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TRANSFERRING PUBLIC SECTOR OPERATIONS TO OTHER COUNTRIES: EXAMPLES FROM CHINA

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ABSTRACT

Public sector organisations in many countries have transferred their operations into other countries. This transfer of operations to other countries frequently follows channels such as aid schemes offered by the country's government. Despite the significant amount of operations that have been transferred in this sector, there is a paucity of research identifying whether contemporary operations management concepts are relevant to the management of public sector operations in other countries. Qualitative data collected from eight Australian public sector organisations determined that a set of nine operations management dimensions identified from the literature were relevant to the management of operations of Australian public sector organisations in other countries. Two operations management dimensions -- operations development and operations constraints -- were found to apply to all the participants. Between 0% and 85% of the remainder of the dimensions applied to each of the participants. The least frequently identified dimension was technical skills levels, being identified as a critical issue by only 25% of the participants. It is concluded that it is important to focus on the operations management practices of logistics, supply chain management and technology and systems transfer in managing the operations of public sector operations in other countries.

Keywords: International Operations Management, China, Public Sector

INTRODUCTION

Increasingly, public sector organisations manage some of their operations in other countries. The Australian education industry is a good example. The introduction of operations in other countries has caused it to develop from a very minor exporter to Australia's third largest exporter, after coal and iron ore over a ten-year period [1]. Another important example is Chinese state-owned (public sector) operations in other countries, such as those of the very large China Capital Iron and Steel Company [2].

For the purposes of this research, international operations management is defined as the management of operations in other countries. It is an operations, rather than market oriented perspective. The competitive priorities determined for the operations provide the connection with any new market oriented approaches that have been adopted to suit new markets that the organisation may enter [3]. Operations may be conducted in other countries without the intention of servicing any new markets, solely to gain access to certain local conditions such as lower labour costs. This occurs frequently in organisations based in developed countries where operations are conducted in low labour cost countries to reduce operating costs without the organisation attempting to enter any new markets.

Despite the scale of public sector operations that are now managed in other countries, very little research has been conducted into the nature of these operations management processes

and no research has been published on the international operation strategies that public sector organisations have adopted. The most significant research dealing with the application of operations management to the public sector was Voss, Armistead, Johnstone and Morris's book "Operations Management in Service Industries and the Public Sector", published in 1985 [4]. This book, however, focused almost exclusively on operations management in the domestic public sector context [5-7]. Since then, only a very small number of articles which investigate operations management in the public sector (e.g. [8-10]) have been published. These articles predominately focus on performance improvement rather than the full spectrum of operations management. This contrasts very poorly with the extensive international operation management research that has been conducted for private sector organisations [11].

PROJECT SCOPE

This paper examines how the operations of eight Australian public sector organisations were conducted in China. The research takes an operations rather than market perspective. It focuses on the operations management issues associated with managing public sector operations that take place in other countries.

This research falls under the category of operations management research. It does not fall under the category of international business theory. International business theory focuses on the reasons for and process of creating an international business to gain access to local markets or resources [12]. International operations management theory is concerned with achieving organisational goals such as the competitive priorities of cost and quality objectives. Whilst operations management focuses on internal issues and is thus independent of the markets in which the organisation operates, it is nevertheless affected by local conditions. The differences in local conditions in other countries that can affect operations management activities, such as managing the supply chain, are significant [8]. There has been relatively little research dedicated to identifying the significance of these factors and the dimensions of operations management upon which they act. There has been almost no research identifying the significance of these factors and the dimensions of operations management that apply to public sector operations that have been transferred to other countries.

These findings have been extended to the broader public sector through connections with the research findings and other public sector research.

LITERATURE REVIEW

As noted in the introduction, little research into the dimensions of operations management that apply to public sector organisations with operations in other countries had been undertaken. The result is that there is no research available that comprehensively identifies which dimensions of operations management are likely to be relevant and their relative importance. This review examines the literature around public sector operations that occur in other countries. It is broken up under the categories of:

- why public sector organisations establish operations in other countries
- operations management dimensions that have been found to be significant to public sector organisations with operations in other countries
- the operations management experiences of specific public sector industries with operations in other countries.

Why public sector organisations establish operations in other countries

In developed countries, the case has been made for some time that public sector enterprises possess skills and capabilities that are valuable in other countries [13, 14]. In addition to industry support and revenue generation, one of the principal motivations for transferring public sector operations to other countries is to provide advanced management skills to support the aid programmes being delivered by those public sectors. To establish their operations in other countries, public sector organisations are frequently forced to adopt commercial business behaviours or link with commercial organisations [15-17]. Not all of these behaviours have proven, however, to be suitable for public sector organisations. In Norway, for example, it was found that international supply chains supporting public sector organisations could not be effectively managed using commercial sector performance measures [18]. Some public sector organisations found that they needed either to privatise and become fully commercial, or abandon their adopted commercial behaviours to remain successful. Where they chose to abandon commercial behaviours, their performance consequently suffered [19].

Operations management dimensions that have been found to be significant to public sector organisations with operations in other countries

Research has individually identified some of the dimensions of operations management that apply to the public sector domestically. For example, technology management was found to be major factor contributing to increasing operational efficiency in a US government Department of Motor Vehicles [8]. Lean operations techniques were found to contribute to improving operational quality and efficiency by reducing waste and facilitated employee driven change in a number of sectors of the UK public service [9]. Interestingly, a large scale research project considering UK further education colleges found that employee satisfaction was a larger contributor to increasing the quality of output for these public sector organisations than the more traditional operations management dimensions, [10].

Public sector relationships with industry have also been significant contributors to managing public sector operations to other countries. Levels of co-operation between the public and private sector have increased over the last decade through the formation of cooperative networks in many countries [15]. These networks have been established by public sector organisations because of the valuable resources which the public sector now possesