% positioning, but then functionally they can’t do anything’ (Vendor Shaun).

Vendors noted wheelchair aesthetics was considered important for younger consumers, while sitting comfort and function were more important for older consumers: ‘for young children and for teenagers, [aesthetics] is number one. I think in the geriatric area, your older clients, that isn’t so high on their list’ (Vendor Sarah). Therefore a successful wheelchair outcome was measured differently depending on the consumer’s stage of life. Vendor Sarah noted her geriatric cohort measured wheelchair outcome on comfort, function and the wheelchair’s simplicity: ‘It’s one where the client feels comfortable and they feel safe in the equipment, and they can comfortably use the equipment’. In comparison, her paediatric cohort required a flexible, supportive system with growth capacity for developing bodies that enhanced performance. ‘How supportive it is for that child and how their function levels go up in other areas because they are posturally supported’ (Vendor Sarah). Paediatric wheelchair procurement was a family affair, and success was measured by its integration into their family’s quality of life.

Enhanced ‘quality of life’ (Vendors Ivan; Shaun; Sarah) was a measure of comfortable, functional mobility with postural stability that enabled community participation. Outcome success were related to the appropriateness of wheelchair-seating solutions that enabled greater consumer engagement in occupations that had personal meaning. For example, ‘He’s been able to go and take his dog for a run up to the dairy and help his father and he bombs around the beach ... and [goes] all over the place ... He uses it indoor-outdoor’ (Vendor Ivan). A successful wheelchair outcome enabled the above consumer to go where he wanted and to do activities and occupations that he wished.
The third vendor theme identified was this group as the technology expert.

**The vendor as the technology expert.**

The role of vendor, as technology expert in wheelchair selection and in supporting prescription justification, was pivotal. Under this theme were three sub-themes related to the vendor’s role: the wheelchair technology expert, the vendor as seating mentor, and the vendor’s contribution to a seating team.

There was a range of differing vendor roles across Australian seating services and these differences were informed by how wheelchair technology was applied. Some seating services only provided seating systems to be used with existing wheelchair bases, while others provided or manufactured a complete wheelchair and seating system. Some wheelchair suppliers were sponsored to promote and sell specific brand or product lines, while others, not committed to technology sponsorship, mixed and matched technology according to needs.

One such wheelchair supplier spoke of applying a flexible approach to the consumer–technology match. ‘We will work on any sort of [wheelchair] frame. So it’s finding the solution that best suits that client whether it’s an off-the-shelf product or whether it’s a custom-made product’ (Vendor Sarah). The majority of suppliers preferred the universality of modular technology that custom-made products lacked. Optimising the technology-consumer fit required technical expertise, creativity and ingenuity.

**Wheelchair technology expertise.**

The use of commercially available modular technology and custom-made technologies varied in the services available in Australia. A number of Integrated Services
only accepted referrals based on the premise that all available commercial technology had been trialled and failed. These services manufactured bespoke seating systems.

The wheelchair suppliers who worked within a Networked Team or delivered a Vendor Clinic felt underappreciated by the funders, as their technology knowledge was not valued by state-run funding programs: ‘No, not valued at all in their knowledge, for their expertise, or what they bring to the table. They’re just seen as sales people’ (Vendor Sarah). Despite the above sentiment, however an expert seating vendor was highly regarded by participants.

**The expert seating vendor as a seating mentor.**

To succeed in matching a wheelchair-seating system with the consumer’s occupational performance needs required more than good listening skills. Vendors required a quality seating assessment and prescription skills (to construct wheelchair-seating solutions) based on clearly established mobility and postural goals. Establishing these was the primary therapist’s role as the principal prescriber; however, wheelchair-seating expertise depended upon the prescribing clinician’s ‘experience, their knowledge and their areas that the therapists work’ (Vendor Sarah). As such, many expert seating vendors guided a less confident clinician through the assessment–prescription process, as seating mentors (a value-add vendor service).

As a group, the wheelchair suppliers stated their unease with the average prescribing clinician’s lack of knowledge, especially as they were the primary prescribers. An inexperienced clinician was vulnerable to vendors’ good or poor advice. Vendor Tom noted, ‘I feel sometimes maybe [therapists] leave to us with too much to say ... I’ll recommend and ... set them up, but I haven’t done the university [study, so] ... I don’t have
that degree, I suppose, to be qualified to really do that [level of prescription]’. Vendor Dave, who provided seating training, felt current undergraduate training was insufficient for wheelchair-seating prescription: ‘It’s sometimes disheartening, the lack of training those therapists get in their actual schooling. We were doing all of their training’. The vendors also noted that inexperienced clinicians were overly influenced by vendor-sponsored workshop training and marketing:

I see spasmodic and circular ... trends where, for example, JAY ran a workshop, and then for three months all you’d be asked for is JAY. Then ROHO do a workshop, and they become the flavour of the month for a while. (Vendor Dave)

An expert vendor was a valued resource and many acted as seating mentors—within their own teams and beyond—sought by their peers for assistance with especially complex referrals. The final vendor theme identified the vendor’s contribution was an important component of the seating team.

Vendor’s contribution as a seating team member.

As noted, the vendors described their commitment to specialised wheelchair procurement as both challenging and satisfying, especially when they solved difficult mobility, postural and seating problems. Vendor participation in seating service varied depending on the type of team approach (multi-disciplinary or trans-disciplinary). While most vendors worked in clearly defined technical and technology roles, their contribution as provider experts in technology and construction were highly specialised and much valued in the clinic based multi-disciplinary team. A cohort of expert seating vendors worked as multi-skilled members who worked across team roles (i.e. trans-disciplinary teams). In this study, all the vendors operated as a part of cohesive teams (of both team
configurations), their skills were acquired on the job and the supplier group in particular scheduled on-site training. As the vendor group was an experienced cohort, their technology knowledge and their ability to find creative solutions were acknowledged as a valuable contribution to the wheelchair-seating team (and sector).

The themes emerging from the vendors’ data identify an experienced vendor group who enjoyed and were challenged by their seating work. As technology experts they were sought for their technical and seating knowledge. Their contribution was valued as members of the seating team and they were often used as seating mentors.

The above data elaborate on the scant knowledge of Australian seating service experiences from the service providers’ perspectives. This adds to the data collected from the service recipients helps to build a deeper understanding of the similarities, differences and issues that impact on the specialised wheelchair procurement, seating service provision and delivery from four stakeholders’ view point. The following section describes the common themes that emerged as consistent across all the participant groups, providing even greater data as required for an in-depth case study investigation.

**Themes Common Across All Stakeholder Groups**

Six common themes were identified across the four stakeholder groups (see Figure 15) as: wheelchair procurement is complex, funding is always problematic, forming trustworthy partnerships, person-centred service approach, home-based service are appreciated, but resource intensive and home-based trials are decisive. The first common theme is discussed now.
Wheelchair procurement is complex!

The complexity of the specialised wheelchair procurement was a common theme across the four stakeholder groups. The service providers managed complex caseloads involving multiple stakeholders with varied degrees of wheelchair and seating service experience. Complex caseloads required competent service skills and sophisticated solutions. A team approach boosted service provision, and collegial support boosted team competence: ‘I try to get a therapist involved, because two [pairs of] eyes are better than one’ (Vendor Winn); ‘two sets of hands [and] ... I think a few sets of eyes are good too’ (Clinician Sally). Finding individual solutions within the available funding for complex postures and differing consumer capacities required competent, resourceful and creative teamwork.

Collaborative creative thinking required engaging the consumer into a trusting partnership—to take risks—to solve problems together. ‘I’ll ask them to just think a bit outside of the box with me, and just go: what could we do? Could we cut these front castors off and out-rig them?’ (Clinician Patty). This was particularly challenging as there was no modus operandi for creative problem solving. Finding creative solutions was undertaken instead by ‘trial and error ... there’s no hard and fast rules’ (Clinician Nancy). Intuitive thinking required evaluating interventions quickly: ‘feedback on the run’ (Clinician Sally), with the skill to conjure up an image and communicate what ‘the final outcome might be like’ (Clinician Nancy). This relative unstructured approach to complex problem-solving required a cohesive trusting team collaboration, personal resilience and accrued seating experience.
Access to specialised wheelchair suppliers and seating services was location dependent, as many specialist services were metro-based. Further challenging access to specialist seating services, service eligibility dictated access to each Integrated Service and their limited numbers reduced their caseload capacity and service scope. This resulted in long waiting times for an Integrated Service initial appointment, for some of ‘about a nine to 12-month wait’ (Clinician Belle). As depicted in Figure 15, specialised wheelchair procurement was made more complex because of a fragmented seating service sector.

Figure 15 Common themes emerging across all stakeholder groups

The procurement of appropriate wheelchair and seating systems suitable for complex wheeled mobility required time, trusting collaborations, competent service resources and considerable funds to achieve a successful wheelchair outcome. These findings confirm previous claims specialised wheelchair procurement is complex (Batavia et al., 2001; Di Marco et al., 2003; Gowran, 2013; Plummer, 2010; White & Lemmer, 1998) and requires
adequate funding. The second common theme emerged was funding access was problematic.

**Funding is always problematic**

Funding is an important theme to emerge, as the activity of accessing adequate funding embellished successful wheelchair procurement outcome; or if inadequate ensured dissatisfaction that negatively impacted on consumer and family quality of life.

As non-standard wheelchair technology is expensive, this required additional funding than for standard wheelchair-seating solutions. A common theme to emerge was the problem of accessing adequate funding for costly technology. Under this theme were two sub-themes: funding protocols controlling access, and influencing technology prescription by the access to adequate funding.

Funding was a universal concern across all stakeholder groups: ‘I think it’s always a problem, funding, funding, funding!’ (Carer Wisty) and ‘it’s all about funding really. I think the funding needs to be improved upon (Carer Donna).’ Wheelchair technology was expensive: the average price is ‘$2,500 for a basic seat [compared to] ... a full seating system might be $6,000 ... others $15,000. My most expensive chair with chair and seating was $30,000!’ (Vendor Bert). Seeking adequate funding for specialised wheelchair procurement was stressful, and bridging the funding gap was problematic.

Some consumers self-funded their wheelchairs to maintain their control to purchase independently, devoid of constraints applied by a systemised prescription process dictated by funding protocols.
**Funding protocols control access and technology prescription.**

Each state-run funding program required a clinical prescription provided by a primary therapist. Their wheelchair prescription behaviour was routinely influenced by access to available funding. The state-funded programs were not routinely person-centred, and wheelchair procurement was bound by funding protocols: ‘You can’t just access [funding] yourself, you have to have specialists tell you that you need the stuff’ (Carer Donna). Inflexible funding allocated according to wheelchair categories (e.g. subsidised-schemes) caused further angst: ‘I think that [a funding program] only pays six grand or something and I think all up the chair’s worth about $15,000’ (Carer Cara).

Funding flexibility allowed for greater sense of control. ‘I think flexibility is more important for me than just more money’ (Consumer Brian). Funding flexibility empowered consumer control to allocate their funds according to personal choice (refer to Table 7).

Consumers’ anxiety associated with funding shortfalls was evident. This anxiety was evident when self-employed Consumer Vince worried how he was going to bridge his funding gap: ‘I was very, very nervous because it looked like ... I might even have to put in a couple of thousand dollars of my own money. So that was the scariest bit for me!’ (Consumer Vince). As noted in Chapter four, the service effort expended (often by the primary therapists) in seeking top-up funding was considerable, but rarely overt within wheelchair procurement.

The funding environment was fragmented and routinely inadequate for consumer needs. Access to additional funding was sought from a range of national, state and local charitable grants and philanthropic trusts, as eloquently appraised: ‘ATSA identified around 130 different funding schemes for assistive technology, different forms of assistive
technology, so that’s 130 schemes with all different eligibility, all different what they will and won’t fund, criteria, application forms’ (Vendor Freda). To be successful, prescribing clinicians required strong networks, competent clinical justification and strategic knowledge to best present their consumers’ cases for top-up funding.

The participants formed, where possible, trustworthy partnerships with peers and service providers to manage the difficulties encountered by complex wheelchair-seating needs in a fragmented funding environment. Forming trustworthy partnerships was a common theme identified across all stakeholder groups.

**Forming trustworthy partnerships**

Forming trustworthy partnerships is the third common and important theme to emerge across all the stakeholders groups. Under this theme, four sub-themes emerged as: respect and transparency, the benefits of team continuity, sharing three ways, and supportive teams for managing complex caseloads. Team communication, service transparency, knowledge sharing and working collaboratively were common features associated with building trustworthy partnerships. Trustworthy partnerships empowered spontaneous, creative brainstorming: ‘I email [my OT] questions informally [as] she’s often good with ideas [as] ... I just need her advice and expertise to answer my questions and provide [her] opinions’ (Consumer Brian). The advice provided by trusted service providers was respected and employed by one, whose trusted occupational therapist advice, was as a ‘good tool to help convince Mum and Dad about things because they respect her’ (Consumer Brian). Trustworthy partnerships operated well when based on mutual respect and respect.
Respect and transparency.

Good inter-personal skills were an asset in building rapport and sustaining relationships. Superior communication skills and clear understanding of the team’s roles and goals developed trust. ‘When we have therapists that we work with regularly, we can develop that common language set. They understand what we can do. We understand what their requests are’ (Vendor Stuart). The communication capacity of the consumer was a significant factor in building quality relationships: ‘I’m able to be as independent as I am because I have great communication skills, and I have a way of approaching people that seems to really work for me’ (Consumer Vince). Less formalised teams, like Networked Teams, explicitly required excellent communication skills to ensure all stakeholders were informed and all needs were heard. Long-term teamwork built trust and team respect. ‘The same physios that I’ve ... dealt with these for so long, there’s a mutual trust. It’s I’ll supply the right thing, and vice versa ... building of trust between the supplier and therapist that's what we’re suggesting will work’ (Vendor Tom).

A trustworthy three-way relationship between the consumer-carer, clinician and vendor endowed service honesty. Delivering on promises enhanced service transparency, by delivering ‘what they said they promised’ (Consumer Sarina). Transparent services, honest wheelchair and seating technology appraisals built service trust: ‘To have a physio or an OT give you an honest critique on the chair and how it would suit the person better and in their own home. That would be ideal!’ (Carer Cara). Such an honest and transparent service approach was built on a respectful partnerships, built over time and subsequent services. Vendor and supplier respect were also generated through service demonstration
and delivery action: ‘If you’re doing the right thing, and be seen to be doing the right thing’ (Vendor Sarah), service actions built a reputation of delivering as promised.

A trustworthy service run by a respected team expedited successful service provision. A successful service aligns clinical goals with consumer satisfaction with proactive service delivery, as exemplified: ‘They ultimately want us to deal with what the physio asks, but also have the client comfortable and happy with [the technology], and to provide the backup that the client needs [and] to be held accountable for it’ (Vendor Dave). A service that delivered successfully attracted return business: ‘Your product should sell itself ... and I’m a great believer that it comes back’ (Vendor Sarah) and ‘the therapist is happy and he gets repeat business from the therapist, which is happening, and he gets good results like the client’s happy, the client gets the chair he wants’ (Vendor Dave).

As a service provider, being transparent and honest required clinical confidence. It takes confidence to request a reprieve, such as saying: ‘I’m sorry, I don’t know but I’ll follow that up for you and get back to you’ (Clinician Nancy) to find the right answer or solution. Service transparency, provider honesty and confidence helped overcome some of the difficulties associated with specialised wheelchair procurement. Long-term team partnerships enhanced working relationships.

**The benefits of team continuity.**

Continuous partnerships provided good role models: ‘I’ve come to think of me as a very amateur OT, having been around OTs a lot over my life’ (Consumer Brian). Likewise, nurturing father–son collaborations informed and transferred knowledge, skill base and confidence: ‘I’m very, very good at getting my point across, because I’ve watched Dad deal
with wheelchair companies my whole life as we’ve kind of always done it together’ (Consumer Vince).

Successful collaborations over subsequent wheelchair procurements built continuity of service provision, consumer knowledge and wheelchair history. Satisfied consumers returned to trusted providers for upgrades: ‘I would have gone straight to [my supplier] because I was very, very happy with them’ (Consumer Vince); ‘at the moment, as in the past ... I am so pleased with [my supplier] that I am not looking at all, not considering anything else’ (Consumer Brian).

This continuity of care, inherent in long-established relationships, was valued by the participants: ‘We’d been there since [my son] was born and some of the staff had been there that long too. So having that sort of network around you meant there was always someone you could ask for advice’ (Carer Donna). As previously noted, long-term relationships enhanced the service satisfaction based on accumulated knowledge.

Severing long-term working relationships caused participant grief. In relocating their families, two participants encountered difficulties re-engaging their family member into a new disability care system: ‘We had to wait for a year to get everything. You know, to get [my son’s] funding up here and get everything set’ (Carer Donna). Re-establishing the care continuum (carer routines) required time to build trust: ‘It takes a good year to settle in with a good bank of carers trained up enough for me to leave them alone with [my husband]’ (Carer Cara).

Trust was built over time and successful outcomes: ‘The wheelchair people we trusted for such a long time ... we always had a great run with the chairs’ (Carer Ian). Continuum of service provision guaranteed quality after sale service: ‘because they did
know the chair really well’ (Consumer Sarina) and trusted repair service providers who knew the consumer and their wheelchair history solved wheelchair repair issues quickly.

Trusted service continuity helped manage some of the issues associated with wheelchair procurement and enhanced the longevity of the wheelchair with timely maintenance and repairs. Exchanging and sharing knowledge was evident in collaborative, trusting service partnerships.

**Sharing three ways.**

As noted in Chapter four, each seating service team operated to its unique service scope. The one universal service feature noted, was in educating the consumer (and care providers) early to encourage their informed involvement in the seating service process. An educated consumer cohort enabled greater information sharing and exchange as a team. Engaged team members made better decisions based on their informed knowledge.

The collaborative team approach enabled proactive problem solving: ‘it allows us to work together on the problems’ (Consumer Max). Collaborative teamwork encouraged and equalised partnerships. ‘I’d like to learn more from them and they maybe can from us as well and I think that will help the client in the end as well and help us all, helps the whole three-ways’ (Vendor Millie). Working partnerships accelerated skill acquisition. ‘We’ve got quite a strong mix of experienced staff, so we can educate others, and role release while we are doing things’ (Clinician Hanna). The layered experiences within collaborative teams support essential knowledge sharing, transfer and release, needed for building a robust seating service sector.
Supportive teams for managing complex caseloads.

The size and composition of the seating team influenced how seating roles were allocated. Role definition was evident in large seating teams such as Integrated Services: ‘It’s a mix ... very strong on physios doing seating, but other regions might have an OT [in seating assessment], but generally ... traditionally it’s the OTs that do the equipment’ (Clinician Hanna). The larger multi-disciplinary teams with layers of different seating experiences provided nurturing venues for building team and individual skill capacity.

By comparison, the smaller multi-skilled teams were more experienced fully formed teams, capable of providing flexible, mobile services. These teams, dependent on individual members’ skills and confidence levels, morphed over time and as needed to meet the demand: ‘Our roles do change depending on who the people are and what experience they bring in [to the team]’ (Clinician Tracey). These small expert teams provided greater service flexibility into the consumer’s residential environment: they had greater capacity to provide a person-centred seating service. Clinician Tracey, a team coordinator, described her ideal seating team as containing skills of: one therapist, one orthotist and one technician. The clinical-technical blend ensured a depth of team skill capacity should one team member be absent:

The therapist and the technician can keep the service going; and the orthotist and the technician can keep the service going; and the therapist and the orthotist can keep the service going ... any combination of the two of us could keep the service going.

(Clinician Tracey)

Team leadership was vital in a multi-skilled seating team. Leadership qualities that impressed were providing: ‘clinical supervision and regular catch-ups with all of the staff ...
Playing a real advocacy role for our team’ (Clinician Jane) while also being person-centred: ‘being passionate in pursuit for best outcomes on an individual level’ (Clinician Catrina).

A supportive team environment was significant in managing complex caseloads. Supportive teams mentored less experienced team members, especially when ‘the case load is quite complex’ (Clinician Betty). Clinician Paula described her seating consultant role as:

To support the [primary] therapist ... at any stage of the process that they required assistance. Whether that be right from the start in doing interviews or may be doing mat assessments, analysing what the mat assessment tells us and observational assessment tells us. Helping them with pressure mapping; helping them with analysing that information.

Supportive teamwork eased clinical stress associated with demanding workloads. Quantifying caseloads varied. One example was highlighted when a single complex case consumed a whole day: ‘I’d rarely see more than one [client] a day’ (Clinician Candy); ‘it was a whole day fitting’ (Clinician Fran). Another example described a single wheelchair-seating case, consumed ‘six, eight, nine appointments to get it to trial’ (Clinician Fran). Those working in paediatrics described caseloads by intervention numbers rather than child numbers, as one child required constant seating adjustments to accommodate growth.

Large caseloads meant greater consumer variation and this could be challenging: ‘I very often had a caseload of 60 to 70 people. Some requiring postural support, some requiring just mobility aids, so it was a very varied caseload’ (Clinician Belle). Different caseloads required different seating services and skill sets. Collaborative teamwork assisted in managing complex caseloads and wheelchair procurement within tight funding.
protocols. In an environment where access to seating education was fragmented, trusted partnerships helped to fill the knowledge gap.

The fourth common theme to emerge across the stakeholder groups was the application of a person-centred service approach.

**Person-centred service approach**

The person-centred service approach was a strongly expressed theme common across all the stakeholder groups. Under this theme there were two sub-themes: two-way conversations and understanding the consumer–carer’s lifestyle needs. Participants spoke of providing person-centred services, spending time listening to understand the consumer’s occupational needs. ‘It’s important to go in and listen to what they want and what they need’ (Clinician Cam). Listening to the consumer’s life experiences might require ‘extra time’ (Clinician Candy), but good listening helped to understand the lived experiences and clarify priorities. ‘If you listen to them first, see where their priorities lie, it is quite often surrounding access to community and being able to function properly or continuing to function like they are or improving the functions that they have’ (Clinician Jon).

Service recipients (consumers and care providers) spoke of the importance of being heard. Care providers wanted their family member’s needs to be heard. A person-centred team allotted adequate time to listen: ‘listen, that’s the biggest thing, people that listen’ (Carer Ian) and were competent: ‘they know what they’re doing’ (Carer Ian). Continuity of service delivered a person-centred service as: ‘they know me and my chair’ (Consumer Vince) that ensured ‘a better outcome in the end’ (Consumer Christine). Person-centred services empowered greater communication exchange between all team members.
Two-way conversations.

A person-centred service approach ensured there was equality information sharing: ‘Listening both ways ... [an] open exchange of ideas’ (Carer Ian). Considered two-way exchange was another person-centred attribute: ‘She listened to what my needs were, but then she told me what she also thought’ (Consumer Sarina); ‘[He] explained what he’s doing, what he’s thinking and what the issues might be and he involves me in the discussion. So it’s a two-way conversation, rather than a—you know—bit of didacticism’ (Consumer Max). Good listening and collaborative team exchange were assets of person-centeredness.

A person-centred service approach required a considered and open service approach. ‘I say I’ve read the referral ... [Now] Give me your spiel. Tell me your story’ (Vendor Matt). Considerate person-centred service approach encouraged greater consumer contribution: ‘to understand what a consumer was actually wanting and I’m teasing that out a bit from the clinical needs’ (Vendor Walter). When consumer passivity was noted, a considerate service approach sought ways to draw out the consumer’s opinions by saying, ‘Just give us a second. Take a step back. What is it you want?’ (Vendor Shaun). A person-centred service approach worked to bring the needs of the consumer (who might be overwhelmed) into focus and thus to anchor the problem-solving task to understand the consumer's perspective. Understanding how the wheelchair-seating system would impact of the family or home lifestyle was essential.

Understanding the consumer-carer’s lifestyle needs.

A quality person-centred service approach required competent skill, knowledge and time to accommodate individual need. ‘If that person needs 20 minutes to answer one
question, then we wait the 20 minutes’ (Clinician Belle). A person-centred team allocated adequate time to build rapport, to understand the consumer’s lifestyle needs, to empower and problem-solve collaboratively. ‘The person ... [in] a wheelchair is the person who knows their own body the best ... if you don’t ... get their full story, you’re not going to be able to come up with a solution’ (Clinician Nancy). Empowered team collaboration was linked team creativity, to take risks: ‘To think outside the box’ (Carer Cara) to ‘solve problems’ (Carer Ian). As complex wheeled mobility needs were unique, ‘creative thinking’ (Carer Cara) was an important team attribute in finding person-centred wheelchair-seating solutions.

Person-centred service provision was also praised as being sensitive to individual needs, as when ‘staff have been amazing and have gone out of their way to assist us in anything that we have required for our son’ (Consumer Lenna). The person-centred service approach was described as part of service culture:

They were just really, really imaginative with things like, all the problems that came up they had a solution ... and just rearranging things to suit; and they were just a really nice bunch of people for a start and really, really cooperative and bent over backwards basically to get it all right. (Carer Cara)

A person-centred repair delivered by a trusted local repair agency was linked to better wheelchair repairs and timely maintenance enhanced wheelchair performance. A centralised repair agent was not considered capable of delivering a successful person-centred repair service. Funding protocols rarely focused on person-centred service or wheelchair procurement. While a needs-based funding approach was considered more person-centred, the inventory-listed and subsidy-scheme approach were not. The data show
good service attention to the consumer’s holistic needs is linked to person-centred service provision, conversely poor service attention is not conducive to responding holistically and this caused service breakdown.

**Breakdown in listening.**

The care providers stated their most important contribution was to ensure the wheelchair and seating systems met the needs of their family member, within the family dynamic. Care providers, who acted as consumer advocates viewed their contribution to the wheelchair procurement as a service consumer. The power of carer’s collaboration was particularly evident when their contribution was ambushed. Disenfranchised carer’s ‘were not heard’ (Carer Cara) or ‘not listened to’ (Carer Wisty). Frustration was expressed when participants’ service feedback was ‘not acknowledged’ (Carer Cara), such as when a letter of service complaint was ignored: ‘They didn’t reply at all. No! And I addressed it to the manager, so that ... [he] was aware of it. No reply whatsoever! But then we haven’t had an account rendered, so I know they got [the letter]’ (Carer Wisty). Ignored service feedback was particularly concerning when it compromised the consumer’s health, such as, when a pressure ulcer formed overnight was a direct result to a previous seating adjustment service. Carer Cara’s service feedback was not acknowledged: ‘No, nothing! It was just a little stuff up that just had a big impact!’ The big impact alluded to was Cara’s husband endured two years of pressure ulcer remediation and this was associated with considerable family distress.

The fifth common theme to emerge across the stakeholder groups was the valued resource of home-based service provision.
**Home-based servicing: resource-intensive but valued**

The theme of providing home-based services also included the value of providing an adequate home-based trial. Providing a home-based service was aligned to providing a person-centred service. That is, demonstrating, trialling and adjusting wheelchair and seating technology at home: ‘So it’s good to try it in your home and if they can bring them to your home that’s ideal!’ (Carer Cara). Home-based services enhanced the consumer’s control where goal setting was consumer focused, as ‘on the individual, with individual needs’ (Consumer Sarina). Consumers wanted personal control of their own goal setting agenda: ‘You are in control of what you see as your priority, rather than the system saying we can do this for you’ (Consumer Christine).

While the home-based service empowered consumer control, resourcing it was challenging. For example undertaking a mat evaluation in a consumer’s home was more demanding, than in a purpose specific clinic with team support. Meshing a primary therapist visit with care attendants needed at home for transfers was problematic. This staffing challenge was noted by Consumer Vince whose seating assessment could not happen, as his therapist could not ‘take me out of my chair at the time because it was too difficult to organise carers and [my OT] couldn’t come at the time when carers were there’. Travelling to provide a home-based services was service consuming; some clinicians regularly travelled ‘between one and a half to two hours’ drive there and back again’ (Clinician Paula) and routinely ‘would allocate, say, two hours’ (Clinician Betty) for home-based services. The four metro-based wheelchair suppliers who offered state-wide services ‘travelled extensively’ (Vendor Graham) and regularly committed to a ‘four hours’ drive’ (Vendor Sarah; Millie). Providing wheelchair services in consumers’ homes: ‘required
extensive planning to ensure you have everything needed’ (Vendor Sarah). Vendor services planned well in advance for home-based services to provide a range of technologies to address all possibilities. Providing home-based services were resource intensive.

As noted, access to specialist wheelchair suppliers and seating services was location-dependent as most specialist services were metro-based. In general, regional and rural consumers and their carers travelled to attend multiple seating appointments: ‘for rural people it’s a big, big job ... which we had to do a lot of times’ (Carer Cara). Specialists who offered an outreach service were appreciated by these isolated or remotely located participants. Providing outreach services was resource intensive and logistically challenging.

Providing an outreach service to regional communities required considerable logistical preparation. The metro-based services undertook extensive pre-clinic preparations, as evident: ‘Raw materials [were] either shipped there or we ship them with us from here’ (Vendor Matt). The annual outreach clinic provided an intensely compacted procurement service addressing: ‘somewhere around 20 [consumers] give or take in four days, plus their return visits’ (Vendor Freda) to provide a complete wheelchair-seating system within a prescribed time. To achieve this the clinic team worked long hours in tandem with therapy and technical teams, to assess, prescribe and manufacture individual seating systems, in-situ.

One outreach service combined a rural educational-consultancy service specifically as a combined clinic service meshed with formal education. The pre-service educational sessions were directed at educating local providers prior to providing collaborative seating services with individual consumers. The educational-consultancy service approach aimed at
building capacity of the locally-based providers to confidently fit the raw seat insert once delivered (some weeks later).

By comparison, the mobile outreach services provided direct services in conjunction with local providers and this helped build local workforce capacity. ‘Rarely did I take a therapist with me. It was more a case of skilling the [local] therapist’ (Vendor Walter) and ‘we used an upholsterer up there who was fantastic’ (Vendor Matt). When the metro-based service provided a consultancy seating service, their knowledge release was vital, ‘as a consulting service, [we are] not the lead clinicians for these rural cases’ (Vendor Freda). The consultancy teams who worked collaboratively with the local service providers acknowledged the locally-based services were responsible for coordinating services, the assessment-prescription process and in monitoring the wheelchair outcome. This service model required excellent stakeholder coordination: ‘we could bring everybody together, to sit down and work out solutions in the clinic room [that] was the high school classroom’ (Vendor Walter). The outreach seating service also provided a training activity as regional, rural and metro-services gathered in one location to, ‘[bring] those therapists together for the training, so we could run training sessions [together] which were useful’ (Vendor Walter), as case based learning.

Outreach servicing was intensive and participants spoke of work-related stress: ‘I think we’ve got some concerns in the specialist services about clinicians burning out, and the sustainability of our services’ (Vendor Freda); ‘You can burn out quite quickly. So for the [annual clinic] week, we can’t run at that speed all year. We do one week of that and everyone’s buggered!’ (Vendor Matt). The focus on helping to build local seating capacity was linked to spreading and sharing some of the workload.
The sixth and final common theme (see Figure 15) to emerge across all the stakeholder groups is the value of trialling wheelchair prototypes in the consumer’s routine environments.

**Home-based wheelchair trials are decisive**

The theme of home-based trial linked to sound decision-making is directly related to selecting the most appropriate of the wheelchair-seating system. The home-based trial provides a real evaluation of the person–wheelchair–environment match. Appropriate prototype trials in the consumer’s routine environments affords a trusted method of ensuring the wheelchair-seating system capacity is suitable, for example:

I can manoeuvre [power chair] around my house easily ... then I gave it a run around the block about half a dozen times ... while test driving it. (Consumer Vince)

Get the client to potter up and down the driveway. Potter around the house, in and out of the kitchen, go in and out of the toilet, all that sort of practical stuff. If they’re worried about the gutter, get them to go out, up and down the gutter a few times. (Clinician Rocko)

It’s better to have them in your home ... like for example, our crazy back ramp that I always had to hold [wheelchair] handlebars, but now in this chair he can [safely] just go up and down it easy. (Carer Cara)

A successful home-based wheelchair trial validates the wheelchair prescription. It extends and empowers consumer and their carers’ wheelchair education (including safe application, manual handling and wheelchair maintenance) and enables timely adjustments for optimal technology fit. Trialling of modular technology could be adjusted, as needed: ‘I
tend to turn up back there a week or two weeks later, and have a bit of a look at it, and do a fine tune’ (Clinician Rocko), during the trial period. Providing home-based wheelchair prototypes are however, resource-intensive.

Accessing modular technology to construct a trial prototype was not always easy. The wheelchair suppliers provided the majority of the modular seating prototypes and logistically supplying a diverse range was not feasible: ‘from a financial point of view you just can't have endless chairs, like I’ve got three Ti-Lites sitting there and they retail for $6–7000 each. Like I’ve got a lot of money tied in three manual wheelchairs sitting there’ (Vendor Paul). Providing wheelchair prototypes was commercially taxing: ‘for a week’s [trial] ... We’ve got six power chairs but 80% of the time it’s the one brand that they want to go out each time [for simultaneous trial] ... No-one could afford to do that’ (Vendor Millie). The cost of providing a scripted trial prototype prior to purchase was borne by the supplier. ‘The reality is that a supplier can’t keep a demo product of every size available in every configuration. You may not always be able to find a demo product that’s the match in the right size or the right [product]’ (Clinician Cam). Resourceful suppliers proved better at sourcing trial technologies, and being with easy location assisted too.

Home-based trials were not so easy for remotely located consumers, so accessing appropriate wheelchair technology for trial was a constant challenge. The challenge of synchronising all necessary items needed to build a trial prototype, required resourcefulness. Regional Clinician Nadia accounted for most commonly used wheelchair components, to stock these ready for prototype assembly and this reduced the delay waiting for all the items to arrive: ‘We can narrow it down to perhaps one option we’d like them to trial at home, based on a couple of sessions at the centre, instead of waiting for [all the]
products to come out [from various suppliers]. It takes smart coordination, amongst a busy caseload, to resource the commonly used modular technologies and considerable technical skill to assemble and adjust a suitable prototype for each trial.

The assembly of a custom-made bespoke prototypes for trial is more convoluted than applying modular technology, but once constructed the home-based trial flowed. The bespoke trial prototype is the consumer’s nearly completed wheelchair system. This meant the home-based trial was less time pressured, and re-trials were interspersed with adjustments over several fittings. Unlike the quick home-based adjustment of modular trial prototypes, the refitting of each custom-made prototype was undertaken by the clinic-based seating team:

The chair tends to go out on trial, with temporary covers, but set up ... so any problems are raised ... be it comfort within function, within ability to drive, if there’s any pain, we tend to have a really good look ... any changes [are] made ... then it will go out on trial again, or the delivery is arranged. (Clinician Belle)

Poor outcomes were commonly associated with inadequate wheelchair trials. ‘I have had over the years, you know, some, sort of bloopers, I guess, that may have been alleviated by trial equipment’ (Clinician Talia). Principal prescribers validated their wheelchair-seating prescription based on the evaluation of the home-based trial, particularly for non-standard technology. Funding agents demanded robust justification based on home evaluations: ‘The reasons for [prescribing]... certain [sophisticated technology] features that are increasing the costs of that equipment but then looking at, Can we present it to the funding body with enough justification that they’d consider funding it?’ (Clinician Cam). The funding agencies demanded a home-based trial (some required
comparative trials of several prototypes), and while these were resource intensive, a good home-based trial empowered the consumer’s decision making control, assisted in educating all family members involved its use and the evaluation process strengthened clinical reasoning and prescriber justification.

The thematic data analyses exposed six important themes common to all the stakeholder groups. Each of these six themes confirms international literature and adds essential data to the scant Australian data. Specialised wheelchair procurement is complex (Di Marco et al., 2003; Kenny & Gowran, 2014; Mortenson & Miller, 2008; Plummer, 2010; Poulos et al., 2013; Routhier et al., 2003; Gowran, 2011; White & Lemmer, 1998) and is constantly fraught by inadequate funding (Mortenson & Miller; Plummer; White & Lemmer). Forming trustworthy partnerships empowers team decision making (Arledge et al., 2011; Batavia, 2010; Who, 2008) and home-based service provision informs and empowers consumer decision making (Plummer, 2010).

Summary

This chapter presents essential data of the Australian seating service experience being studied. Of relevance particular to an Australian seating service experience, is specialised wheelchair procurement is a complex, multi-layered process (Di Marco, et al., 2003; Eggers et al., 2009; Mortenson & Miller, 2008; Plummer, 2010; Routhier et al., 2003) in which the less specialised primary level of service dominates, in need of greater access to a small, metro-centric specialist seating service sector. The Australian seating service seeks a person-centred service approach, they encourage inclusive working partnerships and consumer driven service and technology selection aimed at appropriate wheelchair provision. The service experience is empowered by accumulated lived-wheelchair
experiences and immersion with nurturing seating team environments. These helped build stakeholder’ knowledge, skill and confidence for informed decision making (Kittel, et al., 2002; Mortenson & Miller; Plummer).

Within an Australian context, the specialised wheelchair-seating system is viewed as both a personal enabler and an important reflection of the consumer's sense of self (Gowran, 2012; 2013). Person-centred wheelchair-seating provision and maintenance empowers social inclusion through optimal wheelchair performance (Sapey et al., 2004). Australian specialised wheelchair procurement is hampered by a fragmented, unjust funding environment (Layton, 2012; Layton & Walker, 2012; Productivity Commission, 2010). The consumer’s Australian location intrude on timely service access (Stagnitti, 2008; Stuber, 2004), stymie service collaboration, knowledge exchange and technology choices in non-metro Australia. These are new, essential data for a deeper understanding into the Australian seating service experience.

The next chapter presents the study findings pertaining to the second phase of data analysis: the influential factors in decision making, from an Australian perspective.
CHAPTER SIX:
Decision-making in the Context of the Australian Seating Service

The previous chapter presented the stakeholders themes, this chapter presents the findings from a decision-making perspective as particular to the seating service experience from an Australian perspective. The data collected regarding decision-making were informed by second and third research questions (see Table 1 for review of research questions) and the data gathered helps inform the case study exploration of Australian seating service experiences.

The Eggers et al. (2009) Wheelchair Service Delivery Model (see Figure 3) was employed as the analytical lens to delve deeper into the data from a decision-making perspective. The model identified the influential contributors to seating services from a North American perspective as: the healthcare system and the payor, supplier, provider and client factors. As noted previously, the key stakeholders in Australian wheelchair procurement are the consumer, their care provider and their primary therapist, the suppliers and the specialist seating service team. The data show appropriate wheelchair and seating technology is dependent on the consumer's eligibility and access to specialist seating services (predominately metro-centric), competent person-centred prescription, proficient supplier services and adequate funding. The Eggers et al. model also identifies seven seating processes within a North American service perspective. As previously exposed, there are six seating service steps identified in the Australian seating service context (see Figure 13).

The following findings expose the factors that inhibit or enable the decision-making process in the Australian seating service environment (see Figure 16). As elaborated below,
decision-making in specialised wheelchair-seating provision in Australia is dominated by enabling and inhibiting factors. The data expose inhibiting factors are influenced by case complexity, stakeholders’ inexperience, a small fragmented seating service environment, further influenced by consumer’s service access and restrictive funding protocols. The enabling factors were enhanced by forming trustworthy partnerships, accumulated wheelchair experience, aspiring a person-centred service approach, accessing locally based seating services and transparent funding protocols. These data assist build a deeper understanding of the case study: the Australian seating service experience.
The inhibiting factors are presented first, followed by the factors that enabled the decision making process (Figure 16).

Inhibitors

The inhibiting factors are identified as preventing, restricting or delaying specialised wheelchair procurement and/or access to seating services. Four major inhibitors are identified in this case study as: case complexity, inexperienced stakeholders, fragmented seating service, and service access. These are presented now.

Case complexity.

Case complexity is compounded by the bio-psychosomatic factors commonly present in multiple disabilities that impact on consumer mobility. In this case study multiple disabilities describe conditions where several health conditions are present, such as long-term spinal injury associated with complex postural and pressure care concerns. Each condition presents unique challenges that help determine both the seating service need and the decision-making pathway within service provision and technology selection based on the consumer’s capacities.

Consumer functional ability.

The consumer functional capacity describes their capacity to attend, engage and contribute in making and owning choices. Communication skills were essential in facilitating the consumer’s contribution, while communication difficulties slowed decision-making. Speech difficulties hindered the consumer’s active engagement in the decision-making process. It was common for people presenting with complex disabilities to use
augmentative speech technology like ‘an alphabet board, but he is such a strong advocate for himself’ (Clinician Jane), or ‘a little bit of signing and ... a few little cues on an I-Pad’ (Clinician Betty). Language difficulties and the use of speech technology required additional time to allow consumers to express themselves. Therefore, ‘extra appointment time [was required] if verbal or cognitive skills impact on their ability to make their needs clear’ (Clinician Neve). As specialised wheelchair procurement is notably complex, extra time was required to accommodate for: ‘some of those big decisions you can’t ... avoid those five hours of conversations’ (Clinician Betty). Consumer’s communication skills are considered crucial to enable making their own decisions.

The consumer’s adverse health status negatively impacts on decision making stamina. The consumer's decision-making capacity was linked to their ability to engage and stay immersed in the process. The consumer’s health status affected physical and emotional stamina, and consequently their ability to attend and to absorb the information needed to process the options being presented. Consumer Hallie shared her experiences of trying to stay engaged when fatigued: ‘The energy required to be up and thinking and having a conversation was too much, so 15 minutes was all I could cope with ... the person’s talking was going in one ear, coming out the other. I just lost it!’ Consumer Hallie noted her poor sitting stamina, associated with postural tachycardia, overwhelmed her ability to participate and prevented her engaging actively during making decisions.

The thematic analysis confirms specialised wheelchair procurement is complex on multiple dimensions. There was a clear divide between what constituted complex from non-complex case need. Clinician Mia described complex case need as: ‘basically, if you needed laterals and adductors, you were complex. If they needed to be offset for scoliosis,
you’re complex!’ While the above clinician identified a clear distinction between non-complex with complex, a deeper data analysis identified four complex levels of postural complexity (see Figure 17). As shown in Figure 17 the four levels of postural complexity were: Complex, Complex Plus, Very Complex and Extremely Complex. Each describes an escalating degree of case complexity according to a consumer’s seated function, postural deviation, support need and pressure care risk.

The least complex level—Complex need—describes a fixed and/or flexible deformity requiring postural support; the consumer’s independent movement and in transfers reduces pressure care concerns. The second level—Complex Plus need—describes less independent movement, transfer dependence, with greater postural support needs and pressure care concerns. A history of pressure ulcers history compounds seating complexity and requires advanced seating solutions. These two lower levels of case complexity (Complex and Complex Plus needs) may be allocated to a Networked Team. The Network Team may collaborate with a local supplier for modular wheelchair-seating solutions; or with a specialist service, such as a Vendor Clinic, to blend or adapt modular technology to meet their consumer need.

The third and fourth levels describe greater case complexity. The third level—Very Complex—describes a seated postural deviation in a single body plane, such as an anterior pelvic tilt or lordosis, plus pressure care concerns. This level of seating complex requires customised seating solutions with options to assist pressure care management. The fourth and most complex level—Extremely Complex—describes very complex posture: a seated postural deviation in two body planes, such as scoliosis associated with pelvic obliquity, plus active pressure care requirement. A consumer categorised as Extremely Complex
needs maximum body-conforming, pressure-distributing seating solutions aimed at optimal body immersion (i.e. a contoured moulded seat insert). The data show the higher levels of case complexity (Very and Extremely Complex needs) required specialist seating services capable of manufacturing bespoke solutions. These four domains categorise the complexity of the seating need, inform the seating service selection and the technology approach.

Figure 17 Four levels of bio-functional complexity

This data expose the specific multi-dimensional information that describes postural complexity, informs seating service selection and technology approach. This builds on essential, Australian specific data required to delve into seating service experience as a case study.
Added to the bio-functional data, the consumer’s ability to make and own their decisions enabled consumer’s control.

**Consumer’s decision-making capacity.**

The consumer’s capacity to engage in making sound decision was enabled or inhibited by their locus of control. Three types of decision-makers were identified according to the consumer’s decision making capacity and control. These are described below as: an independent decision-maker; as a supported decision-maker, or as an advocate decision-maker (see Figure 18). Of the three types, only the first as the label implies— independent decision maker—controlled their choices.

![Figure 18 Three levels of decision-making capacity](image)

**Figure 18 Three levels of decision-making capacity**

*Key: DM = Decision-making or decision-making capacity*
The independent decision-maker controls decision-making.

The independent decision maker proved to be the most empowered consumers. Independent decision-makers describe consumers with capacity to engage in and control their own decisions. They demonstrate insightful capacity to research and analyse relevant information, to understand all elements, and to communicate and act on their decisions. Independent decision-makers are described as: ‘people who are very cognitively able [and] who are also very complex posturally’ (Clinician Naomi); ‘able to advocate for themselves, they’re able to express themselves, whether that’s through a communication device or their own voice, they know what they want and they’re able to articulate that in some way’ (Clinician Jane). Independent decision-makers are empowered self-advocates: ‘I was quite, you know, directive of what I wanted’ (Consumer Bea) and they require less service support.

The other two types of decision makers (supported and advocate) were less empowered, however the most vulnerable was the supported decision maker.

Supported decision-makers require additional support.

Participants noted that not all consumers were capable of making sound decisions independently; some need additional support. The second category, the supported decision maker, describes a consumer who can make choices but requires assistance to fully comprehend the consequences of decisions made: ‘They’re able to make decisions but they need a lot of support to understand the implications of [their] decisions, to think through the pros and the cons and the compromises’ (Clinician Jane). Poor insight associated with cognitive impairment acted as an inhibiting factor. These consumers were considered vulnerable, as compromised cognition and poor insight (to make good decision-making)
meant their decision making control was tenuous. Vulnerable decision makers required considerable time, support and service resources to consider and measure options to make sound choices. The care provider’s contribution in supporting decision-making was a valuable asset. As such, consumers who were not well supported, were identified as needing greater support; especially when they ‘don’t have very good family support’ (Clinician Jane). Lack of carer support was a significant inhibiting factor, as supported decision makers needed the greatest support. Poorly supported consumers consume greater service resources, than those with supportive networks.

Guiding the supported decision-maker is challenging. As such this cohort were considered as the ‘trickier groups to work with because it’s very easy to veer towards the cotton wool—we’ll just look after you—kind of approach through intensive support’ (Clinician Jane). Sensitivity and care are required to ensure the supported decision-makers needs are heard. These consumers were considered vulnerable to stakeholders with more dominant agendas, as noted by Consumer Brian when recalling how his teenage goals were high-jacked by clinical needs: ‘I guess it’s just natural for other people to be focused on [and] to have different priorities for your chair than you do because, because they not experiencing it’. Supporting these more vulnerable consumers to make sound decisions they understood, required additional service resources and sensitive advocates.

**Advocate decision-makers negotiate multiple agendas.**

The third type of decision maker identified is the advocate decision maker. The advocate decision-maker describes a guardian who makes decisions on behalf of a consumer. When a consumer is unable to contribute to or make reliable choices, their decision making is assigned to an advocate. The participating advocate decision-makers
were family members; there were three such advocate decision-makers. As family decision-makers, these advocates spoke of managing numerous service teams, appointments and significant information on behalf of their respective sons. Decisions made on behalf of their sons were considered in the context of the impact on the family unit, as exemplified by Carer Donna (see Table 11). Family advocates needed to be strong and assertive to be heard and team trust was developed through respectful collaboration.

In addition to family advocates, prescribing clinicians also spoke of acting in a clinical advocacy role. Prescribing clinicians considered consumer advocacy an important clinical role, but this was undertaken with some trepidation. ‘I’m scared for that cohort of people and we’re trying to play as much advocacy as we can’ (Clinician Jane). Clinicians approached this advocacy role with care and sensitivity to ensure consumer’s needs were heard, and not over-ridden. Again, working as a cohesive team helped support and advocate on behalf of the consumer’s needs, when advocacy decision making was indicated.

The above data show the decision-making capacity of the consumer decided who controlled the decision-making pathway. Lived wheelchair and service experience enhanced consumer’s decision making capacity and thus enabled locus of control. Accrued experience empowers decision-making control; lack of experience hinders decision making control and reduces power. The degree of wheelchair and service experience influenced consumer complexity and need for service resources.

Stakeholder experience (or inexperience) acted as a psychological enabler or inhibitor: as a wheelchair occupant, a care provider and as a service provider. Inexperienced decision-makers fell into two categories: the novice wheelchair occupant and
the inexperienced service provider involved in specialised wheelchair procurement. These are presented below.

**Inexperienced stakeholders.**

The inexperienced stakeholder describes: the novice consumer; the poorly networked consumer (or one with unrealised carer support); and the inexperienced prescribing clinician.

**The novice consumer.**

The novice consumer describes a person who, due to newly acquired mobility disability requires specialised wheelchair and seating technology. A novice consumer requires support and time to learn, to become confident in making wheelchair choices; and in selecting suitable service providers.

Wheelchair inexperience inhibits active decision making collaboration. Children are often silent participants in their wheelchair procurement. Such example was provided by Brian’s childhood reminiscence: ‘I used to feel [less decisive] growing up when the decision-making was driven by my parents and an OT, and I was more there along for the ride’ (Consumer Brian). The childhood status inhibited decision making contribution. Despite their lack of decision-making power as children, consumers spoke of learning from experienced role models who guided their developing decision-making process. Parents and their occupational therapists acted as good role models to develop consumer confidence in making choices. Inexperience coupled with poorly addressed support needs or support networking are identified as inhibiting factors on decision-making control.
**Poor support networks or limited carer support**

Consumers with poorly formed support networks had fewer service choices. Poor networking inhibited Consumer Hallie’s access to suitable services and appropriate technology. Hallie was poorly networked for two reasons: her regional location was poorly resourced and she was ineligible for disability care funding (Her story is further elaborated in Table 13). Hallie’s lack of carer support, compounded by her fatiguing health condition, meant she was socially isolated from a peer group within her regional community. Her social isolation meant she was poorly informed of available services options. Being outside the networked circle, meant Hallie’s self-directed decision-making was informed by her own trial and error process. As Consumer Hallie battled with fatigue, making decisions based on insufficient knowledge or limited access to services was exhausting and this exacerbated her health condition. Poor health status, lack of carer support and social isolation are inhibiting factors to empowering effective decision making.

The study identifies regional and rural isolation as inhibitors to developing decision-making confidence. Regional and rural consumers noted they had less wheelchair service access and therefore fewer wheelchair and seating technology choices. Limited technology options and lack of service access inhibited the participant's capacity to make good decisions quickly. Making complex decisions without specialist support or the opportunity to validate choices, hindered developing confident decision-making capacity. Isolated participants required more time to acquire the knowledge and skill for make confident decisions.
The inexperienced prescribing clinician.

An inexperienced clinician is described as being less skill (Benner, 1982) as such may—as a professional—be one ‘who’s feeling out of their depth’ (Clinician Mia). Like their novice consumers, inexperienced clinicians require time and timely clinical support to develop their reasoning skills, as required to make sound clinical decisions. Newly graduated therapists acquired basic clinical skills on graduation. As inexperienced seating clinicians, they relied on colleagues with greater skill to make clinical decisions: ‘New grad-therapists as a general rule of thumb are really scared of equipment and spend a lot of time picking the brains of suppliers, I guess, to justify their [wheelchair prescription] justification to their funding bodies’ (Vendor Paul). The data expose lack of wheelchair-seating experience is often linked to poor clinical decisions and if isolated from trusted support, these clinicians became susceptible to vendor persuasion. ‘New grads are understandably totally inexperienced with the equipment stuff and exposure to suppliers. Knowing how to use a supplier to the best of your advantage, as a therapist, is really important’ (Vendor Dave). Service inexperience inhibited confident clinical reasoning.

Clinical inexperience leads to poor service provision, as a service culture informed by lack of spinal knowledge discouraged essential rehabilitation practice. Consumer Hallie’s regional service actively discouraged her from practicing essential wheelchair skills for curb climbing: ‘When I came to ... my regional hospital, the physios and OTs hadn’t really seen many people [wheelchair] balance, and they thought it was quite a dangerous activity’ (Consumer Hallie). In this case, poor wheelchair knowledge and clinical inexperience lead to poor decision-making regarding wheelchair skill acquisition. As the majority of spinal rehabilitation occurs in metro-based spinal units, regional clinicians maybe unaware of their
knowledge gaps in spinal wheelchair-seating practice. The need for providing greater clinical support for inexperienced clinicians is highlighted, thus confirming universal standards for seating education.

Acquiring essential knowledge, as an inexperienced clinician is further inhibited by isolation from expert peers. Working with a range of expert and experienced peers enables information exchange and transfer. Acquiring adequate knowledge and sustaining its currency is challenging, as qualified by this dedicated wheelchair vendor: ‘[there is] an enormous array of product now; that must be overwhelming for some of our population; it certainly is for the therapist…the run-of-the-mill therapist, trying to keep up to date’ (Vendor Dave). The run-of-the-mill therapist refers to the primary therapist providing wheelchair-seating prescription as part of diverse caseload.

Nurturing team environments develop clinical reasoning confidence, but developing team trust to collaborate effectively takes time and experience. Trusted collaborations helped primary therapist stay current in wheelchair-seating technology options, however service experience was also essential to seek out suitable working partnerships, as the Australian seating sector was not universally networked.

**Fragmented seating service environment**

The data expose a fragmented seating service sector in Australia. Australian wheelchair procurement is inhibited by the following compounding factors: funding system variation, divergent service eligibility systems (i.e. compensable versus non-compensable), restrictive funding protocols, and lack of funding policy transparency. These are elaborated upon below.


**Funding system variations.**

As previously noted, at the time of data collection, the fragmented seating service environment was influenced by various confounding funding factors. These included: an overarching Australian healthcare system funded by a state government system in which eight state-run systems controlled service scope and wheelchair provision (some with additional federal funding). The Australian healthcare system was further fragmented as specific disability-related services were commonly funded by not-for-profit sources with some government assistance (e.g. for cerebral palsy or multiple sclerosis). ‘The service delivery is quite fragmented throughout the state, I mean you get so many different organisations who tend to compete for money with each other’ (Clinician Jon). The manner each seating service received funding determined its service scope, dictated the type of service hosted and its service pathway. Each identified seating service and wheelchair supplier differed in its service delivery approach, as influenced by their funding source.

The data expose two methods of service funding: intermittent and recurrent funding. Recurrent funding provides regular funding certainty: thus enabled service scope, decision-making flow and wheelchair provision; intermittent funding inhibits service flow. Intermittent service funding causes funds irregularly, in quantity and/or in uncertain timed schedules and this hindered service planning and inhibits service capacity. Irregular funding negatively impacts upon service scope and decision-making flow: these negatively influenced wheelchair provision. The services resourced by intermittent service funding suffered service uncertainty; this hindered service capacity as service provision stopped when funding was spent. Making decisions with funding uncertainty hindered wheelchair procurement. Lack of funds interrupted seating service flow and restrictive service
parameters modified work behaviours: ‘It didn’t work very well; but that was what my team was used to’ (Clinician Tammy). Intermittent and irregular funding stymied service provision, dictated service scope and limited timely wheelchair provision. Funding certainty empowered service provision certainty and thus ensured scheduled wheelchair provision (to elaborated under enabling factors).

Further funding fragmentation was imbued by state-run procurement systems. Each Australian state operated its own unique non-transferable system of wheelchair procurement program. These system differences caused significant consumer inconveniences: such as alluded by two care providers with recent experience of transferring across state-run healthcare systems: ‘I thought that it would be a little [different] but not to the extent that it was’ (Carer Donna); ‘I can’t take my funding. If want to move [inter-state] to Queensland, I can’t’ (Consumer Hasina). Both participants, after moving interstate, experienced interruptions of one and three years before each was reinstated fully of their disability-related entitlements.

**Restrictive funding environments.**

The data expose restrictive funding protocols dictate wheelchair provision. Restrictive protocols thwarted a person-centred approach to wheelchair selection (and intentional prescription). The multi-layered prescription process—that is matching consumer complexity with the cost of wheelchair technology while working within unforgiving protocols—challenged clinical decision-making. Considerable experience, acquired clinical skill and confidence were required to accurately estimate the cost of specialised wheelchair-seating technology. This skill was acutely relevant when estimating procurement costs with information, as supplied by the referring agent:
I make an estimation based on primary therapists’ referral information to estimate of total cost per request. This I send to the funding body for approval prior to first appointment. (Clinician Catrina)

I quite often look at how much it costs and think, Well, I can do that, yes, for that price and if I can’t or if somebody wants an extra item then ... [we’ll have to] apply for more funding or do another quote. (Vendor Bert)

Variation in specialised wheelchair procurements was further affected by a two-tiered funding system based on eligibility: as compensable and non-compensable consumers. Funding discrepancies exist between those who were government-funded as non-compensable consumers and their compensable peers covered by insurance-type programs. The data expose the non-compensable system hinder person-centred wheelchair procurement when compared to a more generous compensable system.

The majority of the study’s participants were aligned within the non-compensable system, where decision-making regarding both service and wheelchair selection was imposed by one of three funding protocols (Figure 12): needs-based, inventory-listed and subsidy-scheme. Each state-funded protocol dominated the specialised wheelchair procurement: dictating what wheelchair technology was funded, and this directly influenced what technology was prescribed, to whom, and in what time frame.

Of the three funding protocols, the needs-based funding is the preferred system for enabling decision making. Needs-based funding empowered person-centred wheelchair prescription approach intentionally for present and future needs. The inventory-listed and the subsidy-scheme approaches inhibit person-centred decision-making. Prescription
behaviours altered according to inventory-listed funding protocols, as speedier provision was assured from a pre-determined inventory of standard technologies (purchased economically in bulk). Prescribed non-standard technology (more sophisticated and costly) was rarely stocked, required additional clinical justification, special equipment panel consideration and thus caused delays in timely wheelchair provision. Participating clinicians actively tried to avoid delays in wheelchair provision and so avoided non-standard prescriptions where possible. The inflexibility of an inventory-listed approach hindered decision-making, as wheelchair prescription was driven by listed technology and less by consumer need.

The subsidised-scheme funded according to units or standard items: aimed at stretching inadequate resources across burgeoning consumer demand. Subsidised-schemes operate by listing technology into categories so technology is funded accordingly, from non-complex variously through levels of complex needs: ‘They’ve structured every single item of equipment ... it just falls into that basic and essential thing, that mobility is really the key focus ... they’re just setting limits as to the maximum amount you can spend’ (Clinician Valerie). As such, a subsidised-scheme funded to a priced limit: a ‘ceiling amount’ (Clinicians Valerie; Talia), so additional funding was routinely required for non-standard items. Encumbered participants had two choices: to find additional funding or to downsize their wheelchair choices to fit within the restrictions applied by a subsidised system. This is considered an insidious form of funds gatekeeping (Barbara & Curtin, 2001). The subsidised-scheme approach inhibits appropriate wheelchair procurement; participating clinicians spoke of prescribing wheelchairs according to the scheme
guidelines to avoid delays, again considered another level of funds gatekeeping and inhibited person-centred wheelchair procurement.

Funding protocols influence wheelchair prescription and supply (White & Lemmer, 1998; Plummer, 2010). Participating suppliers quoted according to the itemised cost structure as dictated by their prevailing subsidy-scheme, to win technology contracts. Specialised wheelchair procurement was further hindered because seeking additional funding delayed wheelchair purchase.

These findings concur the literature pertaining to person-centred wheelchair prescription (see Batavia, 2010; Dolan, 2012; Duffield, 2013; Mortenson & Miller, 2008; Plummer, 2010), while Barbara and Curtin (2001) alert service providers to advocate for person-centred procurements, to be aware of restrictive protocols to avoid becoming default gatekeepers for funding programs. Lack of service transparency inhibited specialised wheelchair procurement.

Lack of funding policy transparency.

Lack of transparency in the funding process inhibits decision-making. Participants complained there was scant disclosure regarding funding distribution or the funding approval process. As noted, non-standard and sophisticated wheelchair-seating solutions—common in complex seating—were subject to funding shortfalls. Lack of disclosure within the funding application progress meant consumers were not alerted early and this affected them accessing (in a timely manner) additional top-up funds, if needed. Funding delays hinder timely wheelchair provision, while early warning assisted seeking supplementary funding to keep the procurement process rolling:
If they were more transparent in what stage of your [funding] application is. If they could give an average wait time ... Then you could make decisions around that.

(Consumer Brian)

Delays in acquiring adequate funds; as in supplementary funds commonly required for non-standard wheelchair procurement, hindered the flow of decision-making and service planning. Initiating the top-up funding process consumes clinical time: in advocating for the required wheelchair technology, to present a compelling funding application and to find the best funding resource appropriate for the request.

Poor disclosure of the actual funding application process is considered a major inhibitor to timely wheelchair-seating provision. Good networks enhanced access to additional funds. The consumer’s ability to contribute initiated top-up funding quests, either personally or through their support network enabled funding success: ‘The first port of call is to see whether the client can pay some top-up funding themselves. Which is often quite a challenge’ (Clinician Claudia). When the consumer’s access to funds was exhausted, a wider search was undertaken: ‘Then there are other buckets of money that you can top that up with’ (Clinician Bev). Participants indicated acquiring adequate funding was time consuming; and while some consumers were independent seekers, others required assistance.

The lengthy process of seeking adequate funds influenced what wheelchair and seating technology could be provided and within what time frame. Applying for funding, the data show, was routinely allocated to the primary therapist as principal prescriber. To ease the clinical load, where possible, the task was delegated. ‘We’ve made a rule across our team, here, that if a person has a case manager involved, we ask the case manager to be
involved in the [seeking] top-up funding’ (Clinician Wendy). Teamwork assists in finding funding for non-standard wheelchairs, and therefore the quality of decision-making is influenced by the supportive teamwork culture (or lack of).

**Service access and environmental factors**

Wheelchair procurement was influenced by the consumer’s location to suitable seating services. Therefore, environmental factors could enhance or hinder decision making. Two sub-themes were identified within the environmental factors as: the consumer’s postcode, and its influence on inhibiting technology choice and access to wheelchair repair services.

**The consumer’s postcode.**

Consumers’ postcodes defines their geographical location in Australia and their location influences access to service provision: thus location influences how and when decisions are made. The majority of secondary seating services are metro-based. Of the 19 metro-based Integrated Services identified, 16 were located in metro centres, two in regional Australia and one in rural Australia. In addition, a handful Vendor Clinics were found located in or near metro-centres (within two driving hours). Therefore the location of the consumer to the majority of specialised services—specialist wheelchair suppliers and seating services—influenced service access.

At the time of data collection, access to outreach seating services was inconsistent, so regional and rural consumers commonly travelled, many with their care providers, to access appropriate specialised services. Travelling time, the cost of transporting wheelchairs and away-from-home expenses were common imposts borne by the participants. These factors
impact on decision-making, as consumers and care providers considered the urgency of wheelchair need against the expense and inconvenience of travel.

The participating regional/rural consumers and care providers economised on their metro-based service access by condensing the time and frequency of their visits, compacting their service provision into an intense, condensed couple of days. As a consequence, their decision-making was rushed: ‘It was a bit of a rigmarole. No OT in [our region] would help us so ... we had to travel ... and spend a few days up there to go for an hour—we had an hour to have a look at four chairs’ (Carer Cara). Making decisions with minimal reflective time requires confident skills, considerable experience and conscientious planning; and may not achieve a satisfactory outcome. A condensed seating service process inhibits the opportunity to collaborate and reflect, as a cohesive team. As a result, participating non-metro based participants experienced less interactive decision-making time with their metro-based service providers (some just hours, other a few hectic days), than metro-based peers. Restricted time for full consumer engagement inhibited sound decision-making and result in less satisfying outcomes. By comparison, metro-based participants spoke of more measured decision-making process in which the seating process was scheduled over a number of weeks or even months. This enabled time to reflect upon one’s decisions, therefore their choices were linked to making sound decisions and good outcomes.

Access to most Integrated Services was defined by eligibility criteria based on disability, health status and postcode boundaries, as noted by Vendor Freda, a member of a state-wide service: ‘It would depend where they were located. If they were an in-patient ... in one of the hospitals within [the city] then yes, we could see them. They would be
eligible’. Her service parameters were caseload specific: ‘the reality is unless they were at [this hospital] we probably wouldn’t [service them]. We just wouldn’t get time’ (Vendor Freda). Access to Integrated Services was also controlled by external systems, where a consumer’s postcode could decide who was service eligible. Even with these limitations, the number of Integrated Services were considered inadequate for demand, and this imposed further service access restrictions.

Many regional and rural consumers were service ineligible, or could not access metro-based secondary seating services due to their location. They accessed services delivered by a Networked Team, as a locally based team of service providers within easier travelling distance. The variations in seating specialisation in non-metro Australia was an factor affecting sound decision-making, as dependent on the primary service expertise.

Vendor Graham, a state-wide service provider, noted regionally-based therapy services (employed to provide generic services) were routinely less experienced or skilled: ‘Therapy experience is less well formed and skills less honed [and as such] there is limited choice, less experience, limited time which impacts on decision-making’. As the primary level of seating service was dependent on each member’s expertise, the clinical decision-making capacity varied within each Networked Team.

An early career prescribing clinician working with limited wheelchair-seating prescription experience, who collaborated with a wheelchair supplier stocking standard wheelchair technologies would make different wheelchair selections, than those chosen by an experienced seating clinician who collaborated regularly with a trusted Vendor Clinic providing non-standard and sophisticated technologies and services. The decision-making
process is influenced by available seating expertise and access to an appropriate range of wheelchair technology.

Consistent with Stagnitti (2008), retaining expert staff in regional and rural Australian health services was a noted challenge. The employment of early career clinicians was common in non-metro-based health services, and as such, their clinical decision-making skills were often insufficient for specialised wheelchair procurements. Participant concern was raised regarding this generically employed cohort of prescribing clinicians who were considered less experienced for complex wheelchair-seating prescription. Furthermore, many worked in solo positions across diverse caseloads: this and work-related stress were often linked to poor decision-making. The data note that inexperienced clinicians were often less well networked and often remote from timely supervision. As a result, isolated clinicians were more reliant on wheelchair suppliers’ recommendations and this may bias wheelchair prescriptions. The data show clinical inexperience compounded by seating peer isolation negatively impacts on making and hinders developing quality clinical reasoning skill and decision-making confidence.

**Inhibiting technology choice and access to wheelchair repair services.**

Regional and rural participants spoke of adjusting their decision-making to the available services. Participants with limited access to technology options and after-sales service altered their choices accordingly. Consumer Christine lived in remote Australia and as such had limited access to specialist services including seating services. Over a lifetime, her technology choices remained simple, due to her lack of supplier access: ‘I’ve used ordinary anything all my life and just adapted things, like you know, an extra cushion under or behind the back of your feet so they don’t drop and keep your heels off the bed, all those
practical type things’. Consumers, like Christine made decisions based on their intuition, informed by their knowledge acquired over their lived experience. Furthermore, Consumer Christine simplified her selection of seating technology in response to her limited specialist services. Therefore remote location, lack of specialist service provision and supplier access influences how decisions are made. Of additional interest, is how choice making habits persist and in Christine case, influenced her lifelong decision-making behaviours.

Access to wheelchair services in non-metropolitan Australia also dictates clinical decision-making. The data show wheelchair prescription and wheelchair selection were influenced by access to after-sale repair services. Ready access to locally-based wheelchair servicing, especially for non-standard wheelchairs, was particularly important and timely repair access was problematic for consumers living remotely from specialist (often) metro-based services. In some instances, wheelchair selection was restricted to a single wheelchair manufacturer based on their environmental conditions, to reduce the need for repair work. One example of restricting wheelchair selection according to limited service access was: the universal provision of the robust Australian-made Glide wheelchair range suitable for physically challenging environments remote to service access. The Glide range of wheelchairs were considered best suited to the Australia harsh environment (dusty, rough terrains) and were commonly prescribed for consumers living in remote, harsh locations. In addition, the Glide wheelchair range was also selected because it was easy to maintain, as its fleet shared common spare parts (e.g. axels, tyres, wheels and brake parts). ‘Instead of having fifty [wheelchair] options which might suit you, they almost always used all Glides, because everyone knows what the brake is ... and the [local] mechanic knows how to put it on’ (Clinician Rocko). Repairs to Glide wheelchairs could be expedited; as universal spare
parts were couriered to the local mechanic directly from the manufacturers. Importing spare parts for overseas manufactures incurred import delays.

The pragmatics of maintaining an operational wheelchair in remote locations influenced selection, as the logistics of accessing wheelchair repair and maintenance services were commonly difficult. Technological simplicity and reduction of the types of wheelchairs in use enabled locally-based generic services undertake timely wheelchair repairs. In-situ servicing assisted in timely repairs, thus optimising consumer’s wheelchair performance and timely maintenance ensured less wheelchair downtime caused by unexpected breakdowns.

The above section provides an in-depth view of the inhibiting factors as experienced by the participants in Australian seating services, at the time of the study. Identifying the inhibiting factors and qualifying their influence of decision making, adds to the data required for an in-depth case study into the Australia seating service experience. The following section describes the factors that acted as enablers.

Enabling factors

The data expose four major enabling factors as: wheelchair and service experience, seating service ease-of-access, locally based technology access, and specialist seating knowledge (see Figure 16). The first major enabler in decision-making is the accumulated participant experience with wheelchair technology and associated seating services.

Wheelchair technology and service experience.

The participants accumulated experience enhanced their decision-making confidence. There were three sub-themes contextualised the value of participant experience as:
understanding consumers’ decision-making capacity, lived experience, competent assessment–prescription, and proficient vendor service. These are elaborated below.

*Understanding consumers’ decision-making capacity.*

Effective communication enabled consumer’s capacity to engage in their own decision-making, and this empowered their self-advocacy, as noted: when consumers ‘were very proactive. They’d ring you up and tell you ... they want a new chair because it’s the newest, latest model’ (Clinician Rocko); ‘without my communication, I wouldn’t be the successful person I am’ (Consumer Vince). Independent decision-makers (see Figure 18) controlled their choices by deciding whom to engage, and how and when to make choices based on clear understanding of their needs. Independent decision-makers exercise significant control, and this empowered their ability to work collaboratively. They tend to require fewer service resources in order to make sound decisions, as noted below:

I feel like I don’t need someone to like set an appointment or organise things. I just need the advice and the expertise that answer questions and provide opinions.

(Consumer Brian)

That particular [skilled] client group I might actually be with them for an hour to two hours initially and then let them take [trial wheelchair] away. (Clinician Nadia)

The above shows independent, decision-makers are confident, proactive operators. They required less service resources. Experienced service providers made decisions based on their understanding of a consumer’s capacity, and this informed their service approach. When compared to knowledgeable participants, novice consumers required greater consultation:
Guys who really know absolutely nothing about their chair ... [they] are coming to you with a blank slate. (Consumer Rocko)

We were in the hospital at the spinal unit in rehab so they arranged it all as we didn’t really know much about [wheelchairs]. (Carer Cara)

Service providers worked to understand the level of a consumer’s prior knowledge and used this as an enabling strategy: to allocate time and support according to need. Considered service time enabled consumers (and their care providers) to learn through dynamic experimentation and thus hone their decision-making capacity. Personal experience informs decision-making (Kittel et al. 2002). As noted by Consumer Hallie, her experimentation helped to ‘determine the things that you like or don’t like about the chair’. Likewise, novice Consumer Mac extolled the benefit of personal experimentation as an enabling strategy:

I had to find a balance of what I wanted. I don’t think you really know what you want until you’ve [tried] it out. It probably takes a couple of years before you find the perfect fit. (Consumer Mac)

Working with supported decision-makers and advocate decision-makers (see Figure 18) alerted the degree of support required and this informed service planning. The data show supported decision-makers were particularly vulnerable to more dominant agendas, a factor identified in the literature (Pépin, Watson, Hagiliassis & Larkin, 2013). One consumer recalled when he was younger, his teenage desires took second place to his parents’ need for his safety: ‘Risk aversion and health concerns tended to dominant over independence things as a teenager. As a youngish adult I wasn’t very good at being
assertive and saying ... that’s not taking into account what I want’ (Consumer Brian).

Providing person-centred service resources was an enabling strategy to ensure consumer’s decision-making contribution was holistically considered during goal setting (i.e. clinical needs and personal-lifestyle wants).

Likewise, data show working with advocate decision-makers requires time to develop trust between all relevant stakeholders. Participants acting as advocate decision-makers relied on their intuition, tempered by their intimate knowledge of their family member’s mobility, postural and lifestyle needs, to guide their decision-making. As such the advocate decision-making role was challenging, as noted: ‘We had to make the decisions for him that we felt were the right decisions’ (Carer Wisty). Supporting decision making on behalf of another required sensitivity as it requires ‘a lot of support around decision-making and advocacy’ (Clinician Jane). The intensity of making decisions as advocate decision-maker is exemplified below. Wisty, a mother and advocate for her adult son, with decades of accumulated experience, refined her ability to make sense of options and contribute equally as shown:

We discussed it between the three or four of us ... We had to have something that would sit him well. Something that went with perhaps a pommel so that he wouldn’t arch his back too far. Something that was comfortable for him [as] he’s got a protruding coccyx, so it had to be something that was soft ... Also, because he’s a bit mobile, we had to have something that we could strap him in but didn’t restrain him too much. So, there were lots of issues. (Carer Wisty)

As is evident above, advocate decision-makers had to process a wide range of information from many stakeholder sources. Three carer providers in this study were
advocate decision-makers, and spoke of attending numerous seating service appointments, negotiating and collaborating with many team members, all with differing agendas. Additional time enabled them to address multiple agendas, which commonly involved specific postural needs, carer and environmental demands and funding issues. Their lived carer experience enabled their decision-making capacity.

**Lived experience.**

The lived experience of the consumers (and care providers) directly informed their decision-making and empowered their wheelchair selection. Informed consumers (and family advocates) selected appropriate technologies according to their goals and lifestyle; including funding access, carer support or environmental demands. Experienced consumers expressed confidence in making and owning their decisions, as noted: ‘that became my job: to be well informed about what’s what and who’s what and where to do [an] appropriate referral and [get] information’ (Consumer Christine). As such, confident decision-makers exercised greater control in making choices. The same confidence was evident in care providers whose experience of living with their family member enabled them make confident decisions on behalf of their family member within their family context.

Proactive problem-solvers used accrued experiential knowledge to advance their decision-making. ‘I learn best from one-on-one [and] others’ experiences: good and not so good’ (Vendor Graham). Sharing collective wheelchair service experiences transferred problem-solving skills, as evident here: ‘She taught me a hell of a lot in regard to the types of foams and the types of seating, what you would use to make a seat up’ (Vendor Ivan). Sarah, a manager of a specialised seating service selected specific staffing skills and competence to match case complexity:
We make sure that we’ve got the right person in the right position, or whether we need to skill these people up to make them better, or do we need to take them out of that role and put them somewhere else ... [or] give them a wage increase, or what do we need to spend on training for this person. (Vendor Sarah)

The accumulated lived experience as a wheelchair consumer or care provider was an enabling factor in building decision-making confidence, so too, the accrued experience as service provider enhanced their clinical reason competence and therefore decision-making confidence.

**Competent clinical and proficient service provision.**

Clinical decision-making and clinical reasoning are acquired through accumulated clinical experience and backed by theoretical grounding (Unsworth, 2001). The data confirm accumulated, immersed clinical experience and reflection enhanced the clinical reasoning process. Immersed service experience allowed for growth through reflections of positive and negative outcomes: ‘Really only over time, you became more and more confident in doing it yourself and you could make a few mistakes here and there and keep learning and keep going but I had a lot of support initially’ (Clinician Jon). Accrued experience honed decision-making, accelerated clinical reasoning and expedited clinical thinking to make intuitive decision quickly: ‘There were three or four chairs ... that I [knew I] was going to get the most flexibility out of—as far as the driving system on the chair—so those were the things that I was looking at’ (Clinician Nancy).

The participating clinicians stated clinical decision-making was validated through evaluating the wheelchair outcome and by attending to user feedback as an interactive process against prescription expectations. Evaluating service outcomes enhanced decision-
making; such as learning from ‘a lot of experiences—good and bad’ (Vendor Stuart) and ‘from poor outcomes’ (Clinician Catrina) honed and strengthen clinical reasoning skills from comparing anticipated goals with actual outcomes. Reflexive clinical practice deepened clinical reasoning skill, and was consistent with the literature (Schell & Schell, 2008). Consistent with the literature, reflecting on feedback enables clinical reasoning growth (Smith, McCreadie & Unsworth, 1995; Unsworth, 2001); but review activity was notably challenged by busy workloads.

Timely supervision was an enabling strategy applied to develop, validated and deepened clinical reasoning skill and competence. The nurturing seating service environment was an acknowledged skill enabler, providing ongoing timely support: ‘I reflect on ... my working with the [seating] workshop which was quite well resourced and well-staffed. I got to learn so much about workshop capability and [technical] capacity’ (Clinician Cam). Many experienced clinicians enhanced their decision-making through their mentoring or supervisory roles, as noted here: ‘I guess we’re in a consultancy role [as the final prescription] is very much done by the primary therapists, who we work really closely with’ (Clinician Belle). Collaborative teamwork clarified clinical thinking, enriched clinical reasoning and solidified team partnerships.

**Problem-solving.**

Experienced service providers employed a number of problem-solving strategies that enhanced their decision-making capacity. Triaging case complexity early, by identifying non-complex from complex needs, was a clever intake strategy used to manage complex caseloads: ‘its complex! It absolutely is, but ... Like if you’re systematic, it can be done ... that’s why I think [identifying] complex versus non-complex need is a good [reference
Developing clear service pathways informed clinical practices, systems and structure to enhance clinical decisions. Below demonstrates one strategic approach:

So I have a list permanently sitting on my desk. A list of what modifications, what securements, what features of a chair are funded and to what level and what isn’t. And I’m usually—at the point of prescription—very, very clear with the client ... if we have to build a tray to stow this under the chair or on the back of the chair, [I say] you will have to fund that yourselves. (Clinician Betty)

Experienced clinicians described applying ‘an organic’ (Clinician Rocko) approach to holistic decision-making, based on accumulated experience and their intuition. These intuitive clinicians mixed assessments, prescription and trial with consumer education to provide holistic services. For example: ‘A subjective assessment ... with education ... along their whole needs in regards to posture, pressure and seating’ (Clinician Claudia). Blending approaches was indicative of a high level of clinical confidence, such as using intuitive thinking. ‘I don’t use a goniometer [any longer] because I just need to know, you know, am I going to adduct that leg about five-ish degrees? It doesn’t matter whether it’s four degrees or seven degrees. I’m going to work that out’ (Clinician Mia). This high level of intuitive thinking (tacit reasoning) was driven by an extensive knowledge, flexible expert practice and clinical emotion, and is consistent with the literature (Benner, 1982; Chaffey et al., 2010; Unsworth, 2001)

Adapting assessment protocols structured data collection by capturing all relevant consumer data in a person-centred manner: ‘Over the years they’ve been added to [our pro-forma]... around identifying all this environmental access, all the barriers, all the [care]
support stuff. I haven’t found that many assessments that combine the two well’ (Clinician Bev). Each service adapted their assessment pro-forma according to their clinical need. One service designed specifically their pro forma to enhance person-centredness: in a ‘person-inclusive way’ (Clinician Jane). The ‘Tools for Promoting Inclusive Practice’ was designed and used by Clinician Jane’s team to engage their consumer cohort more inclusively into the decision-making process. Person-inclusivity included asking: ‘What does the person think? How do we balance that? [and] To actually record that specific perspective of the person’ (Clinician Jane). Employing a person-inclusive decision-making approach optimised the consumer’s engagement and assisted evaluate the outcome from the consumer’s perspective.

To manage complex requests and clarify the decision-making task, a structured assessment process focussed on problem-solving: ‘We’d write out a problem list, and for every problem we had a solution or a potential solution’ (Clinician Mia) by ‘breaking down what the client needs and then matching components [according to each need]’ (Clinician Candy). Structured service processes clarify service pathways and assist person-centred service provision (Dolan, 2013; World Health Organization, 2008).

The quality of the seating service and access to experienced wheelchair services, suppliers and technology were explicitly linked to quality decision making, as neither functioned without the other. This was consistent with the Isaacson’s wheel metaphor (2011) that links successful seating servicing with quality service practice, access to technology resources and stakeholder skills, experience and knowledge. However accessing a comprehensive seating service, as noted, is location dependent within the Australian setting.
Seating service access locally based

As previously noted, primary services were the most accessed by the participant group, as in the locally-based Networked Team. The sub-themes identified under this theme are: the collaborative Networked Team approach and trusted local after-sales and repairs.

The collaborative Networked Team approach.

The study noted the members of the Networked Team assembled according to each referral and focussed on individual consumer mobility-postural needs. The Networked Team consisted of a small group: a local primary therapist (prescribing clinician), the consumer (their care provider, if relevant) and a wheelchair supplier. Team trust emerged as essential for fostering collaborative decision-making, especially amongst loosely formed teams. Working within trusted teams, built over time empowered greater decision-making collaboration. Working relationships forged over time, as in a Networked Team, provided insightful historical knowledge of the consumer’s wheelchair use and of the team members’ service capacity. Participants spoke of actively forming long-term relationships with their locally based service providers (working as a Networked Team) to address complex mobility and postural referrals.

When required, the primary therapist activated a referral to the secondary seating services to address on the consumer’s established mobility, postural and occupational goals. The secondary service providers relied on the knowledge of the primary therapist (as primary prescriber and referral instigator) to provide holistic consumer’s occupational goals and environmental demands. This helped select the most appropriate seating approach. Working collaboratively helped knowledge transfer:
I try and use the primary therapist. I think it also empowers them as well to understand what I’m trying to explain. I’m very into explaining everything to the client the whole way through, whether they cognitively understand me or not. (Clinician Mia)

The local primary therapist acted as an essential conduit between primary and secondary services, pivotal in enabling the decision-making process and in supporting its outcomes. The consumer and their wheelchair were discharged back to the local Networked Team for ongoing support, once the secondary seating service/s ceased.

The vendor’s contribution to the decision-making process was in providing individual wheelchair and finding seating solutions. The type of vendor service informed their decision making capacity. The rehabilitation engineers and technicians, employed within an Integrated Service, contributed as team members and made decisions as part of their team culture and according to their host service scope. The vendor’s decision making role as supplier operator of a commercial business was more complex, based on astute economic strategy, as this vendor exposes:

What they don’t realise is that we do not get paid unless we’re successful in actually getting that job. So there was a lot of expectations from the funders and also from the prescribing therapists on the vendors, and they don’t realise that we’re having to run a commercial business. (Vendor Sarah)

Making fiscally-based decisions added a commercial dimension to service decisions. A viable business within a tight funding environment required a savvy mix of empathetic person-centeredness and keen business acumen to flourish. Clinicians trusted their vendor’s
knowledge, passion and relied on their advice: ‘A lot of people ring me for advice so I think there’s a big advisory role to the business’ (Vendor Sarah); ‘They’ll just rely on me knowing, so they’ll just ask me for my advice (Vendor Paul). As previously noted, the funding bodies were less trusting of the suppliers' intentions, thinking their decision making bias was informed by sales success (rather than as expert advisor). In attempt to engage funding agents’ discussion in improving specialised wheelchair procurements, one vendor expressed his frustration when his attempts were thwarted: 'we tried to engage the government funding bodies in a dialogue, but where, sadly, suggestions presented to them seem to fall on deaf ears. Very frustrating!’ (Vendor Graham).

The wheelchair supplier’s role, as a primary service provider, was crucial to successful wheelchair outcomes. Working within a loosely formed Networked Team, the supplier’s contributed less formally to the decision-making process (than the vendors in the Integrated Service). Ready access to known wheelchair suppliers fostered informal wheelchair demonstrations, facilitated trial prototypes and this encouraged greater consumer participation in wheelchair selection:

We’re very lucky being [here], there’s a fair amount of variety ... We do have [suppliers] who give us demo equipment a bit more, so I think giving someone a trial of equipment is very important. (Clinician Laura)

Proactive, resourceful suppliers, located within the consumer’s residential environment, were often instrumental in providing continuity of service. They were accessible for post-provision support and ongoing after-sale services aligned to sound wheelchair performance over the lifespan of the wheelchair system.

*Trusted local after-sales and repairs.*
Timely access to after-sales servicing is vital to sustained wheelchair performance, and its access influences wheelchair selection. Participants preferred the known, local services for their accessible repair services (as and when required) and where the same repair person was engaged, their consumer knowledge and wheelchair history provided continuity of wheelchair maintenance. Metro-based secondary service providers actively sought the support of trusted local service providers, to expedite repairs early, as one alludes here: ‘As far as that repair and maintenance type support ... we identify people in community or people in other towns that can provide some of that support, or identify at least ... issues before they become big ones’ (Clinician Cam). Locally-based service providers adequately trained eased caseload pressure by: attending to wheelchair difficulties, in alerting visiting seating teams of particular concerns and in preparing for their visits armed with essential consumer/wheelchair history. Thus, service continuity enabled maintenance and repairs to commence without delay and empowered by accrued wheelchair history from past repairs. When the repair service was also the original wheelchair supplier (familiar with the initial assembly-provision-fitting), this offered effective service efficiency: access to suitable spare parts, understanding of local wheelchair use and community knowledge.

The data expose outsourcing repairs to a centralised repair agent changed how decisions were made, as these were rarely person-centred. As noted, one centralised agency employed numerous repair technicians and the same one rarely attended subsequent repairs. This meant there was no continuity of repair service, poor knowledge of the wheelchair history and/or of the consumer’s lifestyle. What had once been managed in a single session by an informed local repair person, now required multiple visits. In addition,
instead of appointments being made to suit the consumer’s schedule, the appointments were allocated according to a centralised booking system. As a result, Consumer Vince delayed booking his centralised repair services until they became urgent. At the time of our interview, he stated his tilt-in-space repositioning feature had operational for several months. His repair reticence was due to the inconvenience of fitting into a centralised repair system, when compared to his original system, where his local repair service fitting into work schedule, to reduce wheelchair downtime.

**Technology Access**

Just as access to local service enhanced decision-making, ready access to expert vendors enabled wheelchair and seating selection. Modular and custom-made wheelchair-seating systems required expert but differing technical and service provision. Access to the appropriate services influenced the ongoing quality of wheelchair performance: the need for specialised and custom-made seating solutions informed decision-making.

At the complex end of the spectrum, custom-built bespoke seating systems required a dedicated team approach, access to workshop expertise and adequate funding for technology. Bespoke seating solutions were the domain of the specialist: the Integrated Service, located in eleven metro-centres in Australia. The seating process was managed within a tightly 5-6 scheduled program. The assessment–prescription process for more complex needs was notably more intense, impacting on the decision-making process, for example: ‘Hands-on and seven, eight, nine people in a room. That can be quite tiring for some people’ (Vendor Bert). Juggling multiple agendas, such as noted above, altered who and how decisions were made. Custom-made technology, supplied by Integrated Services required specific service skills (e.g. for the assessment–prescription and provision-fitting
processes) and this altered the power dynamic in the team when making clinical and technical decisions. As such, the seating approach dictated stakeholder roles and altered the dynamics of decision-making:

Very personality driven [as] seating clinics are so small ... You get some you can work with and it’s all great and it works well. Then you can get someone who you can’t work with. It’s just a bit disastrous. (Clinician Rocko)

The benefit, however was specialised wheelchair-seating production commenced once funding was approved, and as the prototype was made specifically for that consumer, the home-based trial (and re-trials) was less affected by time pressures and rarely suffered technology access challenges. Access to an Integrated Service, with the appropriate seating approach for the consumer’s needs was pivotal.

The seating approach influenced how and when decisions were made. For less complex cases, the accessibility of modular technology accelerated decision-making and enhanced consumer’s engagement in the selection process. The inherent adjustability of modular technology shortened the assessment process. Participating vendors reported a less rigid assessment process for modular seating; as ongoing adjustments for comfort and body change were comparatively simple, occurred within the consumer’s home environment. On-going adjustments to modular technology could be supported by after-sales service convenience and this expedited timely repairs. Timely repairs benefit the wheelchair's performance longevity. Employing modular technology enabled a proactive person-centred approach to wheelchair selection, as noted:

Modular technology can be pulled off the shelf for immediate trial. This allowed for quick decisions and greater consumer involvement. The immediacy of experimenting
with off-the-shelf technology expedited a person-centred selection process: ‘The vast majority of what I do, in this job ... is off-the-shelf prescriptiony-sort of stuff ... if it’s fairly bulk standard and it’s sitting in the equipment scheme, then it’s really quick ... script and get in’ (Clinician Rocko).

Decisions regarding home-based trials of modular technology were however influenced by technology availability and prototype assembly prior to funding approval. Access to specialist vendors with suitable range of technology and skill to fit (and tweak) complex mobility-postural need was significant to successful procurement.

As case complexity increased, however, the selection process altered to accommodate an increasing need. Custom-made solutions were also produced from blending modular technology with bespoke solutions. Blending the two technologies required the specialist vendor and technical services; a Vendor Clinic. Their service mobility was evident across all locations. Many Vendor Clinic acted as the seating consultant in collaboration with the primary therapist, and their expertise was greatly valued. ‘A lot of therapists ultimately outright rely on a good supplier’ (Vendor Paul).

The inherent adjustability of modular technology enabled a shorter, seating service approach and its commercial availability empowered greater person-centredness. The ease of service access for periodic wheelchair and seating adjustments was a deciding factor in final selection. In comparison, participating Integrated Service adhered closely to a seating process as a way to manage busy, complex caseloads. The more sophisticated the wheelchair and seating technology, the more intense the seating service, the greater the knowledge and diverse the skills required. This divested decision-making contributions of
the stakeholders. Participating care providers spoke of having to be assertive family advocates when working with large seating teams running to a seating clinic agenda.

Ready and ease of access to technology solutions influenced decision-making. This was evident in when, how and why participants decided upon refurbished items. The clinical justification required to access refurbished items from a re-issue inventory was less rigorous, often requiring minimal clinical rationalisation. This resulted in the speedy provision of the item: ‘Take in just a [technology] specification form, pretty much, with very limited rationale ... and they will release [the refurbished item] to you. Whereas ... for brand new [technology justification], you’re going to have to do your several pages of rationale’ (Clinician Mia). A re-issue inventory expedited provision of stored refurbished items; and the delays associated with new purchases were avoided: ‘There was an often delay of up to six to twelve months, well mainly six to nine months ... waiting for approval for the purchase of the new wheelchair. If we could recycle a chair ... that would sometimes speed things up’ (Vendor Walter). Access to a re-issue inventory influenced clinical decision-making and technology selection, and helped determine which stakeholders were in control.

**Specialist seating knowledge**

The data expose seating knowledge as an enabling factor. In Australia, this knowledge was predominately centred within the specialist secondary services. They were legitimised as centres of seating excellence, by their dedication to solving complex wheelchair and seating needs. The specialist knowledge held by these excellence centres—Integrated Services and Vendor Clinics—was a valued source of expertise and best practice, as: ‘it’s important to be able to access people’s ideas and knowledge and for that
to be shared with the next organisation I guess’ (Carer Donna). Knowledge is a powerful enabler in building confidence in decision-making and in validating service practices, as previously noted by Mortenson and Miller (2008). Timely supervision afforded in nurturing environments, within excellence centres, builds confident clinical reasoning skills (Cohn, 1989; Higgs & Jones, 2000).

Specifically Integrated Services provided a dedicated service for complex wheeled mobility needs, predominately at the Very Complex and Extremely Complex levels (see Figure 17). Immersion in complex seating needs and individual customised seating solutions built rich databanks of specialist knowledge. The collective expertise of each Integrated Service’s team was immense, as centres of seating excellence, they offered high levels of clinical reasoning and decision-making skills:

I will just run things past [seating specialists] ... to say, Look, what would you do? ...
And also to rule out [options]. Well, I know you provide this and that won’t work for this client; because their parameters are quite defined I actually find that helpful.
(Clinician Betty)

I think neurological understanding, and an anatomical understanding, physiological understanding of the body, like, so really understanding ... how the pelvis is the king of seating. They understand that concept, that’s kind of important. I think it’s actually really hard to find people whose got that, who’ve got that knowledge and that experience. (Clinician Wendy)

A select few Integrated Services formalised their knowledge transfer, some directly during outreach educational sessions, others electronically (elaborated in the next chapter).
Busy caseloads meant seating knowledge was predominately localised, transferred case by case, through consultation. Each Integrated Service operated a unique clinic-based service, where delivery was structured by venue and construction process ran according to scheduled appointments, after funding approval. The manufacturing process, whether on-site or outsourced, determined how and when service were offered, and dictated the team composition. The other seating centres of excellence, the Vendor Clinics, operated a less structured but unique service. Each provided an expert seating service as a value-added in-house service and many also provided an outreach services in regional and rural venues. These expert vendors travelled with extensive specialised technologies and competent skill required to optimise consumer-technology fit. Mobile vendor services encouraged hands-on wheelchair interaction, experimentation and collaborative decision-making across a range of stakeholders. As expert suppliers were immersed in wheelchair and seating technology daily, this informed their decision-making, based on consumer feedback and informal wheelchair evaluation. The data show the Vendor Clinic was a valued seating service of excellence and were sought for their expertise to validate their clinical decision-making, such as provided by these experts: ‘They rely quite heavily on my knowledge’ (Vendor Paul) when ‘matching the right product to the consumer’s needs and environmental demands’ (Vendor Graham). ‘A lot of people ring me for advice so I think there’s a big advisory role to the business’ (Vendor Sarah). ‘They’ll just rely on me knowing, so they’ll just ask me for my advice (Vendor Paul).

While the above secondary seating services demonstrated a high and consistent level of clinical decision-making capacity, there was greater variation at the primary service level. The Networked Team offered the greatest service variation, because of discrepancies
in service funding, service scope, and in team members’ skills. Despite the inconsistency of service competency delivered, the Networked Team structure offered greater decision-making flexibility. Team engagement and decision-making were notably fluid: ‘I expect [suppliers] to work with me and the client to provide them with their needs. It’s a three-way process’ (Clinician Claudia). Team collaboration was a strong feature of the Network Team, as noted by experienced Clinician Wendy:

Had the other pair of eyes look at [consumer goals] from the environment and also person’s and carer’s perspective, and then brought them to the [supplier] and looked at it from the equipment [perspective] and [asked] what can be practically done perspective?

The fluidity of team members’ contributions, the variation in venue (commonly within the consumer’s environment) and the consumer’s capacity to engage were factors that enhanced the decision-making pathway. Decisions made as a Networked Team were collaborative and as the majority of the seating services occurred in the consumer’s home environment, there is greater opportunity for equality in decision-making, control and partnership in knowledge acquisition.

Secondary seating services, such as the Integrated Service and Vendor Clinics, formally educated their seating teams internally, with concerted induction training and through supported on-the-job service immersion. Unlike clinicians working the nurturing seating service, primary therapists relied on informal professional development activities, such as: learning on the job, using their peer networks and from infrequent workshopping. The primary therapists constantly sought resources to build their knowledge bank through self-directed activity. In the absence of formal seating education, these differing training
approaches reflected how service providers made and reflected upon their decision making processes, as an individual provider or as a team.

The four major enabling factors noted in Australian seating servicing were influenced by accumulated knowledge gained through wheelchair use and seating experience, access to local seating services and wheelchair technology, and the contribution from consulting services provided to augment the decision-making process.

In addition to these major enablers, the data expose additional factors used by the participants to overcome or reduce the negative influences applied by the four major inhibiting factors (see Figure 19). This data provide greater depth to the in-depth case study of the Australian seating service experience. These additional factors employed are presented now as ameliorating factors.

**Ameliorating factors**

Participants applied their service experience and knowledge to help correct, ease or manage difficulties encountered. These are described as ameliorating factors and differ from the direct influence applied by enabling factors.

Teamwork, trusted partnerships, a person-centred approach and transparent funding policies were proactively employed by participants to ameliorate some of the difficulties exerted by case complexity, stakeholder inexperience, a fragmented seating service environment, restrictive funding protocols and personal environmental factors. The directional arrows in Figure 19 represent the decision-making influences that helped to overcome the difficult effects of some inhibiting factors.

The first three ameliorating factors, teamwork, trustworthy partnerships and person-centred approach, were closely linked with stakeholders’ accumulated experience with
wheelchair technology knowledge and seating service experience. Experienced participants employed teamwork, worked with trusted partnerships, and applied a person-centred approach to manage case complexity and other stakeholders’ inexperience.

**Teamwork**

A team approach was a service strategy used to manage complex wheelchair-seating caseloads (see Figure 19): ‘We manage our clients as a team. We don’t manage them individually’ (Clinician Tracey). Team communication strengthened team decision-making: ‘So communication-wise I see [the rehabilitation engineer’s] clinical notes ... But, if [he] says to me the client’s coming in, I’ll say is there anything I need to know?’ (Vendor Bert). Blended team clinical and technical skills (either in-house or outsourced) deepened the collaborative approach to problem-solving. ‘The assessment process was done on a holistic approach where we were getting different points of view from the different members of the team’ (Vendor Sam). The above shows the participants applied techniques to cope with the difficulties inherent in complex caseloads and specialised wheelchair procurement.

The seating team construct emerged as a strong influence on who made decisions and how. The team composition, whether multi-disciplinary or multi-skilled and trans-disciplinary, provided a clear decision-making pathway. Multi-disciplinary teams offered nurturing environments and were active in developing early career skills according to assigned roles. However larger teams required solid coordination, as was noted when assembling multiple stakeholders: ‘A time when all the people who need to be in the room, can be in the room’ (Clinician Jane). Team leadership was required to accommodate differing stakeholders’ agendas and reach consensus. Each team member working within a multi-disciplinary team made decisions according to an assigned role, and the coordinator
ensured the team decisions were focused on a common outcome according to the consumer's goals. Strong team coordination with clear team roles assisted manage complex caseloads.

Cohesive multi-skilled teams expedited the decision-making approach, especially with the right clinical–technical skill blend: ‘The assessment process was done on a holistic approach where we were getting different points of view from the different members of the team’ (Vendor Sam). Smaller trans-disciplinary, blended clinical and technical skills
efficiently as team members were equally skilled and competent. They made decisions based on their skill, were less bound by role definitions and made decision quickly when members contributed as respected decision-makers. Building team respect took time, for example 'a good three years' (Clinician Tracey). The smaller, expert multi-skilled team were commonly more mobile, outreach services.

The mobile outreach services were small multi-skilled, coordinated teams, developed over several years: for example ‘two years’ worth of work in terms of our clinician and technician time' (Vendor Freda). Providing mobile services within complex caseloads required team skill, competence and resilience to avoid burnout. Their multi-skilled capacity supported the flexibility needed to make difficult decisions in complex cases: this helped to reduce some of the decision making stress.

Coordinated teamwork nurtured seating skill acquisition, strengthened workforce capacity and clear processes strengthened teamwork and lead to consensus. Teams developed strategies and used these to manage available resources, prioritise referrals and allocate resources (e.g. an effective intake strategy provided service efficiencies). Efficient practices and procedures provided service clarity, expedited decision-making and fast-tracked team members’ clinical thinking and practice. Layered experience as evident in larger multi-disciplinary team provided peer support and timely supervision. Both helped to solidify clinical reasoning, strengthen decision-making skills and expedite service confidence of the less experienced members. This helped to ameliorate the lack of formal education, built trustworthy partnerships needed to manage complex caseloads and these extended peer networks helped divest generational knowledge.
Trustworthy partnerships.

The formation of trusted relationships with expert service providers was a noted strategy used to improve decision-making. Trusted partnerships enhanced the power of team members to reach consensual decisions, and help to overcome inhibiting factors (see Figure 19). Trust built respect among consumer, clinician and vendor and this collaborative approach boosted problem-solving power. ‘I really value some suppliers’ knowledge and experience because this has been their bread and butter and their livelihood for years, far longer than I’ve been in OT’ (Clinician Wendy). Trustworthy partners and efficient working relationships helped cope with complex seating needs, to advance specialised wheelchair procurement in a measured manner.

Long-term relationships.

The value of long-term working relationships was significant. Long-term relationships strengthened the capacity to navigate fragmented and inconsistent service policies and funding protocols. Long collaborative partnerships built service continuity that strengthened consistency in decision-making, built on a shared consumer-wheelchair-lifestyle history. This advanced wheelchair planning in anticipation of funding cycles or funding releases to reduce delays. ‘Continuity of care is fantastic for some of my clients, who through really good management, have managed to keep their level of functioning the same over many years’ (Clinician Bev). Accumulated wheelchair knowledge empowered independent decision-making. ‘We knew that we’d be able to get our own seating system that had worked for 13 years with no pressure marks or anything’ (Carer Cara). Continuity of service provided valuable wheelchair and consumer feedback. This built clinical
decision-making confidence, enabled anticipatory planning: strategies used proactively to facilitate timely wheelchair procurement.

Strong carer support was harnessed to strengthen collaborative decision-making focused on the consumer’s needs and goals. This was highlighted by Consumer Vince who applied skills learnt from his father, to confidently upgrade his current wheelchair-seating system: ‘I was very, very lucky that I had him for many years. So this time I did it more independently ... I basically approached it the same way Dad would’. Care providers who collaborated with their family members strengthened their collective confidence and power to make choices. ‘We were fully in the process completely and [we] completely had control of it’ (Carer Cara). Collective decision-making built confidence, this expedited the procurement process.

Person-centred Approach

A person-centred seating approach was proactively used to enhance stakeholder’s decision-making. An effective person-centred approach helped educate consumers (and their care providers) to manage multiple complexities: fragmented seating service and complex funding environments (see Figure 19). A collaborative person-based service approach worked best when all stakeholders were in equal partnership. Participants described the strategies they used to bolster their person-centred decision-making including: collaborative knowledge exchange, consumer-driven wheelchair trials and home-based services.

A person-centred seating approach was built on honesty and respect for the consumer’s social, cultural and community mores. Understanding the socio-cultural environment in which the seating service operated impacts on how decisions were made.
One example provided—by a rural consumer who worked in rural health—noted an indigenous attitude to health differed from a non-indigenous approach. Spinal injury acquired from car trauma was not acknowledged within the aboriginal cultural context: that is, vehicular trauma was alien to remote aboriginal culture as a car was considered a western concept. As a consequence, managing pressure care associated with car trauma was perceived as culturally irrelevant: ‘They didn’t bother with wound care, they didn’t bother with lots of things because that was a white man’s problem and not [theirs]; because it was a white [concept] it was from a car accident’ (Consumer Christine). Again as a consequence, many indigenous Australians living in remote communities did not opt into mainstream health-education services. Therefore, Aboriginal Liaison Officers were employed as culturally sensitive health workers to bridge the gap between western and aboriginal attitudes to health. An effective, culturally-centred approach was to address, exchange and transfer cultural sensitivities by employing informed, culturally relevant, wheelchair peers, as suggested:

Like a wheelchair user [who was] an Aboriginal Liaison Officer. They’re in a really important position, a real link often to a lot of appointments ... someone that can train, sort of user skills and all that kind of stuff around wheelchair use. That’s the kind of person that can do follow up in community as well (Clinician Cam).

Acculturated service providers recognised that educating remote communities in the appropriate use of wheelchair technology was of particular importance to overcome the inappropriate use of wheelchairs, as considered here: ‘Grandma’s chair ... had three kids on it during the wet season and they’d surfed it down into the creek ... and snapped a front castor off’ (Clinician Rocko). Repairing wheelchairs in remote rural Australia was
challenging; but timely wheelchair education delivered by a trusted member might alleviate wheelchair damage done by what some might perceive as misuse of essential equipment.

As distances in rural Australia are vast, skilled service providers travelled with spare parts for on-site repairs, acculturated clinicians learnt to work and think within the cultural mores of each community. Spending time with the people in community generated trust. Known, acculturated service providers employed their service time creatively to learn about and understand how wheelchair technology was used in various regional or rural contexts:

You used to travel with a couple of spare wheelchairs in the car so you could strip them [for parts] as much as anything else …. I found it really handy. You gives you time with the client. You sit on the front veranda and pull the chair apart and put it back together again, you’ve an hour to fill and chat. It gives a really nice non-confrontalistic chance to get along (Clinician Rocko).

Service flexibility, informality and easy access to wheelchair technology and seating service providers reduced the pressure on decision-making. Regional and rural service provision tended to be flexible, to fit with community needs: ‘A lot of things do happen less formally at times, it’s a small town, people are always coming off the street, knocking on the door ... with a small job to do and we’ll just do it’ (Clinician Cam). Service informality helped ease service demand, as timely wheelchair maintenance reduced urgent repair work.

A home-based trial empowered greater consumer involvement in the evaluation of the wheelchair fit with their occupational, family and environmental context. Understanding family dynamics and time to experiment with suitable technology in the consumer’s routine environments enhanced selection confidence and influenced the quality of the decision-making process.
Providing home-based services were appreciated, but resource intense. The travel time in providing home-based services influenced service provision: on the duration and quality of each seating service, on the range and appropriateness of technology provided and influenced any service follow-up. Distance limited wheelchair selection, as suppliers were limited in the number of options they can transport, so non-metro consumers were presented with fewer options. To cope, experienced participants recognised these factors influenced their decision making and proactively used peer connectivity (actual and electronic) to enhance their knowledge exchange, intensified their interactive communication pre-service for better planning. These boosted their service provision.

**Transparent Service Policies**

Transparency in service provision and funding protocols were recommended as ways of ameliorating forces applied by a fragmented seating service sector and restrictive funding protocols (see Figure 19). This study highlights several strategies used to enhance service transparency including: allowing adequate service, transparent service and funding practices. Allowing adequate service time to listen carefully to consumers and their care providers enabled two-way exchange and empowered informed decision-making, built trust and honesty for greater service transparency, as noted below:

Whilst time and efficiency is important, I guess what I’ve learnt is: a carer, a parent, a service user would rather me say, Listen, I’m not sure what I’m going to do about this. I need to think about it. I need to discuss it ... That honesty and that openness, I think wins both ways. (Clinician Belle)

Participants requested honest, unbiased appraisal of the application of wheelchair and seating technology within specific applications or environment. Open communication,
attending to service feedback and delivering services as promised were important elements of service transparency. Transparent person-centred decision-making was most effective when undertaken in open collaboration.

Sustainable service funding provided transparency as known budget funds assisted planning: that is service providers could plan ahead and utilise resources effectively. Consistent funding flow helped services determine the caseloads they could manage efficiently, kept teams focused on production rather than financing, avoided technology backlogs and assisted the viability of the wheelchair supply. Business viability was directly linked to ongoing wheelchair purchases and to responsive payment by funding agents. Ongoing customer trade sustained wheelchair businesses and therefore seating service sector.

Aligned to funding transparency, participants recommended an open disclosure policy of their funding application progress. An open-book approach to the funding application process helped ameliorate the stress associated with unexpected funding shortfalls and this advanced informed planning: ‘If they were more transparent in what stage of your application is; if they could give an average wait time ... then you could make decisions around that’ (Consumer Brian). Anticipatory planning activated by transparency in service and funding procedures and helped reduce participant stress associated with the unknown.

Summary

This chapter has presented the data analysis finding from a decision making perspective. The power of the stakeholders' decision making was inhibiting by a predominately metro-centric seating service sector governed by fragmented funding
programs. Service transparency and funding program disclosure were recommended to facilitate a preferred person-centred service approach to collaborative decision making. Decision-making capacity was enhanced by: accrued seating knowledge and experience, the formation of long-term trustworthy partnerships and adequate allocation of time, resources and expertise according to consumer need. These helped to ameliorate difficulties in dealing with complex caseloads, a fragmented seating service environment and restrictive funding protocols currently in use in Australia.

The factors outlined in this chapter build a deeper picture of how, when, why and who make decisions and how this impacts on specialised wheelchair procurement and seating services in an Australian context. The data collected from the second analytical phase, pertaining to decision making adds, expands and contextualises the themes identified from the first analytical phase. This expands the quality and depth of data collected to explore the Australian seating service experience as informed by an in-depth case study approach.
CHAPTER SEVEN:
A Social Justice Perspective on the Australian Seating Service Experience

In this chapter the study findings are interpreted and critiqued for relevance to seating service provision within an Australian context, using a social justice lens. That is, this chapter will present and discuss findings, to explore the data for nuance that distinguish the Australian seating service experience as unique, or not, to international evidence.

The interpretation of the data were informed by the social justice lens, based on Rawls’ three principles of social justice: greatest equal liberty, difference, and fair equality of opportunity. Table 12 provides a brief description of these Rawlsian principles.

| Table 12 Rawls’s guiding principles applied to Australian seating service experience |
| 1. The Principle of Greatest Equal Liberty: Equal access to specialised specialist services and wheelchair-seating technology to all Australians with mobility disability need. |
| 2. The Principle of Difference: Appropriate allocation of necessary resources based on individual postural mobility need. |

All three major themes: equality, equity, and equal opportunity were evident in the data. Each of these social justice themes is discussed pertaining to their influence in empowering control and choice of timely access to seating services and appropriate
wheelchair procurement. Impacts on consumers and care providers who encountered restrictions to access and technology are also presented. The discussion of the findings are presented in past tense and their relevance to contemporary service provision in the present tense.

As each major theme contains sub-themes, Figure 20 presents those that describe the Australian seating service experience from a social justice perspective. The first theme, equality, presents the factors that control equal access to suitable and competent seating service provision across Australia. The second theme, equity, presents the factors that influence the provision of appropriate seating services to meet a range of complex postural and mobility needs. The third theme, equal opportunity, presents the factors that empower or inhibit consumers’ capacity to engage in community participation and the impact on them and their family when this is not realised.
Figure 20 A social justice view of Australian seating servicing

Key WC=Wheelchair; NDIS=National Disability Insurance Scheme

Equality

The theme of equality links successful wheelchair procurement to timely access of the collective: specialist services, appropriate wheelchair-seating options and adequate funding for provision. The four sub-themes pertaining to the theme of equality are: seating service access, service provision, professional education, and funding access.

Seating service access.

Ease of access to suitable seating services is linked to timely access to wheelchair-seating technology. Service access was decided by the consumer’s disability, notably
access to spinal or non-spinal related services. Access to spinal seating services provided
greater consumer access to service resources; the same equitable service access was not
evident with non-spinal seating service in available resource or service access.

The spinal services were considerably more comprehensive for those deemed eligible.
Each Australian state provided a range of health funded spinal seating services that offered
state-wide services to eligible spinal injured consumers. Their eligibility included
comprehensive spinal service access to: a clinic-based service as inpatients, a community-
based mobile service and an spinal outreach service for regional and rural areas.

Participants living with spinal injury enjoyed access equality: that is fair access to
specialist spinal seating services throughout Australia as service eligibility is based on their
spinal injury. Once eligible, consumers benefitted from life-long access to health-funded
spinal services, including seating servicing as a metro-based spinal clinic or a spinal
outreach program (or a combination of both services).

The spinal seating service model, that is, a clinic-based service with an outreach
seating service, is identified as the most comprehensive, accessible and equitable form of
seating service delivery. The spinal service model provides service continuity for eligible
consumers. This continuity of seating service benefitted subsequent wheelchair and seating
upgrades, addressed pressure care needs to enhance their long-term health. Such benefits of
service continuity were described by one experienced consumer, Max whose enduring
service relationship was with one vendor only, as: ‘I haven’t had the experience of a
different engineer working on it, right ... So I don’t know whether one of his staff would be
the same’. Long-term, enduring relationships empower working collaborations and as
previously noted, partnership equality energise decision making capacity.
While equal access to state-wide spinal service was evident, some service variations were noted for regional and rural consumers accessing metro-based services. This variation was accorded to the metro-based service's scope which may mean consumers, depending on their location, were provided a spinal seating services from different service providers for spinal outreach and for clinic-service. That is mobile and clinic-based service caseloads were location bound. When service providers alternated, the importance of effective team communication and sharing of consumer data for service continuity were highlighted. The spinal seating services tended to apply both modular and custom-made technologies while adapted modular seating approach was preferred by the mobile spinal services.

Service access discrepancies are evident when comparing the seating services for differing mobility and postural needs: for example trauma related injury and lifelong disability. The participants who worked in spinal injury and rehabilitation noted seating complexity differed when compared with life-lived disabilities not related to injury. Clinician Claudia compared her spinal-specific caseload with her expectations of providing seating services for non-spinal seating referrals: ‘I think, you know, spinal cord injury is obviously, even, a lot more simple than lots of the other seating things. You know, [when compared to] people with cerebral palsy or the different acquired brain injuries’. Claudia alludes to the wheelchair and seating needs for people with spinal injury are determined by predicable spinal neurological pathways and therefore develop according to consistent continuum.

In contrast, services for non-related spinal conditions - such as cerebral palsy or acquired brain impairment - located in the disability sector were, despite presenting greater and unique seating complexity related to their cerebral neurological anomalies, not well
resourced. Such life-lived disabilities rarely presented postural consistency and thus required unique, bespoke solutions from specialist services, and a custom-made approach was preferred. Participants stated experiencing greater challenges in accessing specialist seating services for non-spinal conditions. The services for non-spinal disabilities varied from state to state, by cohort, age and disability and were funded variously with non-government coffers. The non-spinal cohort did not have equal and fair service access, when compared to their spinal cohort.

Further access discrepancies were evident in services located in the disability sector (when compared to health), as each seating service was operated by a range of different host disability organisations. Added to which, many non-spinal seating services were funded differently by not-for-profit host organisations. Differences in service funding resulted in differing service access and service scope. For example, the not-for-profit disability sector rarely provided comprehensive life-long service; as such, service funding dictated their service scope (i.e. as children or adult services) or funding brief (i.e. for cerebral palsy or muscular dystrophy) and most often provided a metro-based service. A non-spinal seating service rarely offered a mobile seating service, instead many provided a single annual outreach clinic. As a result, there were less seating service options available for consumers living with non-spinal mobility disability; and even less if residing outside metro-Australia.

Unlike the relative seamless spinal seating services, consumers accessing non-spinal services experienced service interruption when transitioning from school to adult services. Again, unlike their spinal peers, relocating from one Australian state to another caused major service interruptions. Service transitions forced changes to providers and often
caused interruptions to service eligibility, provision and funding flow. Service disruption was commonly associated with long delays in reinstatement of entitlement and timely wheelchair seating procurement. As the wheelchair is considered a basic human right by Gowran (2012) and her colleagues (2011; 2012), delays in specialised wheelchair procurement are considered unjust.

In general, the services delivered via the Networked Team provided some equality of access, enhanced by their provision in the consumer’s home environment. Locally based service providers were often known, and tended to take a person-centred approach to each referral. The Networked Team approach provided flexible services designed to meet individual needs, as noted: ‘The service I worked with was really also very flexible and let us have a level of, I guess, customisation and, and ability to sort of prescribe right down to whatever the person needed’ (Clinician Jane). Participants aligned a person-centred service approach with one that took time to allow for the consumer’s needs to being heard, and aligned this to providing greater equality of access. A person-centred service approach encouraged consumers’ involvement in the wheelchair procurement process. Greater consumer involvement is linked to empowerment (Plummer, 2010) and leads to equality in working partnerships for enhanced wheelchair outcomes. The service provided by the Networked Team approach is aligned to the Rawlsian philosophy of equality in service accessibility, however as individual teams were inconsistently and often inadequately resourced, their capacity to provide seating service of equal quality was not universally realised.

Consumers’ perceptions of service participation and equality are related to whether they were engaged and empowered during the seating service process. Feelings of
inequality as a team member were expressed both by inexperienced, or unwell consumers and by some disempowered care providers who acted as advocate decision-makers. The novice consumers reported being overwhelmed by the all-consuming intensity of the seating service process. As inexperienced wheelchair occupants, these novices stated needing time to acquire the necessary knowledge in order to participate equally within the seating team. Novices experienced less control in making wheelchair choices and as inexperienced stakeholders, were more reliant on experienced service providers.

Two carers who acted as advocate decision-makers reported feeling less than equal participants when working with large seating teams. They reported needing to be assertive advocates to be included as equals in the process. These family advocates noted it takes time to develop the required trust and respect necessary for building partnership equality. To do so requires continuity of a seating service that empowers the working partnerships of service recipients and providers.

The more complex the wheeled mobility need, the more intense the seating service process. Some of the Integrated Services required five or even six provision-fitting sessions before the first home-based trial. This level of service complexity was exhausting, tended to alienate (all but the most experienced) and thus disempowered less confident consumers. ‘I’m certainly not an expert on seating clinics but other people that I’ve spoken to [have] ... said that you don’t really get an independent view’ (Consumer Max). The multi-disciplinary team driven by the production process (i.e. production, provision and fitting of custom-made seating systems) tended to dominate, as a team-driven culture. The combination of complex busy caseloads and the specialised nature of some of the processes (e.g. assessment, constructing and fitting) are noted as less conducive to engaging the
consumer, unless informed by a consumer-inclusion service approach. The experienced participants who established long-term relationships experienced greater power and equality in the team. Of greater relevance, these experienced participants proactively formed equal and collaborative one-on-one partnerships with individual providers. Of note, trusted partnerships are formed with preferred individuals rather than with teams, and return to a service because they trust a preferred supplier, or a technician, or an occupational therapist.

The application of modular technology enhances consumer involvement in seating services. Greater involvement positively tips the balance that equalises team partnerships. The availability of off-the-shelf modular technology encourages experimentation. Active experimentation engages the consumer and care provider and empowers their team partnership through collaborative decision making. Consumer engagement and modular technology empowers a team partnership. A paediatric seating team operated a ‘Have a Go Day’ (Clinician Mia) designed for children who had little opportunity to trial various forms of powered mobility. This type of experimental event was aimed at encouraging greater consumer engagement through playful trials, as noted:

We called it a ‘flying carpet’, which was a [wheelchair] base, and we put their existing tilt-in-space [seating system] on the wheelchair ... big head array and switches … [and plenty of space] giving them some access [to powered mobility] (Clinician Mia).

Such an trial approach empowers consumer collaboration in wheelchair technology selection, through practical hands-on experiences. Greater team member collaboration that empowers is aligned with the Rawls’ equality philosophy. Equality is enhanced by
accepting the contributions of the consumers and their care providers as equal within the seating team during wheelchair selection.

However, equality in consumer contribution or choice of wheelchair technology was not universal. While a home-based trial empowers consumers’ contribution, accessing the suitable modular technologies for a trial challenged their control and choice. There was a greater demand for modular trial prototypes than available modular stock. Unavailable or inadequate trial prototypes adversely influenced the quality of a home-based trial, because inadequate trial time, or poorly assembled or coordinated trial prototypes reduced true experimentation in the environments of use. An inadequate wheelchair trial is linked to poor outcomes. This is despite the WHO (2008) recommendations as noted by Vendor Freda, who raised her frustrations associated with accessing trial prototypes even in a large capital city: ‘the World Health Organisation’s guide to wheelchairs in less resourced settings says someone should have a four week trial of equipment. Even in metro-Sydney, it can be hard to get [a trial product] for more than four hours’. Added to the paucity of prototype stock, access to scripted trial prototypes was dependent upon the supplier’s motivation and resourcefulness in assembly and adjustment. The more resourceful wheelchair suppliers provided better service. Adjusting sophisticated modular wheelchair systems requires ready access to competent technical services, so timely access to a proficient supplier permits a better service. Consumers who were not metro-based faced greater challenges in accessing expertise and in the range of suitable technology options. Their access to equal service was notably less to that of metro-based participants, and is discussed next.
Service provision.

An inequality in the provision of seating services is noted across Australia. Differences are noted in the competence of the secondary seating service when compared with the seating service provided at a primary service level. The primary level of seating service delivered by the Networked Team was noted as the most accessible service type, but the competence of the members of any Networked Team varied widely. The secondary level of specialist service delivered by dedicated service providers operated a limited number of Integrated Services and Vendor Clinics (the majority metro-based). Participants who accessed an Integrated Service expected to receive competent consultation and seating services, but were bound by service accessibility and eligibility restrictions. Those who accessed a Vendor Clinic returned for subsequent upgrades because they provided good wheelchair outcomes and satisfactory services into their home environment.

Seating service variation is dependent on service competence, the team members’ clinical interest, and their depth of seating experience as well as their geographical location. Most of the regional and rural Networked Teams described in the study, were formed by local service providers often working as solo providers and driven by personal motivators. For example, Nadia, a regionally-based clinician stated the seating service she provided was driven by her clinical interest: ‘I think a lot of it depends on the individual clinicians and the experience they’ve got. I mean I’m doing this because I’m interested in seating but the previous therapist was interested in other things’. As alluded to by Nadia, regional services were often operated by single clinicians or by small teams. Small regional and rural seating services were directly influenced by staff expertise, staff retention and turnover: ‘[Rural] therapy services are busy [and] ... often therapy personnel are young.'
[The preferred] user friendly service [needs to be] flexible and culturally sensitive, as one size does not fit everyone’ (Consumer Christine). Providing flexible and culturally sensitive services require greater seating expertise and service continuity aligned to culturally specific knowledge. The difficulties experience in recruiting and retaining seating expertise in regional and rural Australia challenged providing equal seating service provision.

An inequality of seating service provision is evident when services delivered by non-metro and metro-based services are compared. Unequal access to services is clear, as the majority of secondary seating services were metro-based, further compounded by 19 Integrated Services, being governed and restricted by service eligibility. Therefore, the participant’s location restricts service provision options and restrictive eligibility criteria limit service choice. By comparison, the flexible service delivered by most Vendor Clinics offers greater equality of service access by delivering services into the consumer’s home environments, across metro and non-metro Australian locations.

Again the quality of services accessed was not equal within the consumer cohort. Consumers with good networks experienced greater access to the seating options, as their insider knowledge alerted them to service competence, funding availability and innovative technology options. Insider knowledge, service experience and quality networking empower consumer’s control and enhance their choices. In addition, experienced consumers proactively employed their networks to enhance the performance of their wheelchair-seating systems: that is, seeking informal assistance for unexpected repairs (tyre changes, tweaking seating for comfort).

The quality of service provision is dependent on the competence, skills and experience of the service team for their specific caseload. As noted, proficient service
providers provide consistently better wheelchair outcomes and as a result win return business.

**Professional education.**

An inequality in seating service competence and education was linked to the lack of a universal seating education program operating in Australia (2010-2014). Access to available fragmented seating education events is problematic, further hindered by the sparse Australian geography that makes attending metro-based workshops challenging. Therefore metro-based service providers working in a team have greater access to educational opportunities, then their non-metro based peers.

The only alternative to education was informally on-the-job training. The degree and quality of internal training or educational events were linked to the service level, type of service delivered and its purpose intent resources. Specialist seating services provided concerted induction and regular internal training dedicated to meeting a specific seating caseload (core business). Primary seating services rarely did unless seating servicing was a core business. In general, the competence of the primary therapist was reliant on the quality of their proactive self-directed learning activity. The greater clinical experience the more proactive was their knowledge seeking and sharing activity.

Aligned to fragmented educational opportunities, the lack of professional development and career structure were raised as industry issues. Equal access to a flexible national approach to education aligned to professional development that accommodates regional diversity is needed. Logistics of accessing centralised educational events are however challenged by the Australian geography, as noted: ‘the fact that everybody’s interstate and all around the place, it’s very hard to organise anything [centrally]’ (Clinician
Alternate educational formatting is required to accommodate a fragmented seating sector that finds attending metro-based workshops challenging. This is of particular concern for solo clinicians working in regional and rural locations, who rarely have access to worker relief: ‘It’s very hard for them to get the time off and it’s a long way to travel, so it’d be overnight trips for some of them’ (Clinician Patty).

One alternate education approach delivered interactive state-wide educational material electronically (via Webinar), by providing the same data equally across a diverse audience at the same time: ‘In Webinar you can preload the platform to allow for everything from discussions, everyone sharing and doing drawing on a white board, all the educational tools that you need for interactivity’ (Clinician Paula). A Webinar approach allows equal access to information and discussion material despite geographical spread. This exemplifies equality of access to seating education, knowledge exchange and information transfer. There is an urgent need for an accessible national program of seating education.

While clinicians expressed a greater need for universal education, the need for an ongoing accredited education program that challenges participants at all levels of clinical and technical experience is apparent: ‘If I can wave my magic wand, there would be a great course I could send a new technician too. That’d be great! You know, something that is good and accredited’ (Clinician Bev). The need for an accredited training system is aligned to service equality and consistency in seating competence throughout Australia. An accredited prescriber denotes a level of competence. Clarity of service provider competence expedites the procurement process, as noted: ‘that way when we got your [accredited prescriber’s] prescription form we felt you were capable of making that prescription, and
we would go on your say so’ (Clinician Wendy). An accredited professional education ensures uniform, seating service competence. Unified endorsement of partitioner and service competence provides transparency and assists stakeholders make informed and sound decisions. Finally, the request for an accredited national educational program is aimed at unifying and consolidating the seating workforce. A consistent, competent and capable workforce empowers service consistency across all Australians involved in wheelchair procurement and seating services. Seating service consistency is also linked to a unified policy of retaining expertise and knowledge within the sector. The need to capture and transfer the knowledge of experienced seating practitioners to the next generation is needed, especially as many experienced colleagues are exiting with their extensive knowledge. In essence, the seating service sector needs career structure for organised service progression: enlightened contingency planning to encourage new graduates in, aligned with proactive career pathways to retain existing expertise for the longevity a future generations of service providers, as reflected upon below:

We tend to have a lot of experienced clinicians, but I think maintaining them is important. Maintaining the number of staff with clinical experience, especially for new grads, because if all of a sudden all the senior staff left, the younger staff, or the less experienced staff, wouldn’t be able to give an effective service because all that knowledge would go [when they depart]. (Clinician Talia)

Equality in professional development requires a national approach where career growth is linked to viable career pathways. The existing small Australian seating sector lacks a credible career pathway to sustain expertise. This sentiment was evident, as Clinician Jon shared his frustrations associated with current lack of career choices:
The career paths are a little bit stunted I think ... that is a bit of an issue because you see quite often ... where you get really experienced staff going into management positions because that is the only way for them to go otherwise, which quite often the people on the floor and the clients are going to lose out. Well if you could get some more career path planning for people, you could keep more experienced staff in positions that would be beneficial for the consumer, yes.

Added to the above concern, the smallness the Australian seating service sector was poorly resourced to empower the next generation of service providers. Skeleton seating teams are ineffectual as training environments: ‘[Services] cut things to the bone, reduce their training to such an extent that if something is going wrong, they have no one to refer to, there’s no specialist seating person they can bring in to deal with it’ (Vendor Walter). A cycle of diminishing seating service capacity, lack of career pathways and poor service resourcing are all identified barriers to building a robust seating service.

Building work capacity linked to career incentives is designed to retain seating expertise. A viable seating service sector requires layering of service experiences: expert to novice. The nurturing seating team environment, as in the multi-disciplinary team, is recognised as best seating environment for early career learning, provides support for junior members and leadership roles for senior members. Diversely experienced team ensures greater workforce capacity, for now and into the future. The sector needs resourced seating team environments (nurturing seating hubs) to expedite early career development, to support leadership aspirations, to inspire evidence based activity to build workforce capacity. Workforce capacity, quality service and team member competence are linked to equitable access to ongoing professional development. To do this the sector needs a viable,
sustainably resourced hub of centres of seating excellence to provide service leadership, proactive career and service planning for a sustainable seating service. This the challenging role of the secondary level of services - Integrated Services and Vendor Clinics - to provide aspirational service and practitioner excellence.

**Funding access.**

Inspiring service excellence within a fragmented funding environment tests person-centred wheelchair procurements. As noted, systemic inequality exists where parallel funding systems unequally fund wheelchair procurement: the non-compensable and compensable funded systems. Compensable consumers are better serviced, intentionally resourced and provided with greater choice than the majority of non-compensable consumers. Adequate funding enhances choices: ‘If someone’s got compensable [funding], they’ve got the money for it, and it’s more of a personal choice for them’ (Clinician Laura). Funding restrictions reduce choices. This funding inequality is most obvious when compensable and non-compensable consumers are provided services in parallel, as in spinal rehabilitation. Consumer Bea eloquently describes her generous compensable wheelchair outcome with her non-compensable peers: ‘The only reason I got both [a manual and a power chair] was because of insurance [funding], if I was a normal [non-compensable] person it would have been one or the other [wheelchair, not both]’. This highlights systemised inequity that exists in parallel, where Bea’s non-compensable peer received a single government-funded wheelchair for all occupations, while she, as an insurance recipient, received wheelchairs to suit holistic needs. That is, Bea received a power chair for her community participation and an ultra-lightweight wheelchair to accommodate her carer’s manual handling needs. As such, compensable consumers experienced greater
control of their choices in service selection, in wheelchair technology, and in their seating approaches. Unequal funding systems operating in parallel result in inequality of service choices and are linked to inequitable wheelchair procurements that influence the quality of each outcome.

Inequitable Australian funding protocols (at the time of data collection in 2011–2012) undermined equality of access to service and technology. Prescribing clinicians spoke of altering their prescription behaviour depending on the source of funding, as noted when prescribing for newly injured in spinal rehabilitation: ‘Most of our clients are non-compensable ... unless they were pursuing [sophisticated wheelchair options] and they wanted it for themselves we wouldn’t necessarily introduce [sophisticated wheelchair options] as an idea [during initial prescription]’ (Clinician Laura). Clinician Laura asserted that within her spinal unit, sophisticated wheelchair options were not routinely considered for non-compensable novice consumers following spinal injury, due to governmental funding protocols. Funding protocols subverted optimal wheelchair prescriptions. By comparison, novice Bea’s insurance agent requested sophisticated wheelchair based on her need, during her spinal rehabilitation.

Additional funding inequality exist between the different Australian states. As shown in Figure 21, state-run funding programs dispensed funds for partial wheelchair provision (subsidy-scheme), or technology from a stockpile (inventory-listed) or according to consumer need (needs-based). Figure 21 depicts how each of these three funding types impact on the equality of wheelchair procurement. The needs-based approach is the most person-centred, distributing funds according to need. This however provides the greatest flexibility in choosing non-standard technology and components. The needs-based
approach prioritises funding for consumers with very complex needs, giving them a greater share of the funding available. As such the greater need acquires greater funding. As funding resources are finite, consumers with urgent need are prioritised, leading to a government imposed and endorsed procurement inequality.

Figure 21 Funding equity & access equality by three funding protocol type

Greater funding equality is noted when standard wheelchair and seating technologies are provided via inventory-listed and subsidy-scheme approaches. The confounding factor however, is these systems’ lack of flexibility as they rarely stock non-standard wheelchair technology, as they do for standard technology. The most inflexible is the inventory-listed system, where consumers who require non-standard wheelchair related technology suffer
lengthy procurement as their requests are processed separately by an equipment panel. The subsidy-scheme approach allocates funds according to unit cost and do so in an attempt at funding equality. Participants with non-standard needs criticised this too for its inflexibility that equates to inequality as complex needs requires more expensive non-standard technologies and therefore require additional funding. Accessing additional funding prolongs the procurement process: again endorses systemised inequality.

As noted in Figure 21, funding fairness is evident when specialised wheelchair procurement is based on need. While funding equality is evident for standard wheelchair procurement through subsidy-scheme and inventory-listed funding, this is not evident for non-standard wheelchair and seating technology. It is common for additional funding (to top-up) a purchase of non-standard wheelchair and seating technology. Again, implying inequality, there is a noted inconsistency to acquiring top-up funding.

Consumers who are well supported are better able to access top-up funding, as evident: ‘I had one mother who found most of the money for her daughter for ... [acquired] equipment up front of it, but I don’t think a lot of people are quite that tenacious’ (Vendor Tom). Consumers with proactive care support systems experienced a greater funding advantage over those without supportive carer networks. Similar inequality is noted in the clinicians’ capacity to find top-up funding to close funding gaps. While some clinicians proactively approached numerous possible funding sources, until successful; other busy clinicians returned the top-up funding task to the consumer or family to persist, after a single source was approached, unsuccessfully. This service inconsistency in seeking and winning additional funding compounds to the inequitable procurement of non-standard wheelchair technology.
The greatest inequality in specialised wheelchair procurement is associated with consumer location. As noted service access to flexible spinal seating services across metro and non-metro locations was relatively equal. Conversely, there was considerable less choice or access to non-spinal specialist seating services and this was further challenged by consumer location. Participants who were not within easy access of specialist service provision, incurred greater travel expense, enjoyed less service choice, time and attention and its inconvenience curtailed their service participation. Distance impacts on discretionary service provision. In addition, as most Integrated Service is metro-centric, each operates uniquely, there is minimal service equality evident: in either service delivery and in specialised wheelchair procurement. Furthermore, non-metro participants enjoyed less choices in specialist seating technology, services or after-sale services, when compared to their metro-based peers.

Equality to specialised wheelchair procurement is negatively impacted by systemised funding systems that operate two opposing systems, in parallel, one more generously person-centred than the other. The funding inequality is further compounded by three different funding protocols that provide technology according to an inequitable distribution systems, one marginally more person-centred, than the others. The consumer’s geographical location conflicts with service access equality, as metric-centred specialist seating services favour those within easy access. Easy access to specialist services meant timely service access, greater service attention and specialisation; this allowed trusting partnerships to develop and collaborate equally. In addition, greater equality of service provision requires a considered, progressive service coordination to build, educate, sustain and accredit service competence and extend equal service reach across the nation. The
current inequitable seating service capacity and reach are concerning for a consumer-driven
NDIS environment. An empowered consumer cohort demands resilient service
specialisation and sophisticated technology access for proactive wheelchair procurement, to
suit their needs, close to home.

**Equity**

Equity is the second social justice theme to emerge from the data. Equity is the fair
distribution of basic resources (Buchanan, 1980). The distribution of adequate resources to
provide an appropriate wheelchair system, based on each consumer’s need, is aligned to the
second Rawlsian philosophy of difference (see Table 12). The theme of equity is evident
when participants spoke of acquiring adequate funding to enable person-centred wheelchair
selection. Five sub-themes pertaining to the theme of equity are found: funding, person-
centredness, specialist services, service resources and wheelchair appropriateness. The
Rawlsian philosophy of difference advocates for distribution of essential resources as a
basic right; therefore access to specialist seating services should be considered an essential
resource in providing a basic human right: healthy, safe and reliable human mobility. This
is consistent with the literature that endorses enabling human mobility with an appropriate
wheelchair and seating system (Gowran, 2012; Mortenson & Miller, 2008; Plummer,
2010).

**Funding.**

Optimal wheelchair technology provision requires adequate funds, as noted by
Consumers Sarina and Mac who stated their mobility was dependent on appropriate
wheelchair provision that is: as a basic requirement. Based on the Rawlsian philosophy of
difference, insufficient funding that fails to enable consumer’s wheeled mobility is both
socially and ethically unjust (Gowran, 2012; Plummer, 2010). Such an example of social injustice was shared by Clinician Jane. Her consumer was forced to make unacceptable ‘choices’, when confronted with actual needs and inadequate funds, as: ‘Do you choose to get a new wheelchair? Or do you choose to be incontinent for four hours a day, sitting in your own urine? That’s not really a great choice to have to make’. Inadequate funding prevents making appropriate choices, forcing an unjust outcome as indicated by Jane where her consumer had to decide between two choices that affected his personal health; i.e. using available funds for healthy continence care or to fund a much needed wheelchair for safe mobility and postural care.

Successful wheelchair outcomes mean greater consumer wellbeing, as noted by Chan & Chan (2007). Equitable funding access is linked to appropriate wheelchair provision and therefore successful mobility. The funding variations evident across Australia adversely affects appropriate access to adequate support and appropriate technology. Variation of procurement outcomes accorded to inadequate funding and support are inequitable:

Not everybody is equitable in their ability to get money for equipment and if someone, even though someone might need equipment just as much as the next person, they don’t have the same access to the money or the care [provision]; and you see very different, big differences in someone’s life, depending on their level of care, and their level of funding assistance for equipment. (Clinician Laura)

Funding variations are starkly noted when two different systems functioned in parallel. This was noted where within the same spinal rehabilitation unit individual wheelchair procurement was affected by access to either a compensable and non-compensable system. Further funding equity is noted when consumers are considered
ineligible for government funding. Lack of funding control constricts choice-making, as was exemplified in Table 13. The systemised disempowerment experienced by Hallie, a regional consumer is described below.

Table 13 Case example 7: Consumer Hallie’s choices are systematically disempowered

| At the time of our interview, Hallie was a young mother of two young sons who lived in regional Australia. Her rare health condition was poorly understood, as her physical performance fluctuated hourly. Hallie’s health condition made sustained upright sitting difficult as she experienced severe fatigue due to postural orthostatic tachycardia syndrome (POTS). She was hospitalised for a prolonged period and eventually discharged to a care facility as her family could not provide adequate daily care, as a wheelchair occupant. Her health condition was not considered permanently disabling (even though she sit for very limited time); therefore she was not funding-eligible. Furthermore, she was not supplied with a hospital wheelchair as she was not discharged home but directly to a care facility (where she recuperated for eleven years).

Hallie’s insight into the systemised inequity she experience is revealing: ‘Even if I met the [funding] criteria of having a permanent illness, they said there’s an 18 month waiting list [for wheelchair approval] and you think: Wait, I’m getting discharged from the hospital. How am I meant to get around? Do you expect me to crawl around on the floor? I just, I didn’t understand that process!’

Hallie was unable to mobilise, however was discharged to the local aged care facility without a loan wheelchair. She shared a communal standard wheelchair with her other
residents. Eventually she self-funded a second-hand manual chair as she could not afford to purchase the appropriate, but more expensive ultra-light wheelchair needed.

The social injustice experienced by Hallie continued. After several years she was provided with a tailored carer support package to assist her to participate in community activities. Hallie did not have control of her carer support package. Decisions were made by her care provider, the funding panel. Lack of funding control meant Hallie endured systemised disempowerment, as evident when she requested carer assistance to participate in an accessible sailing program known as Sailability. Her lack of control is evident, as her carer support package was externally controlled and inappropriate decisions were made on her behalf as: ‘I wanted some funding for a carer to take me to the ‘Sailability’ ... Instead [the funding panel] said, Oh you could do the wheelchair basketball stuff. I was saying, yes, but with basketball I’ve got to be upright, and the sailing I can [participate] more lying down’.

The funding response was neither person-centred nor collaborative, instead it systematically disempowered her participation in decision making. Hallie had neither control of her care support funding, nor control of her choice of community activity. The funding choice made for basketball required greater postural skills than Hallie possessed. The social injustice experienced by this consumer could have been alleviated. System flexibility according to individual need ensures an appropriate loan wheelchair on discharge. A collaborative person-centred approach to administering her tailored carer support package empowers its aim: to enhance community participation. That is, in collaboration with her care team, Hallie could choose an appropriate community activity – with adequate carer support – for greater community engagement.
Participants stated consumer control and service transparency are linked to quality outcomes. In line with a person-centred service approach, transaction transparency is significant in demonstrating equity in the sharing of services and resources. This was noted by a number of consumers who took control by self-funding their own wheelchair and associated seating services. They stated while sustainable funding was important, flexibility, transparent processing and control of funding provided greater power: ‘If there was an open line of credit, that’d be fine because then that way [even though] I actually don’t have the money in my account, that would mean that when I put the actual thing in [for payment], the money would then be transferred to whoever, that I nominate’ (Consumer Ken). The consumer’s funding control provides improved equity as it empowers the consumers’ choices.

**Person-centeredness.**

A person-centred approach empowers equity in service partnerships (see Figure 20). Person-centred funding policies enhance procurement transparency. A person-centred approach is considered best practice for complex cases requiring sophisticated wheelchair and seating technology. Successful outcomes are linked to open and equal partnerships where consumers and their care providers are empowered to participate equally in team decision-making processes: to control how resources are consumed, technologies purchased and funds deployed. A person-centred approach enhances timely access to service resources, pre-purchase and after-sales services: all considered essential resources for sustaining optimal wheelchair performance. The consumer’s ability to choose their repair
service provider ensures timely, ongoing wheelchair maintenance aligned to the consumer’s lifestyle.

Participants explicitly stated both optimal wheelchair performance and personal choice of their wheelchair repair services are essential resources: therefore a basic right. Access to timely, person-centred wheelchair maintenance and sustainable funding are considered essential resources for optimal wheelchair performance. Specialised wheelchair-seating systems require ongoing maintenance for best performance: ‘Wheelchairs aren’t a one off purchase, they’re an ongoing living thing’ (Vendor Matt). Adequate sustainable funding to maintain ideal wheelchair performance is an essential resource. The power to choose one’s own service provider means after-sales attention is within the consumers’ control and responds directly to their needs.

There is however an inequitable system evident in wheelchair repair policies. As noted in Chapter 6, consumers who accessed local repair services enjoyed enhanced wheelchair performance, as these repair services delivered flexibly met consumer needs. Centralised repair system delivered services to an inflexible timetable, thus do not deliver a person-centred service and as such disempower consumers’ timely access to essential repairs. Consumer’s choice of and access to their trusted wheelchair services and seating services should be considered an essential resource—a basic right.

**Specialist services.**

A seating service interpretation of the Rawlsian philosophy of equity indicates greater access to specialist services for those consumers who require them most. Aligned to consumer need, secondary seating services act as centres of seating excellence and thus provide dedicated services for the consumers with the most complex mobility and postural
needs. A complex wheelchair-seating cohort requires specialist services responsive to personal need. A person-responsive service approach is advocated: ‘The role that we play might be tertiary and consultative, depending on the needs of the client at the time ... case by case’ (Clinician Bev). Centres of seating excellent are therefore considered an essential resource for addressing complex needs. Complex needs required exceptional resourcefulness and a comprehensive service approach. The follow demonstrates such a service designed for one young man living with Duchene’s Dystrophy:

Speech pathologists have been involved for the swallowing issues. The physios have been involved. He’s got a chest program at the moment that they’re going to review. We got a psych involved because he’s a very anxious young man, worries all the time, like you would. A very stressed family; very stressed, so we’ve got everybody involved in that. Getting that seating right for him has been a long and drawn out process and with very fine adjustments. (Clinician Nancy)

Complex cases require exceptional resources, as noted above. The seating service provided this young man with very basic needs (swallowing and breathing) plus, a comprehensive service to support his carer network, also a basic need in this case. The importance of service flexibility to meet this level of exceptional needs is a basic human right. Equitable access however is not rarely based on consumer complexity. More likely by service eligibility criteria and geographical location. Therefore inequitable access to specialist seating services is externally controlled.

Prioritising service eligibility for specialist seating services should be person-centred: based on each complex mobility and postural need, within the consumer’s geographical reach. Greater access to specialist seating services for complex mobility disabilities is an
exceptional essential resource: an exceptional service right. The access impediment now evident, is an inadequate, inequitable spread of specialist seating services incapable of providing exceptional service excellence throughout Australia. The current small metric-centred secondary seating service sector is valued for their superior service provision, their role as centres of excellence (in upholding best practice, in building resilient wheelchair and seating workforce) lacks rigor.

The role of centres of seating excellence is to consolidate seating service competence, team expertise and best service practice. A nurturing seating environment develops practitioner competence, as noted through team work: ‘a multi-disciplinary process ... we were all, even some of the physios were learning and we would tend to work very closely together and making sure as much as we could [to extend collective knowledge]’ (Clinician Patty). The multi-disciplinary team, as provided by the Integrated Service, is an essential element of building a robust seating service workforce. Furthermore, the Integrated Service, acting as a centre of seating excellence, has the capacity to act as industry leaders, as described: ‘They were so well resourced, and so well supported by their suppliers in the local area, because it really was the only [Integrated Service] that was offered across [the state]’ (Clinician Wendy). These Integrated Services, as acknowledged centre of seating excellence, have the essential ingredients to set service standards, to provides unique best practice approaches to wheelchair-seating outcomes and are resourced for purpose, the most complex cases. The Vendor Clinic also acts as a centre of seating excellence. These secondary level of seating service provide essential specialist services: essential resources for in sustaining the service excellence now and into the future.
An additional impediment evident, is each seating service operates independently of the next seating service, that means each Integrated Service operates differently to another Integrated Service; as does to each Vendor Clinic (and to every Networked Team). There is no uniformity of seating service provision, therefore no standard of seating service practice. The fragmented funding regime and its impact on service resourcefulness (explicit or hidden) describe a fragmented seating service sector.

**Service resources.**

Aligning to the second Rawlsian philosophy of equity, is prioritising greater service resources according to the consumer’s exceptional need. Exceptional needs describe a consumer with complex mobility-postural needs or health risks or lack of support networks that necessitate a prioritised service allocation. Affiliated to Rawls equity philosophy, consumers with impaired communication, those employing augmentative communication (speech devices) and vulnerable decision-makers should be allocated additional service support and time to encourage consumer inclusivity. Additional service time is also required for inexperienced consumers to enable knowledge sharing, transfer and consumer-carer education. Additional time is essential for enabling a person-centred service approach and for empowering greater consumer engagement through transparent service. The service time consumed by person-centred approach is considered a wise, equitable allocation of resources. Integrated Services, acting as best practice consultants, routinely allocate additional time to ensure all stakeholders are informed. Quality interactive communication empowers equitable team participation, as categorically stated by this team member:

I think the one thing that comes foremost is the communication, and the different levels of communication between staff, between service users, clients, outside
agencies. Without effective communication you may as well not have input, because nothing you will do, you will suggest, will ever get followed through. That communication includes education as well, and whilst I am a seating consultant and my job is to assess and prescribe, my job is also to educate and communicate what, you know, what I am doing. [The approach is] very much active participation of service users, so doing things with service users, rather than doing at them. (Clinician Belle)

Appropriate allocation of time is evident at the secondary seating service level: the Integrated Services and Vendor Clinics that dedicate delivering specialist services as needed. The same capacity to allocate time or resources on a case-by-case basis is not as evident at the primary level, as the Networked Teams, who deliver specialist seating services among conflicting, diverse caseloads. The inequity of service provision is more pronounced when the participants’ experiences of metro-based and non-metro service experiences are compared. Recall Consumer Christine whose experiences with metro-based services were compared to her experience of a seating service in her rural community (refer to Table 6). Christine’s timely access, as a rural consumer to her expert local service empowered an interactive engagement that enhanced her wheelchair outcome. In contrast, due to her remoteness, Christine’s personal engagement with the metro-based specialist teams were condensed, therefore less conducive to interactive collaborations and resulted in her unsuccessful seating outcome (i.e. seat insert too hot and cumbersome for her climate).

Wheelchair-seating appropriateness.

The appropriateness of any wheelchair-seating system is linked to optimised enhanced performance, and this in turn is linked to the consumer’s wellbeing. ‘You can
really make some great changes in their lives which makes them function at a better level by having the correct seating’ (Vendor Sarah). Appropriate wheelchair and seating technology improves basic physical, social and emotional health, enables occupational performance, reduces the burden of care, and enhances the consumer’s community engagement. This is consistent with previous evidence (see Chan & Chan, 2007; Gowran, 2012; Mortenson & Miller, 2008; Reid, et al. 2002). Appropriately matched wheelchair-seating technology paired with personal goals is essential for person-centred procurement: a basic human right.

Access to appropriate wheelchair and seating technology is linked to the provision of timely, accessible seating service. The impediment evident, is an inequity of service availability when spinal service access are compared with non-spinal service options. Seating service access is also defined by the consumer’s geographical location and the challenges in reaching metro-based specialist services, providers and technologies. Non-metro based participants have fewer service options – than metro-based participants – this actively reduces access to appropriate wheelchair and seating technologies. Lack of service access reduces available range of technology and thus disempowers technology choice based on need.

Metro-based consumers who live near specialist services (e.g. an Integrated Service) are better resourced than their regional and rural peers. This was noted by Consumers Ken and Max who state that ‘20–30 minutes’ travel time gained them easy access to their seating service and this helped them to build trustworthy partnerships, to increase their appropriate wheelchair and seating options. Timely service reach empowered choice-making. Conversely, greater travel time or distances impede timely service access, as noted
when Carer Cara drove four hours to her nearest supplier, with her spouse so he could trial four wheelchair options within a one-hour period. Regional Carer Ian complained his son’s power chair options were reduced to a single wheelchair manufacturer, because they could access only one supplier within their region. Regional and rural consumers experienced considerable challenges in accessing appropriate technology because of their lack of options. Their only alternative was travelling to metro-based service providers, but the impost of travel effort and expense meant they were measured in seeking metro-based services.

Access to competent locally-based seating services should be a basic right, but the reality of providing equitable metro-based, regional and rural services is problematic. Seating services are challenged in retaining seating expertise and in delivering services and technology to regional and rural areas. As noted in Chapter 4, providing services and coordinating wheelchair and seating technology for assembling appropriate trial prototypes are logistically challenged in regional locations. These two factors explain in part the inequity associated with accessing seating services equally throughout the country. This directly impacts on equitable service access and appropriate technology procurement. There is an urgent need to build greater seating service capacity throughout metro, regional and rural Australia to meet demand. Greater seating service sector planning is required to ensure seating service competence, access to technical skill and adequate technology choices are more equitable distributed throughout the nation, based of need.

**Equal Opportunity**

In this thesis the term equal opportunity, from a social justice perspective, refers to one’s capacity to engage in one’s community as desired. As previously noted, the
appropriateness provision of wheelchair and seating technology are linked to the optimising the consumer’s ability to engage in occupations of choice. Enhanced wheeled mobility is linked to enhanced occupational opportunities, which in this study describes the enabling of one’s engagement in activities and roles across all chosen life domains (or occupational opportunity).

Five sub-themes pertain to the major theme of equal opportunity, these are: opportunity equality, the National Disability Insurance Scheme, NDIS perceptions, self-managed funds and transparency.

**Opportunity equality.**

The third Rawlsian Principle of Fair Equality of Opportunity (see Table 12) proposes that people with similar skills, abilities and motivations should enjoy equal opportunities to participate in their community (informed by Buchanan, 1980). Within the context of Australian wheelchair procurement and seating service experience, the Rawlsian philosophy of opportunity equality speaks to enhancing the consumer’s occupational opportunities through wheelchair-enhanced performance linked to the appropriate provision of wheelchair and seating technology. An appropriate wheelchair-seating system acts as a performance enabler and thus enables the consumer opportunity to optimise their occupational performance or to engage in meaningful occupational roles equally in their community. Opportunity equality is directly related to a successful wheelchair outcome that satisfy the consumer’s goals. Satisfying consumer’s basic needs in health - being able to breathe and swallow, and mobility and health safety, reduction of pressure ulcers - are fundamental to wheelchair appropriateness. So too, is satisfying the carer’s occupational needs, such as manually handling safety and satisfaction in assisting the consumer’s goals
to participate in the psychosocial–environmental domains, at home and in the community. Finally, the consumers stated wheelchair appropriateness is also related to the fit of personal lifestyle with wheelchair and seating technology (including light-weight, simplicity and aesthetics). Person-centred wheelchair procurement linked to personal satisfaction and greater community participation are aligned to the philosophy of fair equality of opportunity.

The barrier now opposing opportunity equality comes from a fragmented funding system that distributes wheelchair technology inequitably according to protocols. Protocols that routinely issue standard technologies inhibit occupational performance, as prescription behaviours conform to protocol regimes to avoid long delays. Inappropriately procured wheelchair-seating technology stymies occupational equality, as less than optimal wheelchair performance inhibits the development of consumer’s occupational performance thus restricts their performance potential. Government funding agencies focussed narrowly on meeting bio-physical needs (like mobility, pressure care and safety), at the expense of holistic enhancements to quality of life of consumer and carers (aligned to greater community engagement) are poorly informed.

Occupational performance is enhanced through intentionally prescribed wheelchair-seating technology focussed on enhancing the consumer’s occupational performance. Greater performance capacity leads to less dependency and greater quality of life. Providing non-standard wheelchair technology appropriately and according to complex needs is aligned to maximising the consumer occupational opportunities. A needs-based funding approach, aligned to person-centred wheelchair-seating prescriptions aim to
optimise occupational opportunities through the appropriateness of technologies provided (Plummer, 2010).

The participants confirmed their quality of life was linked to equality of opportunity. Consumers’ and their care providers’ lives are enhanced when their consumer can actively, independently and safely participate in their community (Mortenson & Dyke, 2006). An example of optimal wheelchair technology that enhanced a consumer’s quality of life was offered in Chapter 5. Recall Consumer Brian (refer to Table 8) who purchased an after-market powered seat elevator and bespoke tray raiser. These sophisticated technologies increased Brian’s occupational performance, reduced his carer burden, and enhanced his quality of life. Sophisticated technology enhanced Brian’s upper limb function and in doing so, reduced Brian’s need for care requirement at home, to travel and at work. As noted below, Brian’s quality of life was directly linked to his enhanced occupational opportunity due to intentionally procured sophisticated technology:

I now live on my own, and I work at [two jobs], all of which is quite dependent on the chair elevation. Without it, I’d need an extra two hours per day (at minimum) of support worker time—extra 14 hours a week—to maintain [my] current lifestyle, which I would likely not be given funding for. So I’d have to move elsewhere and work elsewhere. (Consumer Brian)

Brian’s experience exemplifies the Rawlsian philosophy of equal opportunity. In contrast, experiences of Carers Donna and Ian exemplify how lack of suitable technology reduces theirs and their respective family’s quality of life through lost occupational opportunities. These two carers described the negative impact of inappropriate wheelchair technology had on theirs and their sons’ quality of life. Recall Carer Donna, whose son was
provided with a heavy-duty manual wheelchair, too heavy for Donna to push in her hilly terrain. The inability of son and mother to access their community (to access the wheelchair accessible swing) resulted in both being housebound. This disrupted the family lifestyle, resulting in Donna's husband existing paid employment, to resume full time care-giving, to manage the heavy wheelchair, while Donna returned to full time work, as primary earner. This poor wheelchair-seating outcome impact on their whole family.

Poorly informed wheelchair prescriptions impact equally on care providers, as consumers. Recall Carer Ian, whose son was provided with a power chair unable to meet the occupational performance goals of his active adult son. As the inadequate power chair failed to meet his son’s needs, Ian’s carer input increased. Again this exemplifies lost occupational opportunities for both son and father. Finally, recall Consumer Vince, whose ‘lemon’ of a power chair, still under warranty, experienced multiple breakdowns:

Within the first month of having it, it broke. The springs broke on it when I was driving and stuff like that. So it’s not as durable as I first thought it would be. My tilt [in-space] is not working and has to be fixed and that will be the second time it has to be fixed. (Consumer Vince)

Numerous wheelchair breakdowns results in considerable wheelchair downtime. As wheeled mobility is essential, these wheelchair breakdowns meant Vince was less mobile, therefore less independent and autonomous than desired. As a result, the unreliable wheelchair performance reduced his capacity to work efficiently and this increased his reliance on family assistance, to mobilise in his community. While inappropriately matched wheelchair performance with consumer goals reduces the consumer’s occupational opportunity, so too does poor wheelchair performance stymie consumer’s occupational
potential. These two impediments negatively impact on both the consumers’ and their families’ wellbeing through an increased carer burden need.

The cause of the above difficulties are linked to inconsistent, fragmented access to specialised seating services. Inconsistent quality in seating prescription, inequitable access to an appropriate range of wheelchair and seating options, and inadequate funding expound poorly matched technology with person-centred goals. While each one of these elements impacts on the provision of an optimal wheelchair, the combination of all three directly reduces the appropriateness of wheelchair-seating system provided. Inappropriate or poorly prescribed specialised wheelchair and seating technology leads to reduced capacity to engage equally as a community participant, for consumers and their families.

As the access to specialist services, adequate funding and suitable technologies are so stultified by external governance, a proposed consumer-driven marketplace fuelled by the National Disability Insurance Scheme invites radical industry change.

**National Disability Insurance Scheme.**

In 2011 the National Insurance Disability Scheme (NDIS) was flagged as a national solution to reshape a fragmented, under-resourced disability support system (Productivity Commission, 2011). As part of the interview process, the participants were asked to provide their perceptions of how an NDIS environment might change their experience of seating service delivery and wheelchair procurement. Six sub-themes describe an environment fuelled by the National Insurance Disability Scheme as: NDIS perceptions, wheelchair provision, reality check, consumer-managed funding, transparency and NDIS-induced attitudinal change. These are presented and discussed now.
**NDIS perceptions.**

In general the participants’ early response to the National Disability Insurance Scheme was positive: ‘I think the NDIS is fantastic, and I’m so excited that it’s happening’ (Vendor Freda); ‘I think it’s fantastic ... the sector is getting such a high profile at the moment, it’s certainly something that’s been needed for a long time’ (Clinician Jane). Participants supported a more flexible approach to addressing disability related services: ‘I just see it constantly evolving—the National Disability Insurance Scheme will be—I see that being a positive’ (Vendor Winn).

There was a positive perception the NDIS philosophy will provide a more equitable distribution of funds. Clinician Hanna, an experienced clinician, applauded the control self-managed packages could empower: ‘They can decide to own their budget, and then they can find their own staff and their own services if they want to, and if they need support, then local area coordination can provide that support’. Self-managed funded packages provide greater consumer empowerment of choice and control: ‘I am hoping that it gives my clients more opportunity to bob up with [what] they want to, as opposed to when someone else thinks they should [access services]’ (Clinician Bev). The basic right of taking control is aligned to enhancing wellbeing: ‘More control over how they get their services and I hope that maybe there’s a level of that available in this scheme as well, that can let people take a bit more control over their care, their health and wellbeing (Clinician Wendy).

**Wheelchair provision in an NDIS environment.**

Participants anticipated greater funding flexibility in a new NDIS environment. Clinician Wendy hoped a NDIS environment would empower wheelchair choices, ‘because
the system that we currently have doesn’t let us have a lot of flexibility to get really beautifully customised pieces of equipment’.

Some participant scepticism was expressed about the NDIS’s capacity to deliver funds adequately and comprehensively to meet the diversity of need and anticipated demand. The following quotes illuminate some of the conflict noted, by service providers at that early stage of NDIS debate:

In theory, the NDIS sounds fantastic. In practice, I’m quite worried. I think, if you’ve got a mild to moderate disability, the system is probably going to fund you quite well and you may well be much better off under that system. If you’ve got a very complex and multiple disability, I don’t have the confidence that there is going to be the money in the system or the assessments set up in place to actually acknowledge the level of support that these people really need. (Clinician Jane)

So I think there’s a whole lot of conversations that we’re going to have over the next couple of years about what the scheme pays for, and how they pay it ... that’s going to be really hard, as clinicians ... there’s so little evidence underpinning what we do. (Vendor Freda)

Freda’s comment confirms the lack of seating service data at the time of interview, implying that the existing seating service sector was poorly positioned to expand rapidly to meet the demand. This lack of data highlights the challenge to an industry preparing for the radical change proposed by the NDIS. The lack of service transparency and of seating service consistency adds to the image of a seating service poorly prepared for a competitive, open marketplace where the consumer has control.
NDIS: a reality check.

The existing lack of transparency in the seating system and wheelchair procurement are concerning. This study shows prior to NDIS implementation, the true costs of service delivery and wheelchair procurement are hidden. Many of the clinicians acknowledged their therapy hours were not comprehensively or consistently accounted for in specialised wheelchair procurements. Worse, many believe the clinical services were viewed as free as therapy costs were absorbed by hosting organisations: ‘Pretty much all the therapists [who] come with [their consumers] ... are from the government services ... they get them for free’ (Clinician Nadia). The therapy and clinical contribution to specialised wheelchair procurement is considerable, but hidden, and this bodes poorly for consumers purchasing clinical services in the future. The NDIS administrators are poorly informed because the clinical hours in wheelchair procurement have not been accurately accounted for.

Added to the shock of paying for explicit service costs, concern was raised of the purchasing consumer’s capacity or preparedness. Ambivalence was expressed regarding the consumer’s capacity to manage their own funded budget: ‘I’m not quite sure how this is all going to work yet, because at the moment they’re not paying for equipment and I don’t think they should. I mean, it’s very difficult for some of these people’ (Clinician Nancy). Managing funds, controlling budgets and wielding discretionary purchasing power requires informed skill, accrued experience and wisdom to make sound decisions.

Add to the above, a variation in service readiness of the existing service delivery and provision for the perceived NDIS environment was evident. Variation in service readiness was expressed by Vendor Walter who spoke of different approaches to wheelchair-seating supply as: ‘several of our professional organisations, the not-for-profits ... the labour isn’t
charged, so they make customised things when they can ... and save resources [via internal manufacture]. A number of vendors spoke of manufacturing their own accessories, such as footplates, mounting devices and lap trays, to economise and save consumers money. The lack of service consistency means there was no universal delivery model available to act as a benchmark. There was no reliable data on the cost of wheelchair and seating procurement in Australia. This lack of basic seating service data belittles the sector’s ability to respond robustly to a rapidly evolving market place empowered by consumers with funding control.

Echoing this notion of a service ill prepared, clinicians voiced their concern that the true cost of specialised wheelchair procurement was not known. In an NDIS environment, they worried, the true cost of wheelchair procurement could prove prohibitive. One participant tried to estimate true procurement cost as: ‘The wheelchair base is $5,000 or $6,000 and the cost of a [seat] insertion is another $5,000 or $6,000 and then we haven’t counted our time, so 35 hours of time or whatever’ (Clinician Jon). These vague estimates on procurement costs (within an NDIS environment) were further illuminated by experienced consultants who reflected on their challenged experience of providing a service within an inadequately funded scheme called the Traffic Accident Commission (TAC): ‘Like if [NDIS] comes under something like the TAC system, where you’ve got five hours to do an assessment and five hours to deliver. You can’t provide any level of service to some of these guys under that amount’ (Clinician Jane). Such experience sets up a precedent where by a consumer expects procuring a complete wheelchair-seating system could be achieved in five to ten hours. Specialised wheelchair procurement is more complex than an allocation of ten service hours, however as this data are not universally known, participants feared consumers’ expectations a NDIS environment might disappoint.
The study findings expose a seating service devoid of essential benchmarking data. The lack of service delivery or wheelchair procurement benchmarks means the industry is poorly informed, making it poorly equipped to compete in an open NDIS market. Furthermore, the dearth of necessary service benchmarking information means agencies implementing NDIS funds are also be poorly informed. In the absence of vital seating service information appropriate funding levels could be so severely jeopardised that those in receipt of NDIS packages could be worse off than at present.

There is voiced scepticism whether an NDIS environment can equitably resource individualised self-managed funds packages: ‘I can’t see [NDIS] ever running as currently planned, just because of the financial implications’ (Clinician Rocko). Poorly informed NDIS means inadequately self-managed packages, therefore crimping of purchasing power for essential services and appropriate technology: imposed this time at a national level. In addition, concern was raised the successful wheelchair and seating outcomes require layers of allied support services for existing wheelchair provision and use. Specific concern was raised: Will there be adequate NDIS funds? Adequate discretionary funding power to purchase essential support services currently supporting specialised wheelchair procurement: ‘Will there be money within the NDIS to actually fund all those services that we currently provide people to support them to do those everyday things?’ (Clinician Jane). Such a question highlights the fact that many consumers’ seating goals are not achievable without allied support services, such as allied technology, transport, care attendant and training services. As support services, sophisticated wheelchair technology and successful consumer’s occupational performance are linked, fear that inadequate appreciation by
policy makers will result in adequate NDIS funds: considerable risk factors to positive wheelchair and occupational outcomes.

Below highlights the dangers of self-managed NDIS fund insufficiencies. Insufficient funding power restricts purchasing a comprehensive service and results in: inadequate service provision linked to poor consumer wellbeing. Clinician Jane provides a possible service response where required services have been poorly accounted for in an NDIS funded service plan. While the consumer may presume a comprehensive service to be provided, instead within a NDIS environment, individual parcels of services are purchased and as such the consumer is disappointed with budget realities, such as: ‘That’s not in your budget, we can’t do it, which isn’t great for the person’. The reality is that poor wheelchair outcomes require greater subsequent service intervention to right the wrong, as experienced by Carer Wisty who spent additional funds with a competitor provide to re-adjust her son’s wheelchair (refer to Table 9).

As identified by Greer et al.’s literature review (2012), lack of adequate funding is pertinent in specialised wheelchair procurement. As complex needs require specialist seating services and technology, this requires additional time. It is not surprising that outcome of inadequate resources, as noted, impacts on reduced service capacity. This is consistent with the literature (Eggers et al., 2009; Plummer, 2010). Inadequate service time is a known factor in poor outcomes, as noted by sole clinician Nadia: ‘I’ve been burnt a couple of times, by things that maybe were overlooked or were incorrectly processed because there really hasn’t been adequate time’. An escalating need for service resources (time and support) parallels with increased case complexity and subsequent service resource need. In addition, inexperienced consumers require greater service time to support
collaborative and informed decision-making. Extra service time takes additional resources and this consumes funding. Inequitable resource access, such as inadequate trial time or poor access to an appropriate trial prototypes, may result in greater carer dependency, greater after-sale service need and reduced community engagement. This study emphasises the importance of understanding the complexity of providing seating servicing to ensure the appropriate and adequate allocation of essential resources, is provided in a timely manner, based on personal need.

**Consumer-managed NDIS funding.**

The participants endorsed the NDIS philosophy of empowering consumer control and choice. While most participants stated they were keen for consumers to control their purchasing power, a few caveats were raised. Caution was articulated by Ian, a care provider who stated that while his son was an able funds manager, not all were as capable:

For someone like [my son] who knows what he’s doing and can, yes, I just think, in [his] situation, I think it would be a good thing for him, for him to manage that [NDIS funds], but I just—because I know a lot of other people—I’m not sure if it would be a good thing [universally], that you would, they would need some [assistance], what’s the word, a co-ordinator? (Carer Ian)

The notion that all consumers and their care providers are equally equipped to prudently manage NDIS funded packages is seen as unrealistic. The implementation of NDIS funding environment requires a judicious approach, where support is provided to assist funds management (for example ‘a co-ordinator’) within a consumer-inclusive partnership. Within an evolving NDIS system that purports to empowering social justice, all effort should be applied now to maximise the consumer’s involvement: to make fair and
appropriate choices, when and as they need services, technology and resources. The NDIS is Australia’s golden opportunity to override an inequitable, inflexible and top-heavy system dominated by external agencies.

Affiliated with seizing the NDIS opportunity, participants’ perceptions evolved and deepened as more information on the National Disability Insurance Scheme became available (during data collection). As more detail was disseminated, participants became more vocal about how a NDIS environment might opportune. The realities of a consumer cohort empowered with funding control and choice differed spectacularly, when compared to that of living under a dominant centralised system, and this required different skills. Carer Donna shared her growing concern when she realised the additional skills and tasks required to manage her son’s NDIS package for the first time:

It is such a dream, I’ve never really kind of added stuff up. Besides which, I don’t understand the wage system and there’s a lot there that would be hidden costs that I didn’t know about. But [I hope] it would be enough to cover more than a chair every five years [and] more than six hours of care [he currently gets].

Such concerns are understandable in a cohort of potential NDIS recipients poorly prepared for imminent change involving undertaking direct commercial transactions with service providers. These additional management tasks add to an already considerable workload many consumers and care providers undertake in their daily wheelchair lives. Adjusting to new funding systems requires time, skill and knowledge. Some service providers, too, struggled with the idea of granting consumers control and choice while also grappling with the pragmatics of poor decision-making: ‘I think, one of my concerns ... [is] you give people a bucket of money, and it’s always a tension between, you know, human
rights and consumer rights and the realities of a highly complex, quite, still a medicalised model of service delivery and equipment sectors’ (Vendor Freda). Their concerns are to whom provides a ‘safety net’ when funds spent do not provide a successful wheelchair outcome. In an empowered consumer driven marketplace, is a safety net mentality an sustainable sympathy, or is a ‘buyer beware’ be a more viable notion?

Many of service providers who operated within a managed funding system also struggled with supporting free choice:

I can’t see how they can do it without still having [funding] gatekeepers. You can’t suddenly give somebody who’s never earned an income $50,000 and say this is your year’s [package], you know, you have to make this work for a year, without giving them the budgeting and the skills. (Clinician Mia)

The self-managed funding philosophy as proposed by NDIS raises issues of consumer responsibility, something poorly nurtured in the operating paternal system of funding control. The operating system, as experienced by the participants, actively discouraged consumer control and choice. The systemised control impeded insight into the all service processes involved, the actual services required and the accurate technology costs. Lack of service transparency disempowers full service recipient engagement and shackles flexible service provision, limits development and growth in accordance to industry demands.

**NDIS funding transparency.**

The notion of an open and competitive NDIS market was critiqued by several participants. While supporting the concept, one supplier stated that his industry was going to have to charge dramatically to stay commercially viable in a NDIS environment: ‘It’s
going to add costs, you know. I don’t think dealers would be saying, oh, well! … even now, I know, there are some dealers who charge for, you know, coming out and doing assessments with the therapists’ (Vendor Tom). Tom refers to many hidden service costs, such as the wheelchair prototype assembly and home-based trials that are not recouped unless the vendor is awarded the purchase contract. In a deregulated market place, wheelchair supply services need to charge for all services provided to sustain a viable business based on demand (that is within a NDIS market). Sadly, not all procurement costs are readily visible to the purchasing public.

While disclosure may appear to add cost, in reality service transparency exposes the true cost of specialised wheelchair procurement and seating servicing (pre and post-provision). Such service disclosure requires dramatic changes in service provision approach and in provider attitude.

**NDIS-induced attitudinal change.**

Within a new and altered NDIS environment, participants predicted that all service providers would have to think their roles and services anew. The service sector acknowledged that NDIS would require considerable changes to their modi operandi: ‘I think we need to be very aware that it’s potentially going to be hard work, and it’s going to be a lot of changes for clinicians prescribing, for suppliers as they’ve doing trials and supplying equipment’ (Vendor Freda). The current seating sector requires rapid reform to be service ready for NDIS implementation, proposed for 2018–19 (National Disability Insurance Scheme, 2013).

Specific service areas were highlighted as noteworthy: some in need of special reform, others as models of reform. Service providers working in less commercially driven
service sectors were identified as being vulnerable and in need of reform. The not-for-profit and hospital sectors where service provision was centralised needed service reform: ‘[They] have a fair bit of work to do to shift their cultural thinking. They’re traditionally service providers. They’re not consumer focused retail organisations’ (Vendor Walter). While apprehension was expressed for some sections of the service industry, evidence shows pockets of service preparedness. Some services were remodelling service thinking and provision by moving from managing busy caseloads, based on referral system to promoting and sustaining commercial businesses. Service preparedness was noted in those Integrated Services operating at a cost recovery level, for example:

Being more market driven than compassionate driven ... our little division of [seating service] will probably cope really well with the transition to a more privatised system of user chooser–user pays, because we are market driven already ... We’re commercial. (Clinician Mia)

Other participants spoke of the changes they or their services would need to make. These included altering clinical service thinking from referral management to spruiking for business. Clinicians spoke of having to acquire marketing and advertising skills to promoting their services actively: ‘[We need to] say what we’re doing, and be very clear about what we’re doing, have our own identity within the service, and then make sure people know what that is. Sell yourself, I guess’ (Clinician Belle). This requires a major shift, from providing a comprehensive service based on referral to costing specific packages of services. Some teams were already working towards a business model of service delivery. Using business language to itemise marketable therapy services helped Clinician Jane’s team move away from a paternalistic approach where everyone gets
everything. Specifically placing the choice-making within the consumer’s control, by directing consumer enquiry:

The first question that we would ask people—I guess in some ways it’s thinking about an intake-style process—is what kind of help do you want? So what sort of product will it be? Where do you want that help? The next question is how much help actually do you want? (Clinician Jane)

Finally, service providers saw the introduction of the NDIS as a potent opportunity for national service accreditation, to address a fragmented seating service sector. In anticipation of what NDIS proposed, participants perceived consumers’ expectations of service were raised, while in reality, the consumer needed to be specific about the services required and purchased using finite funding. A NDIS environment requires an informed, consumer cohort who is explicit in their service needs. A specific consumer-focused approach requires clear parameters of what a quality seating service is, as a purchaser. In response, service providers need to learn, to guide by asking the purchasing consumer to be specific in their needs: ‘What is your high level expectation with this mobility solution? Is it that you’ll have no pain and that you’ll be able to go the shop and that in this wheelchair you will be able to operate your computer?’ (Vendor Walter). Articulate consumers who can state their motivations are well placed to seek appropriate services. In response, the service sector needs to provide accountable, transparent service provision, to assist the purchasing public: such as an ‘appropriate accreditation or some form of, so [practitioners and services] are all practising appropriately’ (Vendor Walter). The purchasing consumer needs assurance that the service they engage has the competence to meet their goals.
The National Disability Insurance Scheme proposes sweeping changes to the way the Australian healthcare system funds specialised wheelchair procurement and seating services. The participants are supportive of this proposed change, from an inequitable, fragmented system to a national funded system, but are concerned that the NDIS scheme may not be a panacea for equality as mooted in the media.

Summary

Chapter 7 presents the final phase of the data analysis process: the investigation of findings and discussion of the Australian seating service experience from the perspective of social justice. A systemic inequity in specialised wheelchair procurement and access to seating services exists throughout Australia. Appropriate specialised wheelchair procurement is dependent on access to adequate funding and a timely access to competent and resourced seating services. The two major funding systems operated in parallel and acted to inequitably govern access to seating services and to distribute wheelchair technology unequally, neither based on consumer need. The existing fragmented funding environment systematically discouraged consumer control and choice, and therefore disempowered personal control of their specialised wheelchair procurement.

In addition to funding inequality, access to a limited number of specialist seating services scattered across Australia assures inequality in the quality of service provision. The majority of specialist services located within or close to Australian state capitals ensures access is geographically exclusive. Consumers in need of wheelchair and seating technology within easy access to metro-based services are better resourced than their non-metro-based peers who experience difficulty accessing the same level of specialist services. Consumers living in regional and rural Australia are commonly less able to access seating
services, as travel distances negatively impact on easy access to timely service provision, and as such they have limited technology options. A consumer’s geographical location does negatively discriminate or positively advantage service access equity and ultimately this impacts on the equality of appropriate person-centred specialised wheelchair procurement.

A national approach to disability funding as proposed by the National Disability Insurance Scheme is viewed with cautious approval. In principle, participants endorse a consumer-driven environment where self-managed funding packages are intended to empower consumer control in their wheelchair procurement choices. The study exposes a greater funding share for complex seating cases as they need and consume greater service resources. This is consistent with the participants’ concern that NDIS eligible consumers may not be funded appropriately because of a paucity of essential data regarding the true cost of specialised wheelchair procurement.

The previous four chapters provide substantial new data to describe the Australian seating service experience, from insider perspectives. This is new data and they pertain to an Australian context, thus filling previous knowledge gaps. The data enable a deeper scrutiny of new with known evidence, Australian and international, to understand its relevance from an Australian perspective. The next and last chapter presents the interpretation of this data as informed by an in-depth case study approach.
CHAPTER EIGHT:  
The Complexity of Delivering a Seating Service Within Australia

The previous four chapters expose a number of influential factors that enable and hinder the access to suitable wheelchair provision and seating services. These factors influence the equitable of quality wheelchair procurements and equity in the specialist seating services delivered to Australians with complex mobility and postural needs.

This last chapter discusses the case study findings, commencing with a brief critique of the research design and participants' reflections of their study participation. This is followed by a discussion of the key findings of this study and their implications for the Australian seating service. These key findings are:

- trustworthy partnerships deliver person-centred seating outcomes;
- the Australian seating service landscape;
- four domains of postural function complexity;
- the determinants of case complexity;
- three types of decision-makers;
- seating service selection;
- six seating service steps;
- seating service benchmarks.

Each of these findings has practice implications on the provision of a seating service in Australia and is discussed in present tense from an Australian perspective, and as related to previous evidence.
Study Participation and On Being Heard

This qualitative enquiry informed by an in-depth case study approach captured, for the first time the complex depth of the Australian wheelchair procurement and seating service sector from sixty participants’ experiences. This is qualitative data of the Australian seating service experience not previously documented. The in-depth interview approach enabled stakeholders to voice and to share rich stories of their unique experiences dealing with wheelchair technology, procurement and seating services: the positives and the negatives. The qualitative methodology allowed the researcher to dig deeply into the narratives of consumers and carer providers to understand the value of the services received and its impact on their personal and family lives. The data add to existing knowledge: to allow a deeper, a better understanding of the very personal meaning of matching an appropriate wheelchair-seating system with the consumer and their carer providers' lives, within an Australian context. These findings are consistent with the contextual factors as described by Scherer’s Matching Person and Technology (MPT) framework (Scherer, 2005; 2008; Scherer & Glueckauf, 2005; Scherer, Sax et al., 2005) and enhance social participation, as aspired by the ICF framework (WHO, 2001) in meaningful occupations (Mortenson & Miller, 2008)

The difficulty in recruiting carer participation for this study was disappointing. This is more poignant, as the findings identified the care provider’s contribution is a vital component of a successful wheelchair and seating outcome. Furthermore, the study shows that when the carer's occupations are not well considered in a wheelchair-seating procurement, the impact affects the consumer's, carer's and families' lives. This is despite the fact that both frameworks by Eggers et al. (2009) and Scherer’s MPT framework (2008)
identify the care providers’ contribution as an essential contextual factor. The data add to the scant knowledge of the care provider's activities, roles and occupations in managing specialised wheelchair and seating technology for a better consumer outcome (Mortenson & Miller, 2008; Mortenson, et al., 2012; Scherer, 2005).

The service providers were keen to share their passion for their service, proud of the differences their solutions made to their consumers and the flow-on effect to both the consumers' and care providers’ quality of lives. These were tempered by some frank frustrations and insightful suggestions for future improvements. The participating clinicians particularly praised the study’s interview process for providing space to reflect on their service or clinical practice. Having an opportunity to reflect on busy service practice may in part explain why there were disproportionately more prescribing clinicians keen to participate. The experiences collected from the prescribing clinicians and vendors also adds to the minimal data available on their roles and experiences in the Australian seating service (Kittel et al., 2002; di Marco et al., 2003; Poulos et al., 2012). This data can now be compared with the international seating service literature.

The study findings support evidence in the literature that successful wheelchair procurement is dependent on accessible, competent vendor services with a suitable range of wheelchair and seating technology options (Eggers et al., 2009; Layton & Walker, 2012; Scherer & Craddock, 2002). Further endorsing previous literature, the data expose matching appropriate wheelchair and seating technology with personal goals boosts the consumer’s occupational performance (Hardy, 2004; Reid et al., 2002; Scherer, 2005) and evident in the MPT framework (by Scherer, 1996; 2005; 2008). Improved occupational performance enhances the consumer’s wellbeing (Lenker et al., 2013, Scherer, 2005), helps
to reduce the carer burden (Chan & Chan, 2007; Frank et al., 2010; Mortenson & Dyke, 2006; Reid et al., 2002) when appropriately provided, and thus improves the quality of life of both care provider and consumer (Scherer, 1996; Hardy, 2004; Lenker, Scherer, Fuhrer et al., 2005; Pape, Kim, & Weiner, 2002).

The following eight major findings provide data to illuminate the essence of the Australian seating service experience. These are discussed now.

**Key Finding 1: Forming trustworthy partnerships**

The participating service providers preferred a person-centred occupational service approach aligned to a consumer-driven wheelchair selection process. Brown (2013) recommends a person-centred occupational approach that collaborates and consults in a respectful, inclusive and egalitarian manner. A positive person-centred occupational wheelchair outcome liberates the consumer as a productive occupational being (Mortenson & Miller, 2008). Aligned with these authors and consistent with Scherer MPT framework (2008), this study finds the formation of collaborative, respectful, trusted, person-centred partnerships alleviates some of the negative pressures imposed by external government systems and funding policies (Scherer, et al. 2010).

A successful person-centred wheelchair outcome is measured by the degree to which an appropriate wheelchair-seating system enables occupational performance (Mortenson & Miller, 2008), enhances the consumer’s feelings of self-worth and their identity to become a social and occupational contributor (Gowran, 2011; Hocking, 1999; Lyons, Orozovic, Davis, & Newman, 2002; May & Rugg, 2010; Scherer & Glueckauf, 2005; Scherer et al, 2005). Forming trustworthy partnerships, over a number of wheelchair upgrades informs and educates confident decision makers, empowers team collaboration and expedites
successful wheelchair procurement. This is the first key finding specific to Australian seating service experience; the second major finding describes the service landscape, at the time of data collection (2011-12).

**Key Finding 2: Australian Seating Service Landscape**

This is the first study to describe the Australian Seating Service Landscape. Figure 22 maps the Australian seating service environment, showing two distinct components: the seating service system and the funding environment. Within the seating service system, two levels of seating service operate: the primary and secondary level of seating service that provided three types of services across Australia. The three types of services operated as: select number of Integrated Services, unknown number of Vendor Clinics and Networked Teams.

In this study, the primary seating service is delivered by loosely formed groups of primary service providers with diverse caseloads that form to provide case specific seating services. These teams are active throughout metro, regional and rural Australia, as various Networked Teams and are generally accessible, in various permeations, throughout Australia. The secondary seating service is a dedicated seating service, delivered by predominately metro-based specialist services dedicated to specialised wheelchair procurement, as 19 identified Integrated Services and an unknown, elite number of Vendor Clinics. Each service level and seating service type operates and is funded uniquely.

Figure 22 also maps the funding environment, where funding is distributed at the service level, by consumer disability funding eligibility and for wheelchair procurement. The directional arrows within Figure 22 denote the direction of funding sources on services
and on wheelchair procurement, on referral pathways and on service flow from primary to secondary services.

In 2011-12 the Australian Seating Landscape presented as deregulated service sector with scant leadership required to advocate for universal seating education; or quality assurance of wheelchair procurement, in seating service delivery or of its service providers’ competence. The data expose seating services were provided—no doubt heartfelt and with good intention—within a service environment without adequate quality assurance measures. This is consistent with a review of the Australian assistive technology sector, by Drs Summers and Walker (2013). Australian assistive technology service advocates Summers and Walker argue that a contemporary assistive technology service sector requires robust service rigor. The same need applies to the Australian seating service sector, now and in the future.

The components of the Australian seating service landscape are now described. Although the funding environment dominated the seating service environment (noted within the mauve box as depicted in Figure 22), it is the seating service sector that is presented first for clarity and context. The funding environment (as depicted on the left of Figure 22) is discussed after.
Figure 22 Australian Seating Service Landscape

Key: arrows denote direction of funding influence (black), referral direction (red) and service flow (broken arrows). Govt.= Government; WC=wheelchair.
Primary service: the Networked Team

As shown in Figure 22, there are two levels of seating services and three major types of service delivery. In Australia, seating services are delivered at a primary and at a secondary level and by three delivery types, as the Integrated Service, the Vendor Clinic and Networked Team.

The primary service is delivered by direct service providers in loose collaboration, as a Networked Team. While the majority of participants accessed primary services, these are the less visible members of the Australian seating sector. The quality of the service provided by a Networked Team is reliant on its members’ seating experience and motivations, as its informal formation was rarely resourced specifically for seating service provision. The Networked Team members' skill varied as the primary therapist (the principal prescriber) is commonly employed by non-seating-specific organisations. The other service member of the Networked Team, the local wheelchair supplier, often provided a broad service and a range of technologies from rehabilitation through to wheelchairs. The study shows, the primary therapist, in collaboration with the consumer, commonly selected a wheelchair supplier within the consumer’s residential location. The supplier selection was intentionally aligned for their after-sale service capacity. After-sale service is essential for optimal wheelchair performance. While experienced consumers choose to work with known individual therapists and suppliers they had dealt with previously; commonly funding agents allocated service providers according to external criteria such as postcode, health conditions or technology approach.

At the primary service level, modular technology is the dominant technology approach employed by a Networked Team approach. The adjustability of modular
wheelchair and seating technology allows for home-based service provision, and optimises consumer inclusion in experimenting and learning about technology, to make informed choices within their routine environments.

The Networked Team is the most accessed primary seating service (refer to Table 5) but is the least resourced service. The skill base of each team varies greatly, depending on its location in metro, region or rural area. Access to universal seating education is difficult, as at the time of this study there was no formal education programme. These team members acquired their skills experientially, on-the-job. This is problematic as most primary therapists provide home-based services, solo; remote to their clinical and seating peers. They routinely acquired knowledge and education informally and many in non-work time. Primary therapists therefore relied on access to their suppliers' knowledge on non-standard wheelchair technology. Again, this is problematic as access to knowledgeable vendors was dependent their service motivation, provider attitude and their location, for timely access to specialist seating services or expert suppliers during procurement. Peer support is aligned to skill development and successful wheelchair outcomes.

By comparison, the specialist wheelchair suppliers and dedicated seating services worked in larger teams and were educated internally through in-house training. While their knowledge base is stronger, their metro-based location means access, by the primary service providers, was again location dependent. The study participants used their considerable seating networks to proactively access these centres of seating excellence. Of concern, is the inexperienced or solo primary therapists maybe be less well networked. They may be unaware of these specialist secondary services and resources, as the Australian seating service sector is poorly coordinated.
This study reveals the majority of seating services are provided at a primary level, within a Networked Team. This is consistent with a recent publication by Friesen and colleagues (2014) that identify Australian assistive technology services are also delivered by primary services. As such, they raised concern regarding of service competency delivered at a primary level, as primary health and community services have ‘comparatively low levels of research capacity and fewer opportunities to generate peer-reviewed evidence at the higher ends of the research continuum’ (Friesen et al., p. 2). Similarly, this study also identifies poor adherence to evidence-based practice within the Australian seating service sector, as exposed by Williams and de Jonge (2010). This missing attribute - quality assurance - is acknowledged by the participants as essential but adherence was challenged by busy caseloads. A greater emphasis on professional development based on evidence-based activity and knowledge exchange in the seating service sector is recommended. This must be aligned with greater industry sponsored research activity and research funding required to build a responsive and sustainable service sector, based on with evidence based data.

The variability in Networked Team’s seating skill and competency at the primary service level is also concerning, as primary therapists act as principal prescriber. However, despite this and other shortcomings associated with a Networked Team, its particular strength is in empowering team partnerships, informed from a variety of experiences, to explore and solve complex needs together. Teamwork is the preferred approach to enhance the quality of seating service through equitable partnerships (Arledge et al., 2011; Eggers et al. 2009; Plummer, et al., 2013) and wheelchair procurement aligned to the consumer's occupational performance (Hardy, 2004; Mortenson & Miller, 2008; Reid et al., 2002;
Routhier et al., 2003). To manage complex cases, the primary therapist participants collaborated with the expert secondary seating services (i.e. by Integrated Services and Vendor Clinics) (refer to Table 5), as required and if accessible. Good networking augmented the participating primary therapist’s seating confidence and skill competency.

The data expose an active, accessible primary seating service in need of service cohesion, universally, accessible education and research activity designed to build a robust, competent, proactive much needed primary service. A robust primary service is essential as they are the referral initiators for greater expertise, as in the secondary level of seating service.

**Secondary seating service: Integrated Services**

As noted in Figure 22, specialised seating services are provided at a secondary service level, by specialist seating services and expert wheelchair suppliers. These are the more visible members of the Australian seating sector. The secondary seating service delivers specialised wheelchair technology and seating solutions as dedicated services: as Integrated Services or Vendor Clinics. The consumer’s primary therapist acts as the conduit between the primary and secondary services. The primary therapist's seating network informs their selection of secondary seating services and access to these vary depending on the consumer’s location, mobility condition and funding protocol.

Data show access to secondary services varied and there was minimal interaction between secondary services (with Integrated Services and Vendor Clinics), as each offer different services and technology approaches. One consistency noted, where funding was outsourced, the consumer’s primary therapist remained the principal prescriber.
The study identifies an unknown, but limited number of mostly metro-based Vendor Clinics operated by specialist wheelchair suppliers as commercial businesses. These accepted requests informally directly from service recipients (consumers, carers, family) or via prescribing clinicians. The vendor services are available to all consumers (devoid of eligibility criteria). The wheelchair suppliers in general offer a mobile service. Equally metro-based Vendor Clinics often provide a mobile expert vendor service to regional locations. The Vendor Clinics provide expert services that blend and adapt sophisticated modular technology with custom-made components for consumers with complex needs. These vendor businesses functioned as commercial enterprises. The other specialised seating service is the Integrated Service.

Each Integrated Service operates uniquely according to the service funding, service scope, seating approach and access is governed by service eligibility. As noted the majority are metro-based and not all provide an outreach service. The majority of Integrated Services provide custom-made seating solutions, but each operates differently according to their manufacturing approach. Again, there was minimal service interaction noted between any of the Integrated Services, each acted in service isolation. These silos of seating excellence, however have the capacity to provide seating sector leadership. At the time of data collection, there was scant evidence of cohesion at secondary seating service level.

The 19 identified Integrated Services operating during data collection in 2011-12 were considered insufficient to provide adequate secondary seating services for the number of Australians living with complex mobility and postural needs. In addition, their centralised location in seven capital cities – with only three operating in non-metro locations – determines access according to the consumer’s residential location.
The Australian secondary service sector is small and their specialist services are in great demand. Recognition for sector coordination was recognised, however participants stated their busy, complex caseloads discouraged volunteer leadership. The value of these silos of seating excellence is the strength of their specialised teams: some operate as smaller multi-skilled teams and others are larger multi-disciplinary teams. The team’s composition are relevant to building workforce resilience, and now described.

**The value of a multi-disciplinary team.**

Larger clinic-based services operated by a multi-disciplinary team are noted as the ideal training environment for and by early career clinicians and vendors (i.e. rehabilitation engineers and technicians). The data show the multi-layered specialist seating teams expedite team skill development and knowledge exchange, through practical on-the-job training. The data show the assessment–prescription and fitting processes are often collaborative and this assists develop a range of skills within the team. Timely supervision and mentoring access build clinical reasoning competence and confidence (Dolan, 2013; Unsworth, 2001).

Services supplying manufactured custom-made wheelchair-seating solutions commonly operated as a multi-disciplinary team. As the manufacturing process requires specific technical skills (engineering, technical and manufacturing) this task was allocated to the technicians, engineers or the workshop team. The manufacturing approach informed the team skills: rehabilitation engineers are commonly associated with on-site manufacturing (e. g. foam-on-ply) while teams with prosthetic and orthotic skill tend to shape outsourced contoured ‘moulded’ seat inserts (e.g. Otto Bock Shape).
The study shows on-site manufacturing expedites the provision and the fitting process. Accelerated seating manufacture is useful for providing wheelchair-seating solutions quickly. This allows for a condensed seating service as used for time-limited provision, such as for visiting regional consumers, or during the annual outreach clinic. Outsourcing seating manufacture lengthens provision time, but reduces the resources required for on-site production. Outsourcing manufacturing enables seating service person-centred innovation: such as capturing a manual body imprint using a Matrix seat system in a consumer’s home, especially useful for those unable to travel.

While the larger multi-disciplinary teams are excellent training grounds, their size and the intensity of their seating approach tend to reduce the consumer’s inclusion. The data show specific clinical and technical roles tended to dominate the team decision making process. The provision-fitting process of a custom-made wheelchair-seating system is vital for accommodating very complex postures (with multiple body plane deviations), but the process is intense. The required time, energy and skill tend to fatigue all but the most resilient consumers and their care providers.

Of note, however the application of modular wheelchair and seating technology empowers the consumer’s contribution through a partnership of exploration and wheelchair selection. The home-based trial engages the consumer’s contribution the most and it informs and empowers their decision making role. The home-based services are often provided by the smaller mobile service teams and was considered more appropriate for slightly less complex postures.

The multi-disciplinary team is commonly associated to large clinic-based services involved in the manufacture of custom-made seating solutions and as such are considered
excellent environments for early career training. The second team composition was the smaller multi-skilled team.

*The service capacity of a multi-skilled team.*

A smaller seating team is evident functioning as a trans-disciplinary team, whose multi-skilled members provide mobile seating services, as an extension of their host, the larger clinic-based service. Unlike the larger multi-disciplinary teams, these multi-skilled teams are experienced, proficient team partnerships built over several years. As such, these elite teams possess the capacity to provide specialised mobile and outreach services. The data show the spinal outreach team operates an efficient mobile service model using elite multi-skilled teams to assess, provide and fit modular technology for the complex posture and pressure care needs within consumers’ homes and community facilities. These mobile spinal seating teams extend their expertise and seating service beyond the clinic by blending and adapting sophisticated technology; such as Otto Bock, Matrix and SPEX systems. The Australian mobile spinal seating service provides a credible mobile service framework for replication to extend as yet the predominately clinic-based seating services for a non-spinal cohort.

As noted in Figure 22, specialised seating services are provided at a secondary service level, by both specialist seating services and expert wheelchair suppliers. The expert wheelchair supplier service is discussed now.

*Secondary seating service: Vendor Clinics.*

Located within the secondary seating service level, sits the specialist wheelchair supplier, a commercial business. These are private businesses and as wheelchair specialists, their Vendor Clinics are operated by expert multi-skilled teams, with access to and
expertise in adapting and customising sophisticated technology. As private businesses, these vendor are less bound by service funding protocols and can provide flexible home-based and regional services; therefore are well prepared for a NDIS consumer-driven market. Access to the Vendor Clinic is commonly initiated by the primary therapist, although strong working partnerships were evident amongst the experienced: that is participating consumers, prescribing clinicians and vendor experts. These relationships are often forged on a personal level: from consumer to individual provider, rather than at a service team level. To ensure quality assurance, service credentialing and practitioner accreditation are recommended at service and practitioner level: that is, quality assurance at an individual practitioner, at a supplier level (aligned with universal education) and at a seating service level. This is consistent with recommendations made by Summers and Walker (2013), aimed at categorising the quality of services provided by assistive technology practitioners in preparation for a consumer-driver NDIS market place. As noted, access to metro-based secondary services are determined by the consumer’s geographical location and their ability to travel, as and when needed.

Service provision aimed at addressing a consumer cohort residing outside easy reach of metro-based specialist seating services, is described as the outreach service model.

**Outreach seating servicing.**

The outreach seating service predominately exist within the secondary service level, delivered by specialist services. As the seating service sector, at the time of data collection, was largely located in major cities, service access is logistically challenging for consumers living in regional and rural Australia. This finding is consistent with the international literature pertaining to delivering seating services and wheelchair technology to regional
and remote locations (Duffield, 2013; Schein, Schmeler, Brienza, & Saptono, 2008; Schein, Schmeler, Holm, Pramuka, Saptono, et al., 2011). The study shows regional and rural consumers who are located remotely to specialist services have less service choice. Remoteness affects the technology access: reduces the range available, therefore the wheelchair and seating technology provided, thus confirming similar findings in wheelchair access in regional South Africa (Duffield). In addition, the lack of timely access to wheelchair suppliers and seating services restricts technology selection in regional and rural Australia. In response to remoteness, specific technology was prescribed, according to restricted access to maintenance and repair services. The challenge of rural access aligns with Canadian findings (Schein et al., 2008; Schein, et al., 2010) as extensive travel, vast distances and adverse weather conditions affect wheelchair procurement and access to seating services.

Outreach service providers optimised their service reach by combining services strategically for greater service immersion. To manage travel distances, participating suppliers strategically aligned seating sessions, by gathering numerous consumer consultations together during any outreach service provision, to optimise their travel expenses, resources and service reach. Likewise, Integrated Services running an annual outreach clinics combined service provision and consultation with peer education to build locally-based workforce capacity in non-metro Australia. This study shows educating primary service providers is urgently needed to sustain their capacity as locally-based services, with competence and confident to address an increased consumer demand. Service resilience, competence and capacity at the local primary level are basic service pre-requisites required now in preparation for consumer-driven fuelled by NDIS funding.
A resilient service sectors needs a robust workforce. A robust workforce needs leadership, education and professional development programs based on evidence based practice (Summers & Walker, 2013). The study exposes an urgent need for a universal education program aligned with best practice service provision, specialised wheelchair procurement and evidence based research. The data show current service practices are fragmented; each specialist seating service (as an Integrated Service and Vendor Clinic) provides expert consultation and secondary services at a case-by-case level, to individual primary therapists and their consumers. Therefore seating skill transfer is often case specific and insular, limited by each service acting as silos of seating expertise. More alarming is the doyens of the seating sector are existing the industry with their knowledge. The sector has no process in place to capture and transfer seating knowledge to the next generation.

Instead, the study exposes a small, busy but fractured seating service sector in need of coordination and leadership to harness its considerable, but fragmented service resources. A coordinated approach is required to unify the collective knowledge and expertise into a common resource for the next generation of service providers. As noted by the experienced service providers, a sustainable seating sector needs numerous seating services (located across the nation) and operated by teams layered with various levels of expertise (ideally novices working with experienced peers acting as mentors). To replace retiring seating experts, a proactive sector needs the ongoing generations of competent, confident and educated service providers capable of addressing the evolving mobility and postural demands. A sustainable seating service sector is urgently required to robustly meet the consumer-driven demands within an evolving funding environment.
The service sector is dominated by the Australian funding environment (refer to Figure 22), this is discussed now.

**Funding environment.**

Data show three dominant elements to funding Australian wheelchair procurement as: service funding (for government and non-government seating services); at a consumer level dictated by disability eligibility systems (as for non-compensable or compensable consumers) and at a wheelchair procurement level. As these three funding systems run concurrently they systematically disenfranchise equitable consumer service access and unjustly distribute wheelchair-seating technology. More specifically, a restrictive, fragmented government funded environment actively disempowers consumer control of and choice during their wheelchair procurement. The underfunded and poorly resourced Australian seating service sector is a reflection of an overarching injustice documented by the Australian Productivity Commission (2010) of its umbrella disability care system.

As noted, equitable wheelchair procurement is shackled by variations in service funding, and its effect on viable services resources.

**Service Funding.**

There were two major sources of service funding: recurrent and intermittent. The study reveals recurrent service funding enables service flow and consistency, leading to quality in service provision and timely wheelchair procurement. Conversely, the quality of seating services funded intermittently reduces service scope and its uncertainty restricts wheelchair procurement. Uncertain funding frustrates service teams unable to guarantee reliable or timely wheelchair and/or seating technology provision, while service funding certainty empowers service flow.
Of concern, there is major inconsistencies in the declaration of prescribing clinicians’
contribution to seating services and therefore to wheelchair procurement. The primary
therapy contribution is largely covert, within a Networked Team; and rarely visible within
wheelchair procurement employing Integrated Services and/or Vendor Clinics. If service
funding is to be remunerated accurately, then the true procurement costs need to be
accounted for. Also invisible from the wheelchair procurement contribution is the time and
energy invested by the consumer and care provider – including lost productivity and time
away from work – these are not yet factored into any wheelchair procurement.

Service funding remuneration for compensable consumers is overt. Compensable
accounting systems tend to declare truer wheelchair procurement costs and service provider
costs, and are more person-centred approach. The same purchase transparency does not
account for the considerable contribution provided by consumer and their informal carer
support. For the first time, the findings show estimates of these invisible service costs.
These are presented later under key finding seven and eight.

Service access and wheelchair procurement are effected by funding eligibility criteria.

**Consumer eligibility.**

As noted, the data show two layers of consumer eligibility to disability funding
operating concurrently: the compensable and non-compensable system. As both system
operate differently this exposes an inequitable funding environment. Appropriate
wheelchair procurement is influenced by the consumer’s eligibility to funding: as a non-
compensable consumer is eligible to restricted government funds or as compensable
consumer with access to more generous insurance-based funding. As described earlier, the
only compensable consumer in this study described having greater access to a range of
seating services and to sophisticated technology, when she compared her wheelchair outcome with her non-compensable peers. The consumer’s eligibility to either funding system impacted on their wheelchair procurement.

**Wheelchair procurement funding.**

The majority of the specialised wheelchair procurements, in the study, are however dependent on non-compensable government funding. Fuelled by government funding, each state-run funding programs operated differently: as needs-based, inventory-listed or subsidy-schemes. As a result, specialised wheelchair procurement within the non-compensable system varies from state to state. The funding approach actively endorsed or inadvertently stymied a preferred person-centred approach to wheelchair provision. The data expose wheelchair procurement as unjustly inconsistent throughout Australia, controlled by government systems.

The needs-based funding approach is endorsed as being more person-centred. The inventory-listed or subsidy-scheme funding approaches were less favoured, as these adversely dictated prescriber behaviour according to funding protocol. This finding is consistent with the literature (Batavia, 2010; Plummer, 2010; White & Lemmer, 1998).

This second key finding shows an Australian seating service landscape with no apparent cohesion, as access to service provision and funding protocols influences wheelchair procurement across the nation. There is an urgent need for service leadership to bolster seating service capacity and the equity of wheelchair procurement based on need. A robust seating service workforce requires a unified approach to professional education and for service quality rigor, such as might be achieved with an accreditation process. There is an urgent need to unify and maximise best practice validation and knowledge exchange
among services and all stakeholders, now and for a robust future. This is consistent with Plummer (2010) who advocates for universal access to education for all stakeholders. National leadership is required, as is a unified centre of seating excellence, to strengthen the broader Australian seating sector with capacity to address a NDIS consumer-driven marketplace.

The next six key findings provide data relevant to establishing service pathways most needed and suitable for an Australian seating service.

**Key Finding 3: Four Domains of Postural Function Complexity**

The third key finding is the identification of Four Domains of Postural Complexity. The four domains of postural complexity, presented in Figure 23, are a simplified form of Figure 17 as identified in Chapter six. This finding provides a clinical pathway to triage service referrals, to allocate the best level of seating expertise according to the postural complexity and to accord appropriate service resources to meet individual needs. The Four Domains of Postural Functional Complexity as shown in Figure 23, provides a quick guide to efficiently process incoming referrals based on the consumer's postural complexity and associated pressure care risk.
Applying the Four Domains of Postural Function Complexity at initial intake assists service providers to identify the anticipated degree of complexity according to the consumers’ mobility and postural function. Similar to the MPT framework (Scherer, 2008) that defines functional factors for the appropriateness of person-technology fit, these four bio-functional domains provide a framework to expedite the match of the most appropriate wheelchair-seating approach according to the case complexity. This is elaborated upon by the fourth key finding.

**Key Finding 4: Seating Service Selection Guide**

The fourth key finding is the Seating Service Selection Guide (see Figure 24). The Seating Service Selection Guide applies to complex seating. It identifies four levels of complexity with a clear divide between the two lesser complex domains from two more complex domains. The two less complex domains, Complex and Complex Plus, are generally accommodated with modular technology and/or blended modular wheelchair-seating technology. The two more complex: Very Complex and Extremely Complex, require customised solutions.
The Seating Service Selection Guide provides a service pathway to steer technology selection and inform the level of service. As noted in Figure 24, an identified Complex consumer tends to require modular technologies, such as SPEX and Matrix seating systems, and could be allocated to a Networked Team, a primary seating service. If customisation and additional adjustment of modular technologies are indicated for an identified for the next level, Complex Plus need, then a Networked Team might access specialist technical skills, such as the Vendor Clinic to accommodate the postural needs, as identified in Figure 24.

The two more complex domains, Very Complex and Extremely Complex, require a customised seating service approach. Customised seating requires manufacturing by a specialist seating service, such as an Integrated Service. The study shows the Very Complex case requires a customised seat seating insert (foam-on-ply) best suited to accommodate a single postural deviation, such as lordosis. The contoured 'moulded' seating is considered more appropriate for accommodating multiple postural deviations, such as for a scoliosis with pelvic rotation: to address Extremely Complex needs.

Consistent with the milieu as noted in Scherer’s MPT framework (2008), the Seating Service Selection Guide defines the level of seating service according to the postural complexity, by the seating approach and in doing so indicates the appropriate service type. For example applying the Seating Service Selection Guide: the Complex domain employing modular technology indicates a primary level of service and can be undertaken by a Networked Team. An experienced Vendor Clinic is considered more appropriate level of service for the Complex Plus domain requiring blended technology. As the Very Complex and Extremely Complex domains require custom-made seating solutions. A
secondary service aligned with a workshop service is considered appropriate (an Integrated Service).

Figure 24 Seating Service Selection Guide according to the four domains of bio-functional complexity

Figure 24, the Seating Service Selection Guide provides service structure to identify the level of seating service suitable to provide the appropriate seating technology approach according to four domains of postural, functional complexity. Further elaboration of case complexity is provided by the fifth finding.
Key Finding 5: Three Types of Decision-Maker

The fifth key finding is of three types of decision-makers (see Figure 25). Three levels of consumer decision-making capacity as identified in Chapter six are: independent, supported and advocate. The type of the decision-maker indicates the degree and locus of decision-making control afforded the consumer and as such, helps to define the appropriate level of service resources. As noted previously in Chapter 6, independent decision-makers require minimal additional resources as they are empowered as efficient, effective team members. Supported and advocate decision-makers require greater service resources to ensure their contributions are considered and are inclusive. These findings are consistent with the personal factors highlighted by Scherer (2008), as consumer acceptance and attitude; by Routhier et al (2003) as problem-solving and analytical capacity and Eggers et al. (2009) as consumer capacity and motivation. Each decision-making type, as shown in Figure 25 is elaborated now.
Figure 25 Three types of decision-maker and resource implications

Key DM = Decision-makers

The first type, independent decision-makers make informed choices and decisions about their wheelchair needs according to their lifestyle demands. In the context of family-centred decision-making, which Parette and Brotherson (2004) describes as self-determination. This is the same capacity as demonstrated by independent decision-makers, who determine their choices and decisions based on their needs, informed by their experience, aimed at their desired quality of life. Independent decision-makers collaborate as equal and efficient partners in decision-making and require minimal support resources. The experienced consumers and care providers with accrued wheelchair experience exemplify confident, self-directed decision-makers and as such enjoy intensely collaborative partnerships with their trusted service providers.
The second type, supported decision-makers (see Figure 25), are considered more ‘vulnerable’ (Pépin et al., 2013, p. 159) because their decision-making capacity is adversely affected by their health, stamina or cognition. The supported decision-makers lack insight and may make poor decisions because they do not consider all ramifications (Batavia, 2010). To avoid making poor decisions, supported decision-makers need assistance to understand all the compromises and problems associated with using mobility technology on a daily basis. This finding is consistent with the proposal by Kohn and Blumenthal (2014) who state sensitive inclusive support can empower these decision-makers to make choices well. As noted in practices applied by Clinician Jane’s team, allowing adequate time to include and support the supported decision-maker enhanced their decision-making contribution. The practice of inclusive decision making is consistent with recommendations by Pépin et al. (2013) who remind service providers of their duty of care to ensure vulnerable decision-makers are not disenfranchised. Supported decision-makers require the most support to build competence and to empower their decision-making capacity.

In this study the prescribing clinician, commonly the primary therapist, is usually responsible for providing support to consumers identified as supported decision-makers. This advocacy service is rarely accounted for as a wheelchair procurement cost, despite consuming considerable service resources.

The third type, the advocate decision-makers, act as proxies for the consumer. In this study, the parent acted as the advocate to make decisions based on their intimate knowledge of their respective sons, as the wheelchair occupant. The advocate’s knowledge of the consumer’s needs is considered essential to achieving a successful outcome, as noted in previous research (for example, see Datta & Ariyaratnam, 1996; Frank et al., 2010;
The role of the advocate decision-maker is intense, as they work with numerous stakeholders, multiple agendas and need to digest voluminous data to make good decisions on behalf their family member and within the context of their family. This finding is consistent with family-centred decision-making (Parette & Brotherson, 2004) where the consumer’s needs are central, and where any technology and service decisions impact on the whole family. The participating care providers who acted as advocates on behalf of their sons, spoke of building team trust and respect over time. Trusting the contribution of the advocate is of acute relevance during the assessment–prescription process (Plummer, 2010) as their contribution is vital for appropriately matching wheelchair with consumer goals and family lifestyles.

Identifying the consumer's individual capacity and control in making decisions, by type, enables the early allocation of service support according to that individual's need for support, as required. The three types of decision-makers provides a quick guide to alert service providers of the consumer’s decision-making capacity, to anticipate problems that might impact on making sound decisions; and if required, to allocate appropriate supports early. This fifth finding helps build the multi-factorial characteristics of case complexity, as described now.

**Key Finding 6: The Determinants of Case Complexity**

The sixth key finding describes the Determinants of Case Complexity. A number of compounding factors influenced the complexity of a case (Figure 26) including: the postural factors as described in the Four Domains of Postural Function Complexity (Figure 23) and the consumer’s decision-making capacity (Figure 25). The Determinants of Case
Complexity add to the third, fourth and fifth key findings with the addition of the bio- and psychosocial factors that impact on the consumer's capacity to engage proactively. These additional factors are: the consumer abilities, lived experience and support need, required and realised.

Consumer abilities includes the consumer’s health and the stamina to attend, concentrate and engage. As previously noted, impaired stamina and cognition increased case complexity, as do communication impairment or the use of assisted communication technology. All these factors affect the consumer capacity to engage, thus compounding case complexity. These align with contextual factors in the MPT framework (Scherer, 2008) and as noted in the relational model of wheelchair mobility by Routhier et al. (2003). The study highlights those consumers presenting with confounding factors required greater service resources to ensure their needs were heard (see Figure 26).

The consumer’s degree of lived experience as a wheelchair occupant also impacts on case complexity, as noted (Kittel et al., 2002; Scherer, 2005). As shown in Figure 26, novice consumers lack the wheelchair experience and knowledge on which to base informed decisions. The study’s novice consumers required greater service input, peer support, practical experience, and time to acquire necessary knowledge. This confirms findings by Kittel et al. where wheelchair inexperience, induced by sudden onset of disability (e.g. following spinal injury) require additional service support to accrue knowledge. Novice consumers require greater service time and resources. Conversely, experienced consumers make quicker decisions based on their accumulated experience, knowledge and through team partnership trust. This study finding confirms others findings
where lived experience provided knowledge that informed decision making capacity (Kittel et al.; Mortenson & Miller, 2008; Scherer, 2005).

The final compounding factor noted was the degree of carer support need. Consumers who were dependent on physical or emotional–social support presented as being more complex. In particular, consumers who were poorly networked (in service or with peers) required greater service support and were therefore identified as being more complex. Case complexity was significantly increased when a consumer's support needs were not realised.
Figure 26 Determinants of Case Complexity by contextual factors
Implications of the Key Findings of 3, 4, 5 and 6.

The Determinants of Case Complexity is a major study finding. While specialised wheelchair procurement is an acknowledged complex process (Eggers et al., 2009; Mortenson & Miller, 2008; Routhier et al., 2003), the Determinants of Case Complexity adds to the above evidence in its complexity. That is, Determinants of Case Complexity highlights case complexity by matching bio-functional complexity with psycho-social complexity to inform allocation of appropriate level of competent, efficient and effective seating service resources. The Determinants of Case Complexity confirms that specialised wheelchair procurement is indeed multi-factorial, and specifies the compounding factors. The study highlights the compounding factors as: the consumer's postural complexity, the consumer's capacity to engage, the lived wheelchair experience, their met support need (i.e. the support required versus actual support provided) and their decision making capacity. These are new data to the seating service experience in Australia and adds to existing knowledge internationally.

The application of this finding, the Determinants of Case Complexity is as a guide to alert service providers early of the resources and requirements as identified according to case complexity. Using the Determinants of Case Complexity, the direction of the seating approach is clearer, as is the allocation of specific seating expertise. Understanding the factors that compound case complexity helps to anticipate problems early, including the need for additional, time and funding or a referral on for greater specialisation and/or expertise from a holistic perspective. For example, a consumer with extremely complex postural needs who has excellent carer advocacy, may require fewer service resources than
a consumer with less complex postural needs but who has been identified as a supported
decision-maker with poorly met carer support needs.

A number of strategies are used by service providers to mitigate complex seating
cases, including forming collaborations mutually focused on person-centred outcomes. This
finding concurs with those of Mortenson and Miller (2008) and Plummer (2010). Trusted
partnerships are employed to deliver person-centred seating services. Trusting relationships
empower egalitarian collaboration. Long-term relationships help manage multiple
stakeholder agendas and expedite decision-making based on trust and respect. Gowran and
colleagues highlight the importance of forming strong partnerships to sustain wheelchair
procurement and seating service provision (Gowran, 2013; Gowran et al., 2011). In
addition, concurring with pilot study findings by Fitzgerald et al. (2005), this current study
finds that trusted wheelchair repair and maintenance service partnerships are linked to
greater consumer satisfaction. The trusted partnerships between clinicians and their vendors
enhance service teamwork. The trusted relationships forged by clinicians with funding
agents also assists in transparent decision making. Transparency in the funding application
process enables greater control to make or change decisions earlier to avoid supply delays.

Long-term partnerships assist consumers living with complex seating needs by
providing continuity of seating service. Continuity of seating service strengthens person-
centred practice, and helps to mitigate some seating service complexities. In addition, long-
term partnerships help anticipate postural or seating needs and potential changes so that
wheelchair-seating prescriptions can intentionally anticipate of future needs (and avoid
injury). Long-term partnerships help anticipate funding cycles to proactively avoid
unnecessary delays in wheelchair supply. As research by Mortenson and Dyck (2006) show, funding factors are common inhibitors to successful person-centred outcomes.

Participants spoke of strengthening their seating services and teamwork through service practices and procedures. The study found, however, there is no consistency in service delivery practices, in assessment protocols or outcome measures in Australia. This is consistent with previous research into wheelchair-seating assessment and prescription by Australians Di Marco et al. (2003), and in America by Plummer (2010). As specialised wheelchair and complex seating procurement requires more resources (Sprigle & De l’aune, 2012) than standard wheelchair procurement, the seating service sector requires definition of its service parameters (Harris & Sprigle, 2008). Service structure is addressed by the seventh key finding.

**Key Finding 7: Six Seating Service Steps**

In Chapter 4, the study identifies six non-linear dynamic processes operating in specialised wheelchair procurement in Australia (see Figure 27). The steps are similar to the seating service process operating in America, as noted by Eggers et al. (2009) and the Wheelchair Service Provision Process designed by the American peak body RESNA (Arledge et al., 2011). The differences between the international and Australian processes appear to be mainly procedural. For example, Eggers et al. model define the components of education and counselling as a discrete process, as does the WHO guidelines on provision of manual wheelchairs in less resourced settings (2008). Education, training and information transfer and counselling are interlaced throughout all six seating service steps as noted by the participants with Australian seating service experience. Education and counselling occur as an ongoing dynamic process in the Australian experience. This aligns
with the Routhier et al. framework (2003) that combines assessment and training together as one domain.

In addition, the three components of ‘device selection’, ‘device evaluation’ and device justification’, as described by Eggers et al. are grouped under the umbrella of technology selection in the Australian context. The technology-selection process is closely linked to the home-based trial process and its evaluation is pivotal to justifying wheelchair prescription and hence a funding application. The technology evaluation–funding justification process is explicitly linked to the home-based trial evaluation (see Figure 27). Funding agents in Australia require a wheelchair trial to validate a wheelchair-seating prescription, especially for non-standard technology.

The RESNA model identified fifteen service components: ‘Referral, Assessment, Equipment Recommendation and Selection, Funding and Procurement, Product Preparation, Fitting, Training and Delivery, Follow-up Maintenance and Repair, and Outcome Measurement’ (Arledge et al., 2011, p. 3). In the Australian sector, the majority of these components are captured in the service activities within the six seating service steps (see Figure 27) with the exception of maintenance and repair. The clinical standards for NHS wheelchair services (Dolan, 2013) considers procurement, repairs and maintenance within one related area as ‘equipment management’ (p. 368). In Australia, wheelchair maintenance and repair services are considered and funded separately from wheelchair provision. That is, although access to after-sales service is one of many factors considered at the time of wheelchair selection (and informs the wheelchair prescription); the repair and maintenance services are considered discrete and not a component of wheelchair provision.
Repair and maintenance are funded separately to wheelchair procurement at the time of this study.

The Six Seating Service Steps define the specialised wheelchair procurement process from service entry to wheelchair discharge in Australia; they are described in Figure 27. Each step was described in chapter four, this section elaborates on the findings and discusses each step from an Australian perspective within the known evidence.

**Step 1: intake process**

The first in the Six Australian Seating Service Steps is intake (Figure 27). Intake initiates the wheelchair procurement process upon a service request or referral. This is consistent with Eggers and colleagues (2009) and in accordance with Eggers et al., identifies the consumer’s need and risk to allocate services appropriately. The intake process triages incoming referrals based on the consumer’s anticipated mobility and postural needs and risks (Hardy, 2004; Lyons, Orozovic, Davis, et al., 2002; White & Lemmer, 1998). Triaging incoming referrals assists the seating service to allocate and assign resources to meet the seating request in a timely manner.

The estimated time allocated to process a referral, including the allocation of services or activation of a referral to a secondary service, is approximately one hour. As with NHS clinical standards for wheelchair services (Nolan, 2013), the initial referral is commonly managed by the primary therapist who decides the service pathway and need for secondary service referrals.
Figure 27 The Six Seating Service Steps: a non-linear dynamic process within an Australian context.
Step 2: assessment–prescription process

The second step the Six Seating Service Steps, is assessment–prescription (Figure 27). This process identifies the consumer’s mobility and postural need. The bio-functional assessment establishes the consumer’s personal mobility–postural goals to prescribe a provisional wheelchair-seating system. As noted by Arledge et al. (2011) and Plummer (2010) this assessment does not occur in isolation. There is a dynamic interaction of thinking evident: assessment findings and desired goals are combined to find appropriate technology solutions, select options and commence building of a provisional prescription. A provisional prescription helps focus the technology selection process, by removing unviable options and facilitating the selection of suitable technology for the home-based trial. The study shows this assessment–prescription process remains active throughout the next four steps as the prescriber and consumer assess, re-assess and re-evaluate technology choices and test these against the original (provisional) prescription. This assessment–prescription process is considered the most important in specialised wheelchair procurement (Plummer, 2010), the most complex (Di Marco et al., 2003) and an ideal person-centred educational and information exchange opportunity (Plummer).

The assessment–prescription process incorporates three important components: a seating assessment, interview process and an environmental evaluation. A comprehensive seating assessment includes a bio-functional assessment (mat evaluation). As noted by others (Batavia, 2010, Hardy, 2004; Plummer et al., 2013) the mat evaluation is an essential component of the process and requires specialist seating skill and assessor competence (Plummer, 2010).
The seating interview encourages consumer engagement and education, and is linked to empowering informed choice making (Plummer, 2010; Reid et al., 2002) while lack of involvement is implicated in unsuccessful wheelchair outcomes (Di Marco et al., 2003; Kittel et al., 2002). The environmental evaluation loosely describes the clinical assessment of the consumer’s routine occupational and environmental demands at home and their mobility demands in the community. Understanding the personal meaning of and context in which the wheelchair is used is an acknowledged factor in successfully matching the wheelchair and seating technology within the consumer's lifestyle needs (Gowran, et al., 2002; Plummer, 2010; Scherer, 2005, 2008; Sprigle, 2007). In this study, the home assessment is the task of the occupational therapist, as the primary therapist and principal prescriber. The primary therapist establishes clear goals according to the consumer’s mobility and postural needs and this information is transferred to the secondary seating services if engaged (e.g. referral to an Integrated Service or Vendor Clinic).

**Mat evaluation.**

There is no universal order of the three aforementioned assessment components. In line with the literature, this study endorses the mat evaluation as an essential activity to assess mobility and postural needs accurately (see Batavia, 2010; Plummer, 2010) and to anticipate potential postural deformity or changes (Walls & Rosen, 2008). As Eggers et al. (2009) and Plummer (2010) note, the mat evaluation requires clinical skill acquired through practice. This study finds that accrued seating experience and timely supervision are linked to competent skills required for the mat evaluation task. While the participating clinicians were experienced and confident needs assessors, the study shows less experienced prescribing clinicians are no so confident. They seek to collaborate with the secondary
seating services to complete the mat evaluation for complex cases. Williams and de Jonge (2010) state being a competent, confident seating assessor (i.e. administering a mat evaluation) strengthens the prescriber’s credibility. As home-based assessment is more comprehensive, than a clinic-based assessment, the study findings show this process is estimated as consuming between one to four clinical hours.

A judicious case-by-case approach is advised when undertaking a mat evaluation at home, as the home environment provides less than optimal assessment facilities: where the assessment may occur on the consumer’s bed, or may involve dangers associated with unstable health, such as autonomic dysreflexia associated with spinal injury. A clinic-based assessment tends to be shorter (between half an hour and two hours), as purpose intent facilities with a plinth, hoist and expert assistance are often in place. This finding concurs with findings by Sprigle (2007).

**Seating interview.**

The seating interview is the second component of the assessment process. This provides qualitative information of the consumer’s perspective of their social and occupational issues and needs. Allocating adequate interview time to listen and explore the consumer’s lived experience is aligned to a person-centred approach. This is consistent with findings by Plummer (2010). The interview process enables the consumer–clinician–vendor time to explore the consumer’s lifestyle demands, to understand their routines, their occupational roles and goals (and that of their carer), their environmental needs and technology expectations. Pape, Kim and Weiner (2002) explored the consumer’s and their carer's expectations of service and found understanding their preconceived notions of the wheelchair and its outcome help to clarify a wheelchair prescription. The confirms their
findings, of facilitating a two-way information exchange so the consumer's and their carer's occupational needs are articulated and understood by the provider services. Being heard empowered the participating consumer and the care provider's contribution.

Home assessment.

The environmental evaluation, or home assessment is the third assessment component, and is commonly assigned to an occupational therapist. The home assessment establishes the consumer's routine occupational and community environmental demands such as daily activities, family and carer needs and the common environments in which the wheelchair is used. A comprehensive understanding of psychosocial and occupational needs within the built, natural and social environments helps establish and clarify wheeled mobility and postural goals. Plummer (2010, Batavia (2010) and colleagues (2001) state that establishing clear goals optimises the match of wheelchair and seating technology with consumers' lifestyle. This is only possible when contextualised holistically. The importance of considering contextual factors is mapped by Scherer in her MPT Framework (2008) (see Figure 3). The above assessment data inform the prescription process.

The wheelchair and seating prescription.

The prescription decides the most appropriate wheelchair and seating technology, its procurement approach and the provider. The prescription is an ongoing process of evaluating and trialling wheelchair and seating technology in various environments against the prescription goals. The prescription as a complex and multi-faceted process is well documented (Arledge et al., 2011; Di Marco, et al., 2003; Dolan, 2013; Eggers et al., 2009; Plummer, 2010; Routhier et al, 2003).
In this study, the wheelchair and the seating prescription are the domain of the primary therapist. Again, in this study, the cohort of the primary therapists is identified as exhibiting the greatest variation in seating experience, skill and competence. Getting the prescription right requires between one and four clinical hours and is depended upon clinical experience and skill (Di Marco, et al. 2003). The time taken for an assessment–prescription process is influenced by the case complexity and as noted by Waldron and Layton (2008), is compounded by: the requirement for, and the actual carer contribution, access to adequate funding, and service accessibility in relation to the consumer’s geographical location. The study shows wheelchair and seating expertise is metro-centric, in the Australian seating service sector.

**Assessment–prescription protocols.**

The most common assessment protocol evident in the study is the use of adapted assessment protocols. These are designed by each service, often by modifying vendor scripting forms specifically to suit team needs. The adapted assessment protocols are designed to collect all consumer data: incorporating data from the seating assessment, the seating interview and environmental evaluation.

A modified Goals Attainment Scale (GAS) and the Canadian Occupational Performance Measure (COPM) are tools used by participants. In line with findings by Kenny and Gowran (2014), applying GAS helps busy service providers to plan and evaluate individual person-centred sessions. The assessment–prescription informs the next service process, technology selection.
Step 3: Technology selection-trial process

The third of the Australian Six Seating Service Steps is technology selection (Figure 27). The technology selection and trial process describes the decision-making process of selection and the trial evaluation of the wheelchair and seating prototype.

Consumers select wheelchair and seating technology based on user simplicity, wheelchair appearance and reliability; this is consistent with findings by Fitzgerald et al. (2005). Consumers link wheelchair appearance to their self-identity, like a wearable technology. This study finding is aligned to findings by Gowran (2012) where the wheelchair system is considered an intimate part of the consumer’s body and image. While service providers are alert to the above consumer wants, funding restrictions frequently focus technology selection towards consumer basic needs: comfort, function and stable support, as has been noted in the literature (Batavia, 2010; Karmarkar et al., 2009; White & Lemmer, 1998). Technology durability according to environmental demands is highlighted; wheelchair selection is informed by access to timely after-sale service and linked to optimising wheelchair enhanced occupational performance (Mortenson & Miller, 2008).

Gowran and colleagues (2012) state that wheelchair appropriateness is linked to enhanced occupational opportunity. Therefore appropriate wheelchair-seating technology is essential and should be provided as a basic human right.

As previous findings indicate, appropriate wheelchair selection enables consumer’s occupational performance and if used safely, helps reduce the burden of care (Mortenson et al., 2012). Reduced carer burden enhances the quality of life for both consumer and care providers (May & Rugg, 2010; Hubbard Winkler, Fitzgerald, Boninger & Cooper, 2008). This study finds when wheelchair technology is selected appropriately (whether this
involves a powered mobility upgrade or a seat elevator, for instance), it enables greater community engagement with a reduction in a need for and dependence on support services such as attendant care. This study finds that sophisticated technology appropriately applied empowers occupational opportunity, of both consumer and their carer support systems.

The wheelchair-seating selection process is validated by a home-based trial. The link between appropriate technology selection and wheelchair trial are endorsed by Eggers et al. (2009), by Plummer (2010) and within the ‘environments of use’ construct within Scherer’s MPT framework (2008). In this study, a home-based trial of modular prototypes occurs prior to funding approval while custom-made trial prototypes require funding for construction. Therefore, the home-based trials of custom-made prototypes occur after funding approval. This study finds modular wheelchair prototype trials are commonly conducted over three to seven days, although one to two weeks trial is considered ideal. In addition, the clinician and consumer contributions during technology trial are rarely visible in the procurement process. The suppliers’ trial contribution is overt only if they are successful in obtaining the purchase contract.

A successful home-based trial relies on the wheelchair supplier’s resourcefulness, for example in accessing technology to assemble a trial prototype. Assembling one modular wheelchair and seating trial prototype takes approximately four technical hours. Regional and rural consumers, as has been made clear, experience difficulty in accessing specialist wheelchair suppliers and therefore appropriate wheelchair-seating prototypes for trial at home are problematic. Synchronising all technologies, on loan, to assemble a scripted trial prototype is challenging. In addition, the travel expense and time delay further challenge
the trial process for regional and rural participants, as is noted by (Schein et al, 2010; Schein et al., 2011).

The home-based trial of a custom-made prototype occurs after construction. Seating technicians estimate 20 technical hours (or one week) to construct a wheelchair-seating prototype. There is less time pressure on home-based trial of custom-made prototypes as this is clearly accounted for in the procurement estimate. Routine custom-made trials are estimated at between two to four weeks duration, more if complex. Multiple retrials are common between clinic-based adjustments: these take three to four hours per adjustment session between each re-trial.

The home-based trial is driven by the consumer within their home environments and this empowers the consumer’s decision-making contribution. The consumer’s primary therapist is responsible for technology evaluation, prescription justification and consumer-to-vendor feedback. This study confirms de Jonge, Scherer and Rodger’s (2007) assertion that adequate technology trials are essential for validating the technology prescription. A home-based trial justifies the prescription appropriateness of the wheelchair and seating technology selected, within the consumer's lifestyle parameters. The selection and evaluation components are integral factors when matching appropriate technology with the consumer’s lifestyle needs (Scherer, 2005; 2008).

**Step 4: technology evaluation.**

The fourth of the Six Seating Service Steps is the technology evaluation (see Figure 27) and commonly involves producing a funding application report. The funding application, the domain of the principal prescriber, provides a clinical justification of the wheelchair-seating prescription for funding approval.
Consistent with Barbara and Whiteford (2005), the study confirms funding application process in Australia is bound by state-funded protocols. As standard wheelchair and seating technology are rarely appropriate for complex needs (Barbara & Curtin, 2008), prescribers require confident clinical reasoning skills to justify the additional cost of sophisticated technology (Di Marco, et al., 2003; Eggers et al., 2009; Plummer, 2010; Cohen et al., 2013). Skilled, clear prescription is required to attract adequate funding (Eggers et al., 2009; Scherer & Craddock, 2002), as is extensive networking for possible funding resources.

The principal prescribers with expert clinical reasoning skills are more successful in attracting funding for costly technology. Their success is twofold: linked to their ability to write compelling applications and because they are adept fund raisers. Their extensive networking assists in attracting necessary top-up funding to cover shortfalls.

As shown in Figure 28, the time allocated by the primary therapist to compile a funding application report is estimated between 1-4 hours. The variance is explained by case complexity and the degree of technology research required. The wheelchair suppliers commonly provide a wheelchair quotation, post home-based trial, based on the funding agent’s protocol (an estimated ≥0.5 technical hours). By comparison, the wheelchair-seating service quotation is estimated by Integrated Services prior to construction, and this occurs at the intake process or upon first assessment session (an estimated ≥3-4 hours).

Access to adequate funding activates the production process. The provision and fitting process is the fifth step.
Step 5: provision-fitting process

The fifth of the Six Seating Service Steps is provision-fitting technology (see Figure 27). The provision-fitting process describes activities that cover the supply, assembly, construction and integration of the wheelchair base, seating system and aligned electronics and accessories, fitted to the consumer’s specific mobility and postural goals.

The provision-fitting process is consistent with findings by Sprigle and De l’aune (2013) who state provision and fitting are the most labour-intensive processes in specialised wheelchair procurement. The contribution by the vendors dominates this process: that is the supplier, rehabilitation engineering and seating technician participants. As previously stated, the construction of each custom-made wheelchair-seating system consumes approximately 20 technical hours. As noted in Figure 28, the estimated contribution of clinicians and vendors in providing a wheelchair system with custom-made seating is between 20 and 30 hours. Prior to this study, the technical hours were explicit on successful service purchase however, the clinical hours were inconsistently declared in specialised wheelchair-seating costs.

In addition and before this study, the time expended by consumers (and their care providers) was not calculated in wheelchair procurement. This study conservatively estimates approximately 30 consumer hours per custom-made wheelchair-seating system (see Figure 28). The same estimate for the carer provider support (≥30 hours) is made visible for the first time. This provides a benchmark to compare the influences of case complexity, additional fitting sessions and participation time on specialised wheelchair procurement. The care provider’s contribution is considerable and, until now, has been
poorly acknowledged, in light of the carer’s lost productivity due to interrupted work and lost income.

In comparison to the above approach, the consumer-carer contribution is less during modular wheelchair procurement because it is comparatively less labour intensive: an estimated 20 to 30 hours. Primary therapists who support their consumers from intake through the fitting process (of modular technology) spend approximately 20 to 30 hours, in their pursuit of a high-quality outcome. The vendors spend less time in modular assemble–supply–fitting, as ongoing home-based adjustments provide for greater vendor flexibility: an estimated 10 to 20 technical hours.

In providing custom-made seating solutions to regional and rural consumers, the following is noteworthy. The production of foam-on-ply seating solutions on-site means a seating system can be constructed quickly and this expedites the fitting process. This process benefits condensed seating services such as the regional outreach clinics. By comparison, while outsourcing seating manufacture (like the Otto Bock Shape) lengthens the provision process, the outsourcing of production assists in reducing the need for extensive workshop facilities and manufacturing expertise. In addition, the study finds innovative approaches to bespoke seating solutions: as noted where body imprints were captured digitally (beanbag method) or manually (using a Matrix seat system) helps to extend specialised wheelchair procurement to remote consumers. Once the raw seating insert is manufactured, subsequent regional/rural services fit each consumer with their bespoke wheelchair-seating system. These outreach provision-fitting services allows for in-situ skill and knowledge transfer between metro-based experts and the local service providers. This collaboration enhances networking, builds skills and strengthens local
service capacity. Timely after-sales servicing sustains wheelchair performance. Ready access to knowledgeable locally-based services ensures optimal wheelchair performance. Confident, knowledgeable services enhances service provision and facilitates knowledge and skill transfer at a local level. Ready access to knowledgeable locally-based services empowers consumer decision making: that is when, where and with whom to access wheelchair and seating related maintenance services.

**Step 6: post-provision review process**

The sixth and final step in the Six Seating Service Steps is the post-provision review (see Figure 27), which evaluates the effectiveness of the service (Cook et al., 2008) and the appropriateness of the wheelchair system provided (Arledge et al., 2011; Eggers, et al., 2009; Miller, Garden, & Mortenson, 2011). The service providers acknowledge that this review process provides important feedback on the fit or appropriateness of the wheelchair and seating system with the consumer’s holistic needs. In line with recommendations by White (2003) clinical reasoning is developed from attending to feedback obtained from the wheelchair evaluation.

The post-provision review ideally occurs within the first six weeks of home use, and in this study, is undertaken by the primary therapist as principal prescriber. As noted in Figure 28, the primary therapist takes approximately one to four hours for a post-provision review, depending on the complexity of the case and the sophistication of the technology. Any follow-up modular adjustments (estimated at about an hour per adjustment session) are commonly undertaken by the primary therapist; or the wheelchair supplier, if more complex. Again this is dependent on travel time. The post-provision review validates
clinical reasoning of the wheelchair prescription and is therefore acknowledged as an important final process, by the prescribing clinicians.

Despite its acknowledged importance, the participants acknowledge the post-provision reviews are not universally undertaken, because of crowded service schedules. The end-of-service evaluation is associated with the post-provision review, but this too is inconsistent. A consumer survey is sometimes employed, although participant confidentiality is of concern when consumers are well known. The QUEST (Quebec Users Equipment Satisfaction Test) is also in spasmodic use.

In the study, two outcome evaluation tools being considered but not yet used are the Wheelchair Outcome Measure (WhOM) and the Assistive Technology Outcome Measure (ATOM). The WhOM, a wheelchair-specific outcome measure, is recommended by Kenny and Gowran (2014) as a quick, effective person-centred measure. Harris and Sprigle (2008) found the non-wheelchair specific ATOM is also easy to administer and therefore suitable for busy service providers. Evaluating service efficiency and effectiveness exposes the quality of the service delivered (Sund, Iwarsson, Andersen, & Brandt, 2013).

**Key Finding 8: Seating Service Benchmark**

The Seating Service Benchmark is the eighth and final key finding. The Seating Service Benchmark exposes, for the first time, the hidden contribution of the prescribing clinician, at primary and secondary level and according to each seating service process within an Australian context. This is the first time that each seating service process is quantified by estimated time and by level of service. The Seating Service Benchmark provides a guide for allocating clinical and technical service time, by which to estimate service costs associated with Australian specialised wheelchair procurement.
The data contained in the Seating Service Benchmark confirms that specialised wheelchair procurement and seating servicing are resource-intensive (Arledge, et al, 2011; Eggers, et al., 2009; Plummer, 2010). This Australian benchmark provides valuable evidence-based data by which to structure the service process, resources and professional skill-base of individual seating processes.

Figure 28 reveals the previously hidden costs of clinicians’ contribution for a custom-made wheelchair can be as much as 35 clinical hours. In addition, again for the first time, the contributions of the consumer and their care providers are estimated around 60 hours. This is in addition to the known costs of a specialised wheelchair (≥$10,000-35,000) and the estimated vendor costs (≥20-30 technical hours). For the first time it is possible to show that consumers with complex mobility and postural needs consume services and wheelchair funding for non-standard technologies that are well above their peers using assistive technologies and services, not related to wheelchairs.

The Australian Seating Service Benchmark can be used as an evidence-based tool to justify additional service hours and resources associated with specialised wheelchair procurement and to allocate resources according to the level of seating service. Prior to this study in Australia, primary therapists’ hours were rarely included in the cost of a non-compensable wheelchair purchase. The clinician’s contribution were absorbed by their host service budget and as such, rarely factored into the final wheelchair procurement cost.

At the secondary seating service level, an estimated 60 to 80 hours of clinical and technical time are consumed in the procurement of one custom-made wheelchair-seating system (see Figure 28). This study also exposes the primary therapist’s contribution within an Integrated Service; a cost previously invisible in specialised wheelchair procurement.
For the first time, primary services supporting a custom-made wheelchair-seating system are visible and can now be added to the costs procurement associated with resources provided by an Integrated Service. This includes an estimated minimum of seven therapy hours provided by a primary therapist when they support their consumer through an Integrated Service.
Figure 28 Seating Service Benchmark within an Australian context

Key hrs = hours
The primary therapy service time, in addition to that of the clinical hours provided by specialist service, includes the initial assessment-prescription, home-based trial and evaluation and the post-provision review once the wheelchair is discharged home. This therapy time is rarely included in the provision of a custom-made wheelchair-seating system. The primary therapist’s costs escalate dramatically if they attend all the provision–fitting sessions with their consumer: an estimated 35 clinical hours. The contribution by the wheelchair supplier in supplying technology to the secondary seating service is also visible, and estimated at between one to four technical hours for provision of the wheelchair base and related components. While the additional cost associated with the primary therapy attending their consumer during a secondary service could be construed as extravagant (and there for not necessary), the education, training and information exchange that permeates between the secondary service, the consumer and their primary therapist (and carer if relevant) value-add to the seating service outcome. This is aligns to Plummer (2010) as greater stakeholder knowledge empowers realistic decision making for successful outcomes.

**Implications of Key Finding 8**

The Seating Service Benchmark provides powerful evidence-based data by which to calculate service resources according to case referrals, and thus to justify additional resources. This Seating Service Benchmark can be used at service level to estimate overall costs, or at a case level to predict the procurement cost of one specialised wheelchair. This is powerful information in an NDIS-funded environment.

The Seating Service Benchmark provides seating service transparency. Service providers are now able to predict, using data outlined in Figure 28, and to quote with
confidence, the cost of a specialised wheelchair-seating system, in full or by one of the six processes for service planning. Applying this Seating Service Benchmark, any consumer can now compare wheelchair quotations with the estimated service cost. Any clinician can make informed judgements in regard to funding allocation versus a wheelchair-seating referral, to determine to what extent the available funds cover the seating request (i.e. will the available funds cover the costs of their service provision, or not?). The data provided by the Seating Service Benchmark data assists informed clinical and technical decisions making aligned to accepting a complex wheelchair-seating referral within Australia.

**Implications for the Australian Seating Service**

The eight key findings of this study: forming trustworthy partnerships; the Australian Seating Service Landscape; Four Domains of Postural Function Complexity; Three types of Decision-Makers; the Determinants of Case Complexity; Seating Service Selection; Australian Six Seating Service Steps; and the Australian Seating Service Benchmark, all are the result of, and provide, evidence-based data. These eight key findings add new knowledge to scant data on Australian seating service. They provide the Australian seating service sector with much-needed Australian specific data to guide service decision-making, to structure and resource the provision of service, now and in the future.

The eight key findings offer data to structure to service practice and service pathways. The combination of transparent practices and clear decision-making pathways with trusted partnerships and a person-cantered occupational service approach bode well for an egalitarian Australian seating service.

The study endorses the value of working in trusting, collaborative teams with the consumer and their needs driving the service. Teamwork builds resilience, skills and
workforce capacity for current and future service provision. The study finds the primary services need greater resources, shared peer experience and support as they are the most accessible and accessed services in the Australian seating sector. Innovative approaches to accessible supervision, mentoring and information exchange are required to reach these primary services operating across metro, regional and rural Australia. Teamwork and knowledge exchange and, where practicable, work exchange and team experience at the secondary seating service level is to be encouraged. Greater access by primary service providers to secondary services, aligned with a seating mentorship program, should extend the skills, competence and confidence of the primary service workforce operating at the Networked Team level. This aims to build workforce capacity throughout Australia and beyond its current metro-centric orientation.

Consolidating Seating Service Knowledge to Build Workforce Resilience

A robust Australian seating service needs consolidation of its considerable, but fragmented, contemporary service and knowledge base, now. A robust Australian seating service needs a universal professional development approach. The Australian combined wheelchair supplier and seating service sector requires its own service rigor that includes an accredited national educational program, credentialed service provision, and industry-sponsored research into evidence-based seating practices. Along with operating a national education program, the sector should consider connecting education, training and research to career pathways. Formal service career pathway strategies are needed to retain current expertise and transfer knowledge to build workforce resilience and robust service capacity.

A strategic industry-based approach to workforce planning is urgently required, one that
will consolidate, sustain and retain expertise and knowledge within the industry and to transfer on to oncoming generations.

A centralised centre of seating excellence aligned with the generational exchange of evidence-based knowledge is urgently required. A national centre of seating excellence is needed to act as a peak body to advocate the welfare of the industry and its workforce. While several bodies represent different stakeholder groups within the umbrella assistive technology industry, such as ARATA, ATSA and NCRE, the Australian seating sector needs a greater presence. This sector urgently needs service cohesion and accountability if it is to meet the demands anticipated by an open market-place fuelled by funding as expected by the National Disability Insurance Scheme.

One of the aims of the NDIS (2014) is to generate consumer control and choice over services and resources. The participants in this study endorse consumer control and choice, but service providers are uncertain of their current capacity to provide sustained quality and equity in seating service and wheelchair technology within a consumer-driven market. A robust seating service sector is required to build confidence, competence and proficiency to whatever services and resources are required in a seating environment dominated by empowered consumers funded by a national scheme.

Conclusion

This study describes, for the first time, the Australian seating sector and provides a comprehensive insight into the Australian seating service experience and the factors that impact on specialised wheelchair procurement. The need for structure in the seating service process and for service transparency are expressed by both service providers and recipients.
Eight key findings indicate ways to enable service transparency in time for the imminent changes to wheelchair provision that will occur in the NDIS-funded environment.

The study indicates where resources should be directed to best respond to service usage. Greater concentration of resources is required to support the primary level of the seating service to build workforce capacity. A stronger, equitable, accessible and competent primary seating service aims to ease demand on the limited number of secondary seating services that construct bespoke wheelchair and seating solutions. A stronger seating service sector requires both levels of seating service. A robust seating service sector requires a national educational program backed by accreditation of service providers and services. An NDIS-competitive market requires service transparency, therefore identification of endorsed partitioner and service competence are necessary.

Limitations

The purpose of this study is to describe the Australian seating service process from the stakeholder’s perspective. The qualitative findings, data interpretations and the eight key findings have been developed informed by an in-depth study of participants’ experiences. The transferability of the findings of this case study are limited (Simons, 2009; Stake, 1995) as the sixty volunteer participants may represent the most proactive seating service stakeholders and their perspectives may not be representative of a larger Australian sample (DePoy & Gitlin, 1998).

Despite a lengthy participant recruitment period of twelve months, the recruitment of care providers was more difficult than anticipated. The small carer contribution provides invaluable insights into their perceptions of the Australian seating service, but further research is required to validate their contribution.
The interpretations in this study cannot be generalised to the whole of the Australian seating service experience. All Australian states and territories were included except the Australian Capital Territory; however, recruitment from each state was not consistent across the four stakeholder groups. Furthermore, the study captures the Australian seating service experience for the twelve month period from late 2011 to 2012, and its findings reflect the experiences and opinions of the participants at a specific period, prior to and leading up to the introduction of National Disability Insurance Scheme. The participants’ speculation in anticipation of an NDIS-funded environment are interesting, but cannot be equated to the reality of specialised wheelchair procurements in an NDIS-funded Australia that has not yet come about.

**Recommendations for Future Research**

As there are no statistical data regarding the number of Australians using wheelchair technology, a mixed method study is suggested to canvass the eight state-funded programs and collect data on the number of Australians receiving wheelchairs for daily use. Data collected from these programs would begin to quantify the recipient number and categories of the wheelchair and seating technology being distributed via government coffers, within the non-compensable system. This research could be extended to the non-government sector and the insurance industry to quantify the wheelchair technology distributed to those following compensable trauma.

A number of follow-up studies are recommended. The first, a comparative study of pre-NDIS expectations with post-NDIS real-life experiences is recommended. Comparing participants’ expectations with the reality of employing NDIS’s self-managed funds approach will provide deeper understanding of the factors that empower wheelchair
procurement. The second, a follow-up study is recommended to program evaluate the impact of applying the study's Seating Service Benchmark on the seating service sector. A third, a follow-up mixed method study is recommended to investigate the reluctance of care providers to participate in research. Applying less imposing focus group methodology or questionnaire sampling approach might elicit greater carer participation. Further research could validate or dispel speculation that their care burden is too great for participation, or that the fear of service reprisal or compromise based on their study participation are reasons for reticence. In addition, further research is needed to understand the implications of both family care-giving and supporting wheelchair and seating technology across the carer’s lifespan, as noted previously by Pavalko and Woodbury (2000).

Finally, further exploration into the factors that affect wheelchair procurement and seating service provision to regional and rural Australia is needed. Understanding the logistics of sustaining expertise in regional services has been acknowledged (Gething, 1997; Schoo, Stagnitti, Mercer & Dunbar, 2005). Future research into providing specialist seating services and workforce retention is required to extend seating services more equitably to non-metro Australia.
Appendices

Appendix A: Deakin University Human Research Ethics Committee
2011-042

DEAKIN UNIVERSITY
Human Ethics Research
Effect of Research Integrity
Research Services Division
70 Elgar Road Burwood Victoria
Postal: 221 Burwood Highway
Burwood Victoria 3125 Australia
Telephone: 03 9251 7123 Facsimile 03 9244 6581
research.ethics@deakin.edu.au

Memorandum

To: A/Prof Karen Stagnitti
   School of Health & Social Development

From: Deakin University Human Research Ethics Committee (DUHREC)

Subject: 2011-042
   An investigation of participation in Australian specialized seating services. Participants' perspectives
   Please quote this project number in all future communications

Date: 06 June, 2011

The application for this project was considered at the DUHREC meeting held on 29/03/2011.

Approval has been given for Ms Rachael Schmidt, under the supervision of A/Prof Karen Stagnitti, School of Health & Social Development, to undertake this project from 6/06/2011 to 6/06/2015.

The approval given by the Deakin University Human Research Ethics Committee is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Human Research Ethics Unit immediately should any of the following occur:

• Serosus or unexpected adverse effects on the participants
• Any proposed changes in the protocol, including extensions of time,
• Any events which might affect the continuing ethical acceptability of the project.
• The project is discontinued before the expected date of completion.
• Modifications are requested by other HRECs.

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

DUHREC may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Human Research Ethics Unit
research.ethics@deakin.edu.au
Telephone: 03 9251 7123
Appendix B: Government of South Australia Ethical Clearance.

Reference Number: REC 2011-11#28

Ms Rachael Schmidt
School of Health and Social Development
Geelong Waterfront Campus
Deakin University
GEELONG VIC 3217

Re: Research proposal – An investigation of participation in Australian specialised seating services. Participants’ perspectives

Dear Ms Schmidt

Thank you for providing a copy of the research ethics application made to the Deakin University Human Research Ethics Committee for the above project.

I note that your proposal has received ethics approval from the aforementioned committee and that the Department for Communities and Social Inclusion will not be a major recruiting agency for the project.

In view of the above I have decided to exempt your application from review by the Families and Communities Research Ethics Committee (FCREC) under section 2.2.5 of the FCREC Terms of Reference and Operational Procedures. I understand that Adam Harrison, Research Unit, DCSI will be liaising with you regarding distribution of recruitment posters for your study in Disability Services offices.

I wish you success with your project.

Yours sincerely

Nancy Rogers
Chairperson
Families and Communities Research Ethics Committee

1 December 2011

Contact Officer: Jan-Louise Durand
Contact Phone: 8413 8174

Signature Redacted by Library
Appendix C: Cerebral Palsy League Ethical Clearance

23 February 2012

Rachael Schmidt (PhD Candidate)
Occupational Science & Therapy
School of Health & Social Development
Faculty of Health
Deakin University Geelong Waterfront Campus
P.O. Box 20000 Geelong Victoria 3220 Australia
Mobile: 0409192916
email: rachael.s@deakin.edu.au

cc: A/Prof Karen Stagnitti (Principal Supervisor)
Deakin University Geelong Waterfront Campus
email: karen.stagnitti@deakin.edu.au

Dear Rachael,


Your application was reviewed by the CPL Human Research Ethics Committee (HREC) on 13 December 2011 and given provisional approval pending amendments. The CPL HREC reviewed your amendments at the 14 February 2012 meeting. These were approved, with the proviso of one methodological recommendation which is outlined below.

1. Participant numbers

After review of your initial application, the CPL HREC raised that the recruitment target of 60 participants (outlined in the briefing letter) may be too low to answer the range of questions for the number of participant groups (n=6) across the number of seating prescription service types (n=3) involved in the study. The committee has reviewed your response which suggests that saturation of qualitative responses is being reached for the two clinician subgroups. This is good news. The committee would still like you to keep open the idea that the heterogeneity of experiences of client and family participants might require the need to recruit more than 15 people in each of those subgroups. On review of your Ethics form, 20 participants per subgroup (i.e. 80 participants total) was the initial target approved by your host institution. We are also happy to approve recruitment to this number, after which an amendment would be required.

With this methodological recommendation noted, we are pleased to advise that you have now been awarded full clearance to commence your study.

Approval of this project is for the period: February 2012 to February 2013, pending annual reports and satisfactory ethical conduct of the research. The following standard statement must be included in the information sheet to participants:

This study has been approved by the Human Research Ethics Committees of the Cerebral Palsy League (NHMRC # E000417) (Approval # CPL-xxxx-xx) and [insert other committee/s in relevant order] in accordance with the National Health and Medical Research Council’s (NHMRC) guidelines. While you are free to discuss your participation in this study with project staff, if you would like to speak to a research ethics officer not involved with the study you may contact:

Cerebral Palsy League of Queensland
55 Oakey Drive
New Farm QLD 4005
T +61 7 3358 8001
F +61 7 3254 1291

cplqld.org.au
• Peter Mewett, Chair, CPL Human Research Ethics Committee  
  Mail: PO Box 386 Fortitude Valley, QLD 4006  
  Ph: 07 3358 8050  
  E: pmewett@cralaid.org.au  
  • Insert other committee details as relevant  

Please note that the CPL Ethics Committee is authorized to conduct random audits of research carried out at the CPL or involving CPL clients or staff at any time. If you have not completed your research by the expiry date, or if at any time during the period of the study changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise the Ethics Committee immediately via the Secretary:

Dr Leanne Johnston, Principal Advisor Research & Ethics  
E: ljohnston@cralaid.org.au; P: 07 3358 8001, Mob: 0419 706 949

If you have any questions regarding the above, please do not hesitate to contact the committee secretary, Dr Leanne Johnston who will refer to me as appropriate. The CPL welcomes this research and wishes you well with the study.

Yours sincerely,

[Signature Redacted by Library]

Peter Mewett  
Chair, CPL Research Ethics Committee  

cc: Dr Leanne Johnston, Chair Research Development Committee
Appendix D: Participants’ Invitation

DEAKIN UNIVERSITY

Participants’ Invitation: A qualitative study

EXPLORING THE EXPERIENCES OF SPECIALISED WHEELCHAIR SEATING SERVICING WITHIN AUSTRALIA: THE STAKEHOLDERS’ PERSPECTIVE

This study is seeking participants who have had recent experience in wheelchair-seating services that specialise in prescribing integrated wheelchair-seating systems for people with complex mobility needs.

Specifically, the researcher is seeking participants from four stakeholder groups, who have, within three years, participated in specialised wheelchair seating services in Australia. The stakeholder groups comprise:

1. **Adult consumers** who rely on their wheelchair-seating system for daily mobility at home and in the community;

2. **Adult care providers** whose roles involve providing social, emotional and/or physical support to a consumer;

3. **Prescribing clinicians**, who as occupational therapists or physiotherapists provide a professional service in prescribing individualised, integrated wheelchair-seating systems informed by consumers’ goals;
4. **Wheelchair technicians** and **vendors** who provide specialised wheelchair-seating systems and ongoing technical support to ensure optimal wheeled mobility for consumers with complex needs.

All participants must be adults (aged 18 years and older) who are able to share their service experiences within an in-depth interview process, in English. Approximately sixty people with recent participation experience in Australian wheelchair-seating services (encompassing dedicated seating teams, supplier’s seating clinics, and loosely networked community based services) will be interviewed in this study.

The aim of the study is to explore participants’ service experiences within Australia, to highlight the factors considered as beneficial to or hindered by the service received, to understand how a seating service experience has met the person’s wheelchair needs. It is hoped that information gathered from your experiences will assist in informing future planning of specialised wheelchair seating services in Australia.

If you are interested in becoming a participant of this study, or wish to learn more, then contact Rachael Schmidt.

Rachael Schmidt (PhD Candidate & Occupational Science & Therapy Lecturer)

School of Health & Social Development, Faculty of Health

Deakin University Geelong Waterfront Campus Victoria 3220

**Phone:** 03 5227 8352 (Please leave a message, should I not answer)

Fax: 03 5227 8371

Email: rachaels@deakin.edu.au
HAVE YOU SUPPORTED SOMEONE WHO RENEWED A SPECIALISED WHEELCHAIR-SEATING SYSTEM RECENTLY?

Share your wheelchair service experiences as a participant in this research.

This study is collecting the service experiences of those who have undertaken the process of renewing a wheelchair-seating system in the past approximate three years in Australia. Many service providers have contributed to this research over the past year. This research urgently needs balance the data collected from providers, with the experiences from the service recipients of wheelchair services including:

1. adult wheelchair consumers (18yrs+) who rely on their specialised wheelchair-seating system for daily community mobility and have renewed their wheelchair system recently; and
2. **ADULT CARE PROVIDERS (18+), [PAID OR UNPAID] WHOSE ROLE INVOLVES PROVIDING SOCIAL, EMOTIONAL AND/OR PHYSICAL SUPPORT TO A WHEELCHAIR CONSUMER THROUGH THE PROCESS OF RENEWING THEIR WHEELCHAIR-SEATING SYSTEM.**

An in-depth interview will explore individual participant’s perceptions of their wheelchair-seating service experience, including elements of access to suitable wheelchair services, the decision-making and trial-selection processes encountered within the service experience that met (or not) the desired specialised wheelchair needs. All information collected will be treated confidentially (i.e. participant or service names will NOT be disclosed). The information gathered from this qualitative research will inform a range of specialised wheelchair seating service models with capacity to flexibly meet the anticipated NDIS demand.

The aim of this PhD study is to explore the range of wheelchair-seating service experiences nationally. If you have recent wheelchair service experience and want to share your experiences (positive or not), please email the associate researcher: rachaels@deakin.edu.au for more details.

Rachael Schmidt (Associate Researcher)

Lecturer/PhD scholar Occupational Science and Therapy, School of Health & Social Development

Faculty of Health, Deakin University Geelong Waterfront Campus

*Email: rachaels@deakin.edu.au*
Appendix F: Consumer Plain Language Statement and Consent Form

(Part A)

DEAKIN UNIVERSITY

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: INFORMATION FOR CONSUMERS WHO RELY ON THEIR
WHEELCHAIR AND SEATING SYSTEMS FOR DAILY WHEELED MOBILITY

Plain Language Statement
Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.

Principal Researcher(s):
Dr Karen Stagnitti, Associate Professor, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria.
Dr Geneviève Pépin, Senior Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria

Associate Researcher(s):

Rachael Schmidt, PhD Candidate & Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria

This Plain Language Statement and Consent Form are eight pages long. Please make sure you have all the pages.

1. Your Consent
You are invited to take part in this research project.

This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.
You will be given a copy of the Plain Language Statement and Consent Form to keep as a record.

2. **Purpose and Background**

The purpose of this project is to investigate the experience of participating in specialised seating services in Australia. The project aims to understand what factors impact on the decision-making process involved in matching specialised wheelchair and seating technology to meet the needs of people with complex wheeled mobility needs.

Accessibility to adequate wheelchair seating prescription services, wheelchair suppliers and adequate support services vary in consistency throughout Australia.

To date, however there is no evidence that one service type is better than another in complex wheelchair seating provision. In light of an anticipated increase in the use of wheelchair demands, better knowledge and understanding is required into the factors that may impact on successful wheelchair prescription and provision. In this study four groups will be invited to participate, including the person using the wheelchair (known as the consumer group), the care providers who support the consumer group, as well as the seating therapist and the supplier groups who provide services within a seating service. The aim of the study is to interview participants to explore the perceived factors that benefitted and hindered the seating experience and how the seating service experience assisted (or not) in meeting the person’s wheelchair needs (Edwards & McCluskey, 2010). It is hoped that information gathered from this study will inform resource allocation for future specialised wheelchair seating services. A total of approximately sixty people will participate in this project. It is estimated that 5 persons from each stakeholder groups will participate in this study across each of the 3 seating services.
Previous studies (White & Lemmer, 1998; Kittel, Di Marco & Stewart, 2002) have identified the importance of involving the consumer early in the decision-making process as this assists the successful matching of the person to their new wheelchair system. It is also known that people participating in a seating service come with their own pre-existing expectations for their wheelchair systems and these expectations are not always realised (Smith, McCreadie & Unsworth, 1995). However there is no evidence to show that specialised seating services, provided in Australia are meeting the participating groups’ wheelchair seating goals.

You are invited to participate in this research project because you are aged 18 years and older and have participated in a specialised wheelchair-seating service, within the past 3 years to acquire or upgrade your specialised wheelchair and seating system. You are a consumer who relies on your wheelchair seating system for daily mobility within the home and community. Participants will have the capacity to be interviewed in-depth (approx. 1-2 hours duration) in English.

The results of this research may be used to help researcher Rachael Schmidt to obtain a PhD degree.
References


3. Funding

This research is funded by Deakin University.

4. Procedures

Your participation in this project involves;

- Contacting the associate researcher to express your interest in this project. Contact details are on page 4 of this Plain Language Statement.

- You will be required to undertake an in-depth interview process of approximately 1-2 hour duration and will be audio taped. You may be re-contacted, after initial data analysis, for a follow-up interview to explore specific themes or arising issues from your previous interview. Any additional interviews are undertaken to ensure the researcher has explored your experience comprehensively in the interview process. Subsequent interviews may vary in duration of around 30-60 minutes.
Your interview will be conducted face to face or via the telephone, and will be audio recorded. You be requested to complete a Consent Form prior to the interview process commencing. You will be asked to nominate your preferred method (email or posted mail) for receiving the analysed transcripts of your interview. Your review of the analysed transcripts will ensure that the analysis accurately represents your perspective on this topic.

Your interview will cover a range of topics to better understand your perceptions of participating in a specialised seating service when acquiring your latest wheelchair and seating system. The interview process will explore four main themes. The first interview theme involves exploring your reflections on your last specialised seating service (within the past 3 years), including the type of service you accessed. The second theme of the interview will explore the factors that you felt assisted or hindered you in accessing a suitable seating service and suitable product/technology to trial. The third theme will explore your reflections on your role in the decision-making process when selecting the most appropriate wheelchair system for your needs. The final theme will explore how you successfully (or not) matched the appropriate wheelchair equipment to meet your wheeled mobility goals.

The audio recordings of your interview will be transcribed in full and you may be re-contacted for a further interview to follow up on specific elements of your initial interview.

Your interview transcript will undergo a two phase analysis process. Initially your interview transcript will be analysed individually for themes arising from
your seating service experience. The themes identified from your interview data will undergo further analysis with themes arising from other interview transcripts within the consumer group. Additional analysis of the seating service experience will be undertaken by comparing themes arising from each of the participant groups (consumers, care providers, seating therapists and vendors) and then from within each service type and finally, across all the service types. The analysis process aims to explore the themes arising from the participants’ seating service experience, to ascertain how this experience assisted (or not) in providing the best wheelchair system for the person requiring the wheelchair. Identifying the factors that were perceived as helpful from those factors that were not considered helpful (from participants’ experience), may help to inform future development of an optimal seating service model.

- The analysed data will be emailed or posted to you for checking. After you have reviewed the analysed transcripts, all data from your interviews will then be de-identified and a pseudonym will be ascribed to assure your anonymity.

- In addition to the interview process, you may be asked if your wheelchair-seating system (or configuration) can be photographed. A digital camera will be used to capture an image of a feature of your wheelchair that is of particular interest to this study. All photographs taken will be de-identified to assure your anonymity.
• Before you are involved in any photography, you will be asked to complete an additional Consent Form for Photography (page 6). You are free to decline having your wheelchair system photographed, if that is your wish.

• Any photographs taken will capture specific wheeled mobility systems, examples of technology or unique configuration of product that are relevant to this study. All photography will focus on the wheelchair set-up and avoid capturing any identifying features, to assure your anonymity. All digital images taken of your wheelchair system will be sent to you electronically for your review and consent for use within this research capacity.

• The results of the research will be disseminated in number of ways. These include my PhD thesis, journal manuscripts for publication in peer review journals and through presentations at relevant conferences.

• The research will be monitored by several mechanisms. These include peer reviews of the research by the PhD groups of students, ongoing written reports and the final report for the ethics committee at Deakin University.

5. Possible Benefits
Possible benefits of your participation may include the opportunity to reflect, explore and share your particular seating service experience, to identify what factors benefitted and what factors hindered your optimal engagement in a seating service and how this participation was perceived in successfully (or not) meeting your wheeled mobility needs. Your experience could inform resource allocation for future specialised wheelchair seating servicing. To date there is no published research that explores the specialised seating services comprehensively in Australia.

We cannot guarantee or promise that you will receive any benefits from this project.
6. **Possible Risks**
   This research is considered in the lower risk category of research. There will be minimal risk and consequences of you participating in this research except for the time you spend for the interview. It is possible that you might experience emotional distress during the recall or discussion of past experiences related to wheelchair-seating services or associated wheeled mobility performance.

   Should you experience any distress from the interview, you may contact either Arlene Walker by telephone on (03)5227 8441 at the School of Psychology at Deakin University or by through Lifeline by calling 13 11 14 within Australia, for a free counselling service.

   There may be additional unforeseen or unknown risks.

   You can suspend or end your participation in the project if distress occurs.

7. **Privacy, Confidentiality and Disclosure of Information**
   Your interview recordings, photography, paper copies of transcripts and other documents will be securely stored in a locked cabinet in the office of the associate researcher, located within the Occupational Science and Therapy, Waterfront Campus, Deakin University, Geelong.

   All electronic databases will be password protected on Karen Stagnitti, Geneviève Pépin and Rachael Schmidt’s computers. Pseudonyms and participants names will be stored separately. Only the associate researcher will have access to that data. After the completion of this project, data are bound and will be stored for six years in archives at Deakin University, after which time the data will be destroyed.

   Any information obtained in connection with this project and that can identify you will remain confidential. It will only be disclosed with your permission, subject to legal
requirements. If you give us your permission by signing the Consent Form, we plan to publish the results with the researcher’s supervisors. In any publication, information will be provided in such a way that you cannot be identified.

8. Results of Project
   If you are interested and would like to be informed of the results when the research project is completed, you may contact the associate researcher in June 2013 for a copy of the results. Publication in the form of thesis and journal manuscript in peer review journals is anticipated from this research. Result will also be disseminated through presentations at relevant conferences.

9. Participation is Voluntary
   Your participation in any research project is voluntary. **If you do not wish to take part you are not obliged to.** If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used and will be destroyed.

   Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University and/or within the wheelchair seating industry.

   Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

   If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached.
10. **Ethical Guidelines**

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research* (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethics aspects of this research project have been approved by the Human Research Ethics.

11. **Complaints**

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Office of Research Integrity,

Deakin University, 221 Burwood Highway, Burwood Victoria 3125,

Telephone: 9251 7129, Facsimile: 9244 6581;

research-ethics@deakin.edu.au

Please quote project number **EC00213**.

12. **Reimbursement for your costs**

You will not be paid for your participation in this project.

13. **Further Information, Queries or Any Problems**

If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the principal researcher or

Name: Ms Rachael Schmidt  
Position: PhD Candidate, Associate Researcher & Lecturer  
Centre: School of Health & Social Development
The researchers responsible for this project are:

Name: Associate Professor Karen Stagnitti
Position: Associate Professor
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: +61 3 522 78363
Email: karen.stagnitti@deakin.edu.au

Name: Dr Genevieve Pépin
Position: Senior Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: +61 3 522 78462
Email: genevieve.pepin@deakin.edu.au
Appendix F: Consumer Plain Language Statement and Consent Form  
(Part B)  

DEAKIN UNIVERSITY  

CONSUMER PLAIN LANGUAGE STATEMENT AND  
CONSENT FORM  

TO: Consumer  
Consent Form  
Date: 4th June 2011  
Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.  

I have read, or have had read to me and I understand the attached Plain Language Statement.  
I freely agree to participate in this project according to the conditions in the Plain Language Statement.  
I have been given a copy of the Plain Language Statement and Consent Form to keep.  
The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.  

Participant’s Name (printed): ……………………………………………………………
Having given your consent to participate in this study, please provide your email address (or postal address) so a copy of the interview analysis can be forwarded to you. A copy of the interview analysis will be forwarded after the interview recording has been transcribed and analysed.

1. Please **tick** your preferred method of receiving interview transcripts:

   - [ ] Postal Address: .................................................................................................
     ...........................................................................................................................
     ...........................................................................................................................
   - [ ] Email Address:
     ...........................................................................................................................

2. Please **tick** the box below if you wish to receive a short report summary once this study is complete, due mid-2013.

   - [ ] Yes. Send me an end of study report to my preferred mail option below:

     Please **tick** appropriate box:

     - [ ] Via my postal address □ In Large Print Version or □ via my email (above)

Participant’s Name (printed)...........................................................................................................

Signature........................................................................................................ Date .................................
3. Please return this **signed consent form** addressed to the Associate Researcher, Rachael Schmidt by one of the following methods:

   **Email:**  rachael.schmidt@deakin.edu.au;

   **Fax:**  03 52278371 **Addressed Rachael Schmidt**, Occupational Science & Therapy;

   **Post:**  Rachael Schmidt,

   School of Health and Social Development, Faculty of Health,

   Waterfront Campus, Geelong, Victoria, 3217.

   **Telephone:** 03 52278352
TO: Consumers

Revocation of Consent Form

(To be used for participants who wish to withdraw from the project)

Date: June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and/or within the wheelchair seating industry.
Participant’s Name (printed) ……………………………………………………………

Signature …………………………………………… Date ……………

Please mail or fax this form to:

Email: rachaels@deakin.edu.au

Fax: 03 52278371 Address Rachael Schmidt, Occupational Science & Therapy

Post: Rachael Schmidt

School of Health and Social Development

Faculty of Health

Waterfront Campus Geelong, Victoria 321.
Appendix G: Care Provider Plain Language Statement and Consent

Form (Part A)

DEAKIN UNIVERSITY

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: INFORMATION FOR CARE PROVIDERS WHO PROVIDE SUPPORT TO A CONSUMER WHO RELIES ON SPECIALIZED WHEELCHAIR SYSTEMS

Plain Language Statement

Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective

Principal Researcher(s):

Dr Karen Stagnitti, Associate Professor, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria.

Dr Geneviève Pépin, Senior Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria
1. Your Consent

You are invited to take part in this research project.

This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.

You will be given a copy of the Plain Language Statement and Consent Form to keep as a record.

2. Purpose and Background

The purpose of this project is to investigate the experience of participating in specialised seating services in Australia. The projects aims to understand what factors...
impact on the decision making process in matching specialised wheelchair and seating
technology to meet the needs of people with complex wheeled mobility needs.
Approximately sixty people will participate in this project.

Accessibility to adequate seating prescription services, wheelchair suppliers and
adequate support services vary in consistency throughout Australia.

To date, there is no evidence that one service type is better than another in complex
wheelchair seating provision. In light of an anticipated increase in the use of wheeled
mobility technology demands, better knowledge and understanding is required into the
factors that may impact on successful wheelchair prescription and provision. Four different
groups will be invited to participate in this study, including the person using the wheelchair
(known as the consumer), the care providers who support the consumer group (that is you),
the seating therapist and the technicians, supplier or vendor groups who provide services
within a seating service. The aim of the study is to interview participants to explore the
perceived factors that benefitted and hindered the seating experience and how the seating
service experience assisted (or not) in meeting the person’s wheelchair needs. It is hoped
that information gathered from this study will inform resource allocation for future
specialised wheelchair seating services. A total of approximately sixty people will
participate in this project. It is estimated that 5 persons from each stakeholder groups will
participate in this study across each of the 3 seating services.

In this context a care provider, such as you, is the person that provides primary care
support to a consumer who relies on a specialised wheelchair and seating system for daily
mobility. In this study, the care provider may be unpaid (informal) as in a family member
or a friend (as known as the carer); or as a paid care-attendant (formal), who provides
physical and emotional support for the consumer. Care providers are recognised as an essential ingredient in the wheelchair use, particularly where there is complex consumer needs (Scherer & Scherer, 2008).

There is research on the care provider’s experience in supporting consumers’ participating in specialised seating services internationally (Smith, McCreadie et al. 1995; McDonald, Surtees & Wirz, 2007; Frank, Neophytou, Frank & De Souza, 2010), but very little related to the Australian context. There is however no literature on the combined seating service experience from all groups participating, e.g. those who receive a service (consumers and care providers) and from those who provide a service (therapists and suppliers), internationally or in Australia.

You are invited to participate in this research project because you are aged 18 years and older, and have participated in a specialised seating service in the role as a care provider (in supporting a person, with complex wheeled mobility needs), within the past 3 years.

The results of this research may be used to help researcher Rachael Schmidt to obtain a PhD degree.

References


3. **Funding**
   This research is funded by Deakin University

4. **Procedures**
   Your participation in this project involves
   - Contacting the associate researcher to express your interest in this project. Contact details are on page 4 of this Plain Language Statement.
   - You will be involved in an in-depth interview process. Your initial interview will be of approximately 1-2 hour duration. You may be re-contacted for a follow-up interview to explore specific themes or arising issues from your previous interview. Any additional interviews are undertaken to ensure the researcher has explored your experience comprehensively in the interview process. Subsequent interviews may vary in duration of around 30-60 minutes.
   - Your interview will be conducted face to face or via the telephone, and will be audio recorded. You will be requested to complete a Consent Form prior to the interview process commencing. You will be asked to nominate your preferred method (email or posted mail) for receiving the analysed transcripts of your interview. Your review of the analysed transcripts will ensure that the analysis accurately represents your perspective on this topic.
   - Your interview will cover a range of topics to better understand your perceptions of participating in a specialised seating service when supporting the person, you care
for in the process of acquiring their new (or upgraded) wheelchair and seating system. The interview process will explore four main themes. The first interview theme involves exploring your reflections on your last specialised seating service experience, within the last 3 years. This will include the type of service you accessed, when acting as a care provider for a person who relies on specialised wheelchair-seating systems. The second theme of the interview will explore the factors that you felt assisted or hindered you in your care provider’s role during the process in which the person you supported accessed a seating service and suitable product/technology to trial. The third theme will explore your reflections on your role in supporting the decision-making during the selection process to identify the best wheelchair system for the mobility needs of the person you support. The final theme will explore your perceptions, of how successfully (or not) the mobility and personal needs were matched with the appropriate wheelchair equipment to meet that person’s wheeled mobility goals, by the service you participated in.

- The audio recordings of your interview will be transcribed in full and you may be re-contacted for a further interview to follow up on specific elements of your initial interview.

- Your interview transcript will undergo a two phase analysis process. Initially your interview transcript will be analysed individually for themes arising from your seating service experience. The themes identified from your interview data will undergo further analysis with themes arising from other interview transcripts within the care provider group. Additional analysis of the seating service experience will be undertaken by comparing themes arising from each of the participant groups.
(consumers, care providers, seating therapists and vendors) and then from within each service type and finally, across all the service types. The analysis process aim is to explore the themes arising from the participants’ seating service experience, to ascertain how this experience assisted (or not) in selecting the best wheelchair system for the person requiring the wheelchair. Identifying the factors that were perceived as helpful from those factors that were not considered helpful (from participants’ experience), may help to inform future development of an optimal seating service model.

- Once you have reviewed the analysed transcripts, all data from your interviews will then be de-identified and a pseudonym will be ascribed to assure your anonymity.
- The results of the research will be disseminated in number of ways. These include my PhD thesis, journal manuscripts for publication in peer review journals and through presentations at relevant conferences.
- The research will be monitored by several mechanisms. These include peer reviews of the research by the PhD groups of students, ongoing written reports and the final report for the ethics committee at Deakin University.

5. Possible Benefits
Possible benefits of your participation may include the opportunity to reflect, explore and share your particular seating service experience, to identify what factors benefitted and what factors hindered your optimal engagement, in the role of care provider in a seating service. You will also have an opportunity to reflect, explore and share how the care provider’s participation was perceived in successfully (or not) supporting the process of meeting the wheeled mobility needs of the person you supported. Additional information gathered could inform resource allocation for future complex wheelchair seating servicing.
To date there is no published research that explores the complex seating services comprehensively in Australia.

We cannot guarantee or promise that you will receive any benefits from this project.

6. Possible Risks
This research is considered in the low risk category of research. There will be minimal risk and consequences in this research except for the time spent for the interview.

Should you experience any distress from the interview, you may contact either Arlene Walker by telephone on (03)5227 8441 at the School of Psychology at Deakin University or by through Lifeline by calling 13 11 14 within Australia, for a free counselling service.

There may be additional unforeseen or unknown risks.

Participants can suspend or end their participation in the project if distress occurs.

7. Privacy, Confidentiality and Disclosure of Information
Your audio recordings, paper copies of transcripts and other documents will be securely stored in a locked cabinet in the office of the associate researcher, located within the Occupational Science and Therapy, Waterfront Campus, Deakin University, Geelong.

All electronic databases will be password protected on Karen Stagnitti, Geneviève Pépin and Rachael Schmidt’s computers. Pseudonyms and participants names will be stored separately. Only the associate researcher will have access to that data. After the completion of this project, data are bound and will be stored for six years in archives at Deakin University, after which time the data will be destroyed.

Any information obtained in connection with this project and that can identify you will remain confidential. It will only be disclosed with your permission, subject to legal requirements. If you give us your permission by signing the Consent Form, we plan to
publish the results with the researcher’s supervisors. In any publication, information will be provided in such a way that you cannot be identified.

8. **Results of Project**
   If you are interested and would like to be informed of the results when the research project is completed, you may contact the associate researcher after June 2013 for a copy of the results. Publication in the form of thesis and journal manuscript in peer review journals is anticipated from this research. Result will also be disseminated through presentations at relevant conferences.

9. **Participation is Voluntary**
   Participation in any research project is voluntary. **If you do not wish to take part you are not obliged to.** If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used and will be destroyed.

   Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University and/or within the wheelchair seating industry.

   Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

   If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached.

   If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached. This notice will
allow the research team to inform you if there are any health risks or special requirements linked to withdrawing.

10. Ethical Guidelines
   This project will be carried out according to the *National Statement on Ethical Conduct in Human Research (2007)* produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

   The ethics aspects of this research project have been approved by the Human Research Ethics

11. Complaints
   If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

   The Manager, Office of Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au.

   Please quote project number EC 2011-042.

12. Reimbursement for your costs
   You will not be paid for your participation in this project.

13. Further Information, Queries or Any Problems
   If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the principal researcher or

   Name: Ms Rachael Schmidt
   Position: PhD Candidate, Associate Researcher & Lecturer
   Centre: School of Health & Social Development
The researchers responsible for this project are:

Name: Associate Professor Karen Stagnitti
Position: Associate Professor
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: +61 3 522 78363
Email: karen.stagnitti@deakin.edu.au

Name: Dr Genevieve Pepin
Position: Senior Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: +61 3 522 78462
Email: genevieve.pepin@deakin.edu.au
Appendix G: Care Provider Plain Language Statement and Consent Form (Part B)

DEAKIN UNIVERSITY

CARE PROVIDER Plain Language STATEMENT AND CONSENT FORM

TO: Care Provider
Consent Form

Date: 4th June 2011
Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.

I have read, or have had read to me and I understand the attached Plain Language Statement.

I freely agree to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.
Having given your consent to participate in this study, please provide your email address (or postal address) so a copy of the interview analysis can be forwarded to you. A copy of the interview analysis will be forwarded after the interview recording has been transcribed and analysed.

1. Please tick your preferred method of receiving interview transcripts:

□ Postal Address: ............................................................................................
............................................................................................................ Post Code: _ _ _

□ Email Address: ............................................................................................

2. Please tick the box below if you wish to receive a short report summary once this study is complete, due mid-2013.

□ Yes. Send me an end of study report to my preferred mail option below:

Please tick appropriate box to indicate how you would like to receive this report summary:

□ Via my postal address □ Report in Large Print Version or □ via my email (above)
Participant’s Name (printed) .............................................................................................................

Signature........................................................................................................ Date ......................

3. Please return this **signed consent form** addressed to the Associate Researcher, Rachael Schmidt by one of the following methods:

   **Email:** rachael.schmidt@deakin.edu.au;

   **Fax:** 03 52278371 **Addressed Rachael Schmidt,** Occupational Science & Therapy;

   **Post:** Rachael Schmidt,

   School of Health and Social Development,

   Faculty of Health,

   Waterfront Campus, Geelong, Victoria, 3217.

   **Telephone:** 03 52278352
TO: Care Provider Revocation of consent form

Revocation of Consent Form

(To be used for participants who wish to withdraw from the project)

Date: June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and/or within the wheelchair seating industry.

Participant’s Name (printed) ……………………………………………………………..
Signature ............................................. Date ................................

Please mail or fax this form to:

Name: Ms Rachael Schmidt
Position: PhD Candidate, Associate Researcher & Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: 03 5227 8352
Email: rachael.schmidt@deakin.edu.au
Appendix H: Prescribing Clinician Plain Language Statement and Consent Form

Part A

DEAKIN UNIVERSITY

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: INFORMATION FOR SEATING THERAPISTS (OCCUPATIONAL THERAPISTS AND PHYSIOTHERAPISTS)

Plain Language Statement

Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.

Principal Researcher(s):

Dr Karen Stagnitti, Associate Professor, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria.
Dr Geneviève Pépin, Senior Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria

Associate Researcher(s):

Rachael Schmidt, PhD Candidate & Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria

This Plain Language Statement and Consent Form are seven pages long. Please make sure you have all the pages.

1. Your Consent
   You are invited to take part in this research project.

   This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

   Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

   Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.
You will be given a copy of the Plain Language Statement and Consent Form to keep as a record.

2. **Purpose and Background**

   The purpose of this project is to investigate the experience of participating in specialised seating services in Australia. The project aims to understand what factors impact on the decision-making process involved in matching specialised wheelchair and seating technology to meet the needs of people with complex wheeled mobility needs. Approximately sixty people will participate in this project.

   Accessibility to adequate seating prescription services, wheelchair suppliers and adequate support services vary in consistency throughout Australia.

   To date, however, there is no evidence that one service type is better than another in complex seating provision. In light of an anticipated increase in the use of wheeled mobility technology demands, better knowledge and understanding is required into the factors that may impact on successful wheelchair prescription and provision. In this study four groups will be invited to participate, including the person using the wheelchair (known as the consumer group), the care providers who support the consumer group, the seating therapist and the supplier groups who participate within a wheelchair seating scenario. The aim of the study is to interview participants to explore what factors benefit and what factors hinder optimal engagement in a seating service and how this participation is perceived in successfully meeting the varied mobility needs of the consumers (Edwards & McCluskey, 2010). It is hoped that information gathered from this study will inform resource allocation for future specialised wheelchair seating services. A total of approximately sixty people will participate in this project. It is estimated that 5 persons from each stakeholder group will participate in this study across each of the 3 seating services.
There is some research internationally pertaining to wheelchair prescription and decision-making (Eggers, Myaskovsky, Kelly, et al., 2009). Di Marco, Russell & Master (2003) stated that wheelchair prescription is complex, requiring time and competent skill for optimal prescription (White & Lemmer, 1998). Barbara & Curtin (2008) raised the issues of cost containment and funding body protocols that may restrain the prescription of appropriate assistive technology. For seating therapists participating in a specialised seating service, funding protocols and the cost of specialised wheelchair systems are relevant to successful wheelchair outcomes, especially where there are complex and evolving wheeled mobility needs. There is no published research into the specialised seating service delivery or provision in Australia. There is little information collected on the experience of the seating therapists who participate in specialised seating services in Australia. There is no evidence to show that specialised seating services, as provided in Australia meet the participating groups’ wheelchair seating goals. There is no literature pertaining to combined experience from all the participating groups, specifically from those who receive a service (consumers and care providers) and from those who provide a service (therapists and suppliers) in specialised seating service participation.

You are invited to participate in this research project because you are an occupational therapist or physiotherapist (aged 18 years and older) with at least 18 months of experience and you have participated in a specialised seating service (in the past 3 years) as a seating therapist, to prescribe an appropriate wheelchair-seating system for consumers with complex wheeled mobility needs. As it recognized that full-time immersion in a seating service will fast track your skill development, you are also eligible to participate if as
occupational therapist or physiotherapist you have less than 18 months experience but are currently employed within a seating service full-time.

The results of this research may be used to help researcher Rachael Schmidt to obtain a PhD degree.

References


3. Funding

This research is funded by Deakin University

4. Procedures

Your participation in this project involves

- Contacting the associate researcher to express your interest in this project. Contact details are on page 4 of this Plain Language Statement.

- You will be an in-depth interview process of approximately 1-2 hour duration. You may be re-contacted for a follow-up interview to explore specific themes or arising issues from your previous interview. Any additional interviews are undertaken to ensure the researcher has explored your experience comprehensively in the
interview process. Subsequent interviews may vary in duration of around 30-60 minutes.

- Your interview will be conducted face to face or via the telephone, and will be audio recorded. You be requested to complete a Consent Form prior to the interview process commencing. You will be asked to nominate your preferred method (email or posted mail) of receiving the analysed transcripts of your interview. Your review of the analysed transcripts will ensure that the analysis accurately represents your perspective on this topic.

- The interview will cover a range of topics to better understand your perceptions of participating in a specialised seating service when acquiring your new wheelchair and seating system or to upgrade your current wheelchair seating system. The interview process will explore four main themes. The first interview theme involves exploring your reflections on your last specialised seating service, including the type of service you accessed. The second theme of the interview will explore the factors that you felt assisted or hindered you in accessing a suitable seating service and suitable product/technology to trial. The third theme will explore your reflections on how you decided on and selected the most appropriate wheelchair system for your needs. The final theme will explore how you successfully (or not) matched the appropriate wheelchair equipment to meet your wheeled mobility targets and that of the consumer’s goals.

- The audio recordings of your interview will be transcribed in full and you may be re-contacted for a further interview to follow up on specific elements of your previous interview.
• Your interview transcript will undergo a two phase analysis process. Initially your interview transcript will analysed individually for themes arising from your seating service experience. The themes identified from your interview data will undergo further analysis process with themes arising from other interview transcripts within the seating therapist group. Additional analysis of the seating service experience will be undertaken by comparing themes arising from each of the participant groups (consumers, care providers, seating therapists and vendors) and then from within each service type and finally, across all the service types. The analysis process aim is to explore the themes arising from the participants’ seating service experience, to ascertain how this experience assisted (or not) in selecting the best wheelchair system for the person requiring the wheelchair. Identifying the factors that were perceived as helpful from those factors that were not considered helpful (from participants’ experience), may help to inform future development of an optimal seating service model.

• Your interview transcripts will be sent to you for review. After you have reviewed the analysed transcripts, all data from your interviews will then be de-identified and a pseudonym will be ascribed to assure your anonymity.

• The results of the research will be disseminated in number of ways. These include my PhD thesis, journal manuscripts for publication in peer review journals and through presentations at relevant conferences.

• The research will be monitored by several mechanisms. These include peer reviews of the research by the PhD groups of students, ongoing written reports and the final report for the ethics committee at Deakin University.
5. Possible Benefits
Possible benefits of your participation may include the opportunity to reflect, explore and share your particular seating service experience, to identify what factors benefitted and what factors hindered your optimal engagement in a seating service and how this participation was perceived in successfully (or not) meeting your client’s wheeled mobility needs. Additional information gathered could inform future resource allocation for complex wheelchair seating servicing, as to date there is no published research that explores the complex seating services comprehensively in Australia.

We cannot guarantee or promise that you will receive any benefits from this project.

6. Possible Risks
This research is considered in the lower risk category of research. There will be minimal risk and consequences in this research except for the time spent for the interview. It is possible that you might experience emotional distress during the recall or discussion of past experiences related to wheelchair-seating services or associated wheeled mobility performance.

Should you experience any distress from the interview, you may contact either Arlene Walker by telephone on (03)5227 8441 at the School of Psychology at Deakin University or by through Lifeline by calling 13 11 14 within Australia, for a free counselling service.

There may be additional unforeseen or unknown risks.

Participants can suspend or end their participation in the project if distress occurs.

7. Privacy, Confidentiality and Disclosure of Information
Your audio recordings, paper copies of transcripts and other documents will be securely stored in a locked cabinet in the office of the associate researcher, located within the Occupational Science and Therapy, Waterfront Campus, Deakin University, Geelong.
All electronic databases will be password protected on Karen Stagnitti, Geneviève Pépin and Rachael Schmidt’s computers. Pseudonyms and participants names will be stored separately. Only the associate researcher will have access to that data. After the completion of this project, data are bound and will be stored for six years in archives at Deakin University, after which time the data will be destroyed.

Any information obtained in connection with this project and that can identify you will remain confidential. It will only be disclosed with your permission, subject to legal requirements. If you give us your permission by signing the Consent Form, we plan to publish the results with the researcher’s supervisors. In any publication, information will be provided in such a way that you cannot be identified.

8. Results of Project
   If you are interested and would like to be informed of the results when the research project is completed, you may contact the associate researcher in June 2013 for a copy of the results. Publication in the form of thesis and journal manuscript in peer review journals is anticipated from this research. Result will also be disseminated through presentations at relevant conferences.

9. Participation is Voluntary
   Your participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used and will be destroyed.
Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University and/or within the wheelchair seating industry.

10. Ethical Guidelines
   This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

   The ethics aspects of this research project have been approved by the Human Research Ethics Committee of Deakin University.

11. Complaints
   If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

   The Manager, Office of Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au.

   Please quote project number EC 2011-042.

12. Reimbursement for your costs
   You will not be paid for your participation in this project.

13. Further Information, Queries or Any Problems
   If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the principal researcher or

   Name:     Ms Rachael Schmidt
Position: PhD Candidate, Associate Researcher & Lecturer  
Centre: School of Health & Social Development  
Area: Faculty of Health Medicine Nursing & Behavioural Sciences  
Campus: Geelong Waterfront Campus  
Tel: 03 5227 8352  
Email: rachael.schmidt@deakin.edu.au

The researchers responsible for this project are:

Name: Associate Professor Karen Stagnitti  
Position: Associate Professor  
Centre: School of Health & Social Development  
Area: Faculty of Health Medicine Nursing & Behavioural Sciences  
Campus: Geelong Waterfront Campus  
Tel: +61 3 522 78363  
Email: karen.stagnitti@deakin.edu.au

Name: Dr Genevieve Pépin  
Position: Senior Lecturer  
Centre: School of Health & Social Development  
Area: Faculty of Health Medicine Nursing & Behavioural Sciences  
Campus: Geelong Waterfront Campus  
Tel: +61 3 522 78462  
Email: genevieve.pepin@deakin.edu.au
TO: Seating Therapist
Consent Form
Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective’

I have read, or have had read to me in my first language and I understand the attached Plain Language Statement.

I freely agree to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.

Participant’s Name (printed) …………………………………………………………..

Signature ……………………………………….. Date ……………………………..
Having given your consent to participate in this study, please provide your email address (or postal address) so a copy of the interview analysis can be forwarded to you. A copy of the interview analysis will be forwarded after the interview recording has been transcribed and analysed.

4. Please tick your preferred method of receiving interview transcripts:

□ Postal Address: .............................................................................................................. Post Code: _ _ _ 

□ Email Address: ..............................................................................................................

5. Please tick the boxes below if you wish to receive a short report summary once this study is complete, due mid-2013 and indicate the method you wish to receive the report.

□ Yes. Send me an end of study report to my preferred mail option below:

□ Via my postal address or □ via my email (above)

Participant’s Name (printed) ..............................................................................................................

Signature.......................................................... Date ......................................

6. Please return this signed consent form addressed to the Associate Researcher, Rachael Schmidt by one of the following methods:

Email: rachel.schmidt@deakin.edu.au;

Fax: 03 52278371 Addressed Rachael Schmidt, Occupational Science & Therapy;

Post: Rachael Schmidt,

School of Health and Social Development,

Faculty of Health,
Waterfront Campus, Geelong, Victoria, 3217.

Telephone: 03 52278352
Revocation of Consent Form

(To be used for participants who wish to withdraw from the project)

Date: June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and/or within the wheelchair seating industry.

Participant’s Name (printed) ………………………………………………………

Signature ……………………………………………………… Date …………………

Please mail or fax this form to:

Name: Ms Rachael Schmidt
Position: PhD Candidate, Associate Researcher & Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: 03 5227 8352
Email: rachael.schmidt@deakin.edu.au
Appendix I: Vendor Plain Language Statement and Consent Form

(Part A)

DEAKIN UNIVERSITY

VENDOR PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: INFORMATION FOR VENDORS WHO PARTICIPATE IN SPECIALIZED SEATING SERVICES

Plain Language Statement

Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective.

Principal Researcher(s):

Dr Karen Stagnitti, Associate Professor, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria.

Dr Geneviève Pépin, Senior Lecturer, Occupational Science & Therapy, Deakin University Waterfront Campus Geelong, Victoria
This Plain Language Statement and Consent Form are seven pages long. Please make sure you have all the pages.

1. Your Consent
   You are invited to take part in this research project. This Plain Language Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project so that you can make a fully informed decision whether you are going to participate.

   Please read this Plain Language Statement carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

   Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.

   You will be given a copy of the Plain Language Statement and Consent Form to keep as a record.

2. Purpose and Background
   The purpose of this project is to investigate the experience of participating in specialised seating services in Australia. The projects aims to understand what factors impact on the decision-making process involved in matching specialised wheelchair and
seating technology to meet the needs of people with complex wheeled mobility needs.

Approximately sixty people will participate in this project.

Availability to adequate seating prescription services, wheelchair suppliers and adequate support services vary in consistency throughout Australia.

To date, however there is no evidence that one service type is better than another in complex seating provision. In light of an anticipated increase in the use of wheeled mobility technology demands, better knowledge and understanding is required into the factors that may impact on successful wheelchair prescription and provision. In this study four groups will be invited to participate, including the person using the wheelchair (known as the consumer group), the care providers who support the consumer group, as well as the seating therapist and the vendor or supplier groups who provide services within a seating service. The aim of the study is to interview participants to explore what factors benefit and what factors hinder optimal engagement in a seating service and how this participation was perceived in successfully meeting the varied mobility needs of their consumers (Edwards & McCluskey, 2010). It is hoped that information gathered from this study will inform resource allocation for future specialised wheelchair seating services. A total of approximately sixty people will participate in this project. It is estimated that 5 persons from each stakeholder groups will participate in this study across each of the 3 seating services.

Previous investigation has shown there is some research internationally pertaining to wheelchair prescription and decision-making (Eggers, Myaskovsky, Burkitt, et al., 2009). Di Marco, Russell & Master (2003) stated that wheelchair prescription is complex, requiring time and competent skill for optimal prescription (White & Lemmer, 1998).
Barbara & Curtin (2008) raised the issues of cost containment and funding body protocols that may restrain the prescription of appropriate assistive technology. For wheelchair vendors of wheelchair service and product, participating in a specialised seating service, adhering to funding protocols and the cost of specialised wheelchair systems are relevant to successful wheelchair outcomes, especially where there are complex and evolving wheeled mobility needs. There is no published research into the specialised seating service delivery or provision in Australia. There are no known publications on the vendors’ experience in participating in specialised seating services in Australia. There is no literature pertaining to combined experience from all the participating groups, specifically from those who receive a service (consumers and care providers) and from those who provide a service (therapists and suppliers) in specialised seating service participation.

You are invited to participate in this research project because you are 18 years and older, have worked as a vendor, for a minimum of 18 months and have participated in a specialised wheelchair-seating service, within the past 3 years, assisting with fitting a consumer group with complex wheeled mobility needs.

The results of this research may be used to help researcher Rachael Schmidt to obtain a PhD degree.

References


3. **Funding**
   This research is funded by Deakin University

4. **Procedures**
   Your participation in this project involves
   - Contacting the associate researcher to express your interest in this project. Contact details are on page 4 of this Plain Language Statement.
   - You will be involved in an in-depth interview process of approximately 1-2 hour duration. You may be re-contacted, for a follow-up interview to explore specific themes or arising issues from your previous interview. Any additional interviews are undertaken to ensure the researcher has explored your experience comprehensively in the interview process. Subsequent interviews may vary in duration of around 30-60 minutes.
   - Your interview will be conducted face to face or via the telephone, and will be audio recorded. You be requested to complete a Consent Form prior to the interview process commencing. You will be asked to nominate your preferred method (email or posted mail) of receiving the analysed transcripts of your interview. Your review of the analysed transcripts will ensure that the analysis accurately represents your perspective on this topic.
Your interview will cover a range of topics to better understand your perceptions of participating in a specialised seating service when supplying product and servicing for wheelchair and seating systems for people with complex wheeled mobility needs. The interview process will explore four main themes. The first interview theme involves exploring your reflections on your last specialised seating service, including the type of service you provided a vendor service to. The second theme of the interview will explore the factors that you felt assisted or hindered you in ensuring suitable seating service and product/technology was available for trial. The third theme will explore your reflections on how your role as vendor contributed to the decision-making process to meet the consumer’s needs. The final theme will explore how you successfully (or not) matched the appropriate wheelchair equipment and/or services to meet the wheeled mobility goals of the prescribing clinician and the goals of the consumer.

Your audio recordings of the interview will be transcribed in full and you may be re-contacted for a further interview to follow up on specific elements of your initial interview.

Your interview transcript will undergo a two phase analysis process. Initially your interview transcript will analysed individually for themes arising from your seating service experience. The themes identified from your interview data will undergo further analysis with the themes arising from other interview transcripts within the vendor group. Additional analysis of the seating service experience will be undertaken by comparing themes arising from each of the participant groups (consumers, care providers, seating therapists and vendors) and then from within
each service type and finally, across all the service types. The analysis process aim is to explore the themes arising from the participants’ seating service experience, to ascertain how this experience assisted (or not) in selecting the best wheelchair system for the person requiring the wheelchair. Identifying the factors that were perceived as helpful from those factors that were not considered helpful (from participants’ experience), may help to inform future development of an optimal seating service model.

- You will be sent your interview transcripts for your review. After you have reviewed the analysed transcripts, all data from your interviews will then be de-identified and a pseudonym will be ascribed to assure your anonymity.
- The results of the research will be disseminated in number of ways. These include my PhD thesis, journal manuscripts for publication in peer review journals and through presentations at relevant conferences.
- The research will be monitored by several mechanisms. These include peer reviews of the research by the PhD groups of students, ongoing written reports and the final report for the ethics committee at Deakin University.

5. Possible Benefits
Possible benefits of your participation may include the opportunity to reflect, explore and share your particular seating service experience, to identify what factors benefitted and what factors hindered your optimal engagement in a seating service and how this participation was perceived in successfully (or not) meeting your client’s wheeled mobility needs. Additional information gathered could inform future resource allocation for complex wheelchair seating servicing, as to date there is no published research that explores the complex seating services comprehensively in Australia.
We cannot guarantee or promise that you will receive any benefits from this project.

6. Possible Risks
   This research is considered in the lower risk category of research. There will be minimal risk and consequences in this research except for the time spent for the interview. It is possible that you might experience emotional distress during the recall or discussion of past experiences related to wheelchair-seating services or associated wheeled mobility performance.

   Should you experience any distress from the interview, you may contact either Arlene Walker by telephone on (03)5227 8441 at the School of Psychology at Deakin University or by through Lifeline by calling 13 11 14 within Australia, for a free counselling service.

   Participants can suspend or end their participation in the project if distress occurs.

   There may be additional unforeseen or unknown risks.

7. Privacy, Confidentiality and Disclosure of Information
   Your audio recordings, paper copies of transcripts and other documents will be securely stored in a locked cabinet in the office of the associate researcher, located within the Occupational Science and Therapy, Waterfront Campus, Deakin University, Geelong.

   All electronic databases will be password protected on Karen Stagnitti, Geneviève Pépin and Rachael Schmidt’s computers. Pseudonyms and participants names will be stored separately. Only the associate researcher will have access to that data. After the completion of this project, data are bound and will be stored for six years in archives at Deakin University, after which time the data will be destroyed.

   Any information obtained in connection with this project and that can identify you will remain confidential. It will only be disclosed with your permission, subject to legal
requirements. If you give us your permission by signing the Consent Form, we plan to publish the results with the researcher’s supervisors. In any publication, information will be provided in such a way that you cannot be identified.

8. Results of Project

Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached.

If you are interested and would like to be informed of the results when the research project is completed, you may contact the associate researcher in June 2013 for a copy of the results. Publication in the form of thesis and journal manuscript in peer review journals is anticipated from this research. Result will also be disseminated through presentations at relevant conferences.

9. Participation is Voluntary

Your participation in any research project is voluntary. **If you do not wish to take part you are not obliged to.** If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. Any information obtained from you to date will not be used and will be destroyed.

Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Deakin University and/or within the wheelchair seating industry.
Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

If you decide to withdraw from this project, please notify a member of the research team or complete and return the Revocation of Consent Form attached.

10. Ethical Guidelines
This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethics aspects of this research project have been approved by the Human Research Ethics Committee of Deakin University.

11. Complaints
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Manager, Office of Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, Facsimile: 9244 6581; research-ethics@deakin.edu.au.

Please quote project number EC 2011-042.

12. Reimbursement for your costs
You will not be paid for your participation in this project.
13. Further Information, Queries or Any Problems

If you require further information, wish to withdraw your participation or if you have any problems concerning this project (for example, any side effects), you can contact the principal researcher or

Name: Ms Rachael Schmidt
Position: PhD Candidate, Associate Researcher & Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: 03 5227 8352
Email: rachael.schmidt@deakin.edu.au

The researchers responsible for this project are:

Name: Associate Professor Karen Stagnitti
Position: Associate Professor
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: +61 3 522 78363
Email: karen.stagnitti@deakin.edu.au

Name: Dr Genevieve Pépin
Position: Senior Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
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Email: genevieve.pepin@deakin.edu.au
Appendix I: Vendor Plain Language Statement and Consent Form

Part B

DEAKIN UNIVERSITY

SEATING VENDOR PLAIN LANGUAGE STATEMENT
AND CONSENT FORM

TO: Seating Vendors

Consent Form

Date: 4th June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective’

I have read, or have had read to me in my first language and I understand the attached Plain Language Statement.

I freely agree to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about this project is published, or presented in any public form.

Participant’s Name (printed) ............................................................

Signature .........................................................Date .........................
Having given your consent to participate in this study, please provide your email address (or postal address) so a copy of the interview analysis can be forwarded to you. A copy of the interview analysis will be forwarded after the interview recording has been transcribed and analysed.

7. Please **tick** your preferred method of receiving interview transcripts:

   □   Postal Address: ..............................................................................
       ......................................................................................... Post Code: __ __ __

   □   Email Address: ..............................................................................

8. Please **tick** the boxes below if you wish to receive a short report summary once this study is complete, due mid-2013 and indicate the method you wish to receive the report.

   □   Yes. Send me an end of study report to my preferred mail option below:

   □   Via my postal address or □ via my email (above)

Participant’s Name (printed) ............................................................................................

Signature.............................................................  Date ......................................

9. Please return this **signed consent form** addressed to the Associate Researcher, Rachael Schmidt by one of the following methods:

   **Email:** rachael.schmidt@deakin.edu.au; **Telephone:** 03 52278352

   **Fax:** 03 52278371 **Addressed Rachael Schmidt**, Occupational Science & Therapy;

   **Post:** Rachael Schmidt, School of Health and Social Development,

           Faculty of Health, Waterfront Campus, Geelong, Victoria, 3217.
Appendix I: Vendor Plain Language Statement and Consent Form

Part C

DEAKIN UNIVERSITY

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

TO: Wheelchair-Seating Vendors

Revocation of Consent Form

(To be used for participants who wish to withdraw from the project)

Date: June 2011

Full Project Title: An investigation of participation in Australian specialised seating services. A participant’s perspective

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and/or within the wheelchair seating industry.

Participant’s Name (printed) ……………………………………………………………

Signature ……………………………………… Date …………………

Please mail or fax this form to:
Name: Ms Rachael Schmidt
Position: PhD Candidate, Associate Researcher & Lecturer
Centre: School of Health & Social Development
Area: Faculty of Health Medicine Nursing & Behavioural Sciences
Campus: Geelong Waterfront Campus
Tel: 05 5227 8352
Email: rachael.schmidt@deakin.edu.au
Appendix J: Guiding Interview Questions

Seating service experience

Describe your latest experience of upgrading a wheelchair and seating from these perspectives:

- Does your seating service require a formal referral or who is responsible for the referral in your situation?
- Describe the wheelchair-seating services you participate/d in, what did the team look like, what is your role and where did this take place.
- Describe the most recent assessment process, who was involved, what was your role and what part/s of the seating assessment took the majority of the time?
- Describe the trial process, (location, time and who was involved), what was your role, describe access to trial product (by whom) and for how long (where) and trial evaluation process how you trialled the wheelchairs and seating systems How did you decide on the best product?
- When upgrading your wheeled mobility system, where does the majority of the funding come from?
- Describe how you were fitted to your new seating and wheelchair when the product arrived. How long did that take and what issues arose during that time for you?
- Once you were provided with your new wheelchair and seating system, describe any follow-up you were aware of either from the funding body, the prescribing therapist or the supplier.
- *From your perceptive*, what worked well for you in that seating scenario, i.e. positive experiences, timely appointments, experienced staff etc.

- What did not work well for you i.e. frustrations, interferences, and/or barriers.

- How could this be improved from your perspective for next time?

- Access to services and wheelchair technology

Tell me how you go about finding help to upgrade your wheelchair & seating system, e.g. referral to a prescribing therapist:

- Describe how your goals/needs are heard/or attended to?

- How long do you think is a ‘timely’ period between the deciding you need to update your wheeled mobility and receiving your fitted system at home?
  - How does that (time) period compare with your own experience?

- What are some of the issues you encounter when seeking/ sourcing a seating assessment? How do you assess that the seating assessment process is undertaken by a competent and confident clinician or team?

- *Communication*: Describe how you and the service providers talked to each other about your latest seating and wheelchair upgrade.

Guiding Interview Questions (continued)

- If you received any formal documentation, what was its purpose?

- Hypothetically, if you needed to voice your dissatisfaction at any time, how would you have done this and what do you think the service outcome might have been?

- How would your service deal with negative feedback, dissatisfied consumer or conflict?
• **Trial:** Describe your last trial process. Outline the essential elements you consider important in selecting most appropriate system for you?

• **Funding:** Describe how you funded your latest wheelchair frame and or seating system. In percentage terms, describe the external and personal funding equation for most recent upgrade.

• **Follow-up:** Once the completed wheelchair frame and seating system have been delivered, describe the process you use to ensure new technology is working well (e.g. how/who maintains W/C/, pumps tyres, cleans upholstery, recharges batteries etc.?)

• If required, how do you access after sale service? If required, how easy is it to access the consumers/your prescribing therapist when technology doesn’t deliver as was expected?

• **After-sale service and repair:** describe your service experience or role.

• Emergency service: Have you ever had a technology failure away from home, if so describe how you went about seeking urgent assistance and how you felt during that time?

• Making decisions, selection and choice (services, providers & technology)

When upgrading your/the client’s wheelchair and seating system:

• How do you know it’s time to upgrade to a new wheelchair or wheelchair seating?

• Describe the process you use to choose new wheelchair and seating systems. What is/are the most important item/s of the wheelchair - seating system to meet the goals as identified?
- Describe how you find out what W/C and seating technologies are available and what resources work best for you?
- Describe how you were involved in the process of finding the best/most appropriate technology, most recently? What aspect helped most to make you feel most involved/engaged (in seeking service and or wheelchair technology). What elements could be done better next time?
- What factors, do you consider assisted you in deciding on the best product? When do you feel like the decision-making process is really working for you?
- From your perspective, what factors impede on your decision-making process? How could this be improved for the future?

Hypothetically, can you describe elements that you think/feel allow for a really collaborative and supportive wheelchair-seating process, either at the time of assessment, or trial or fitting? Or if you are content with the process you recently experienced, why was that experience so worthwhile?

- When selecting the most appropriate wheelchair frame and seating system, how much does available funding impact on selecting the best fit of seating goals with technology.
- Describe the process you go through when considering product rationalisation or compromise due to the equipment cost and funding resource mis-match.
- When matching the wheelchair frame and seating system to mobility goals: 

Current experience? Describe your current wheeled mobility system. Describe how/where you use your current wheeled mobility system. What is the best feature of your wheeled mobility system and why?
From your perspective, what assists the process of matching your/consumer needs with the most appropriate product?

- What interferes with a successful match? What are some of the compromises you had to work through? Describe how this is done in your latest seating service experience.

- **Personal factors**: What purpose does the seating assessment process provide you? When deciding on what your/consumer needs for an upgraded system is, how do you describe what you want to those who assist you in the seating assessment process? Or: How do you know you are hearing what the consumer wants?

- **Social issues**: Describe your current social/home situation, i.e. who you live with, are you working/studying etc. How does your current social environment affect the wheelchair and seating systems you use/select.

- What sort of assistance works best in overcoming any difficulties related to the above? In your service how do you acquaint to consumer’s social roles?

- **Community participation**: Tell me about the fun activities you like to do with your friends and what works well and what doesn’t? How does your wheelchair and seating system assist/engage (or not) with having fun/or being part of the community? What works; what doesn’t?

- In your service how do you acquaint to consumer’s community participation activities/ roles? What works; what doesn’t?

- **Funding**: At what point do you consider the cost of equipment when upgrading a wheeled mobility system? What works; what doesn’t?
- **Environmental factors**: Describe your current home and community environment. How does your current wheelchair set-up manage in this environment? How does the consumers/care provider environment and or social activity affect what wheeled/seating technology is selected?

- In your service, what works/or not to assist funding?

- **Wheelchair and seating technology**: How do you sort through the large array of wheelchair products to find the best fit for consumer and technology goals. Describe the factors you consider important when deciding on the seating system?
Appendix K: Study Outline

PhD Study: An investigation of participation in Australian specialized seating services. Stakeholders’ perspectives.

The study in brief: The aim of the study to explore specialized seating service experience as it is delivered within Australia. The study will use an in-depth interview process to collect the reflected experience as each participant recalls their most recent (within 3 years approximately) experience of upgrading or renewing an integrated wheelchair-seating system for a person with complex needs.

Background: The purpose of this project is to investigate the experience of participating in specialized seating services in Australia. The projects aims to understand what factors impact on the decision making process involved in matching specialized wheelchair and seating technology to meet the needs of people with complex wheeled mobility needs.

Availability to adequate seating prescription services, wheelchair suppliers and adequate support services vary in consistency throughout Australia. This may include a traditional seating clinic, or a seating assessment provided via a wheelchair supplier or maybe a combination of clinicians and suppliers working loosely together in the community. To date there is no evidence in seating servicing that support one service type is better than another in complex seating provision. In light of an anticipated increase in the use of wheeled mobility technology demands and with proposed introduction of the National Disability Insurance Scheme, better knowledge and understanding is required into the factors that may impact on successful wheelchair prescription and provision.

Participants: In this study four groups are invited to participate, including:

1. Adult consumers who live in their wheelchair systems,
2. Adult care providers who support wheelchair consumers (of any age),
3. Seating therapists who prescribe for complex mobility and postural needs and
4. Wheelchair suppliers/technicians and/or rehab engineers who are involved in fitting/supplying of integrated wheelchair-seating systems.

All the participants need to be at least 18 years old and can communicate in English. Participation in this study involves being interview in-depth, by me as sole interviewer. In anticipation of some consumers using an alternate form of communication, there is a modified interview format available to facilitate the interview process.

**Methodology:** The aim of the study is to explore the participants experience in specialized seating services (whatever that may look like). The interview aims to uncover the factors benefitting and hindering optimal engagement in a seating service and how this was successful (or not) in meeting the varied mobility needs of their consumers. Approximately sixty people will participate in this project, and will be recruited across a range of seating service types and across each of the four stakeholder groups (as above).

The initial interview process may take between 1-2 hours, depending on each participant’s reflections. The interviews will be audio recorded and transcribed in full. The participant may be re-contacted to ‘flesh out’ arising themes, mostly via email however or face to face depending on mutual agreement. All participant information will be treated as confidential. I will use coding to disguise identities of people and services.

The interview transcripts analysis will undergo two phases. The first phase will analyse the data for themes of interest individually, within the stakeholder groups and then across the seating services types. The second analysis will explore the same interview transcript using lens of decision making and social justice theory and the Matching of Person to Technology framework. It is hoped that information gathered from this study will inform resource allocation for future specialized wheelchair seating services.
**What I need:** I want to broadcast the participant’s invitation across Australia, to inform potential consumers and care providers who may want to share their seating service experiences in this research.

Potential participants can email me directly for more information. On receipt of their interest, a plain language statement and consent form will be forwarded (email or post). An interview time will set that is suitable for both, preferably in person (or by phone). The in-depth interview process requires the participants who can recall and share their seating experience and can cope with an in-depth interview. In rare occasions, participants have contributed via a written format of guiding questions. This has worked well and allows for participation and contributions that may not have been collected verbally.

I wish to also collect data widely from service providers. I am therefore keen to interview seating therapists and wheelchair suppliers with different seating service experiences known to your Seating network. I would appreciate if this invitation could be spread amongst your seating and vendor communities.

**About the researcher:** I am an occupational therapist with 30+ years of experience as a general specialist (all ages: paediatrics early intervention to geriatrics in developmental & learning facilitation, neuro-rehab, oncology, medical, allied health, dual sensory loss, assistive technology consultancy & project development) in regional, rural and metro-based community, educational, health and government services in Qld, NSW & Victoria. I am a Queensland University graduate (B.OccThy, 1976) and Master Health Science (OT) (Sydney University 2006). The past seven years, I have been educating undergraduate occupational therapy students at Deakin University, Geelong Waterfront Campus. I am a full time Deakin PhD student, funded via an APA scholarship until 2013. My most recent clinical experience was as advisory consultant & coordinator of a Melbourne-based pilot seating service within Yooralla Society of Victoria. This seating service experience generated an ongoing interest in the complexity of clinical reasoning employed by seating experts and lead onto this PhD study into researching seating service decision making.

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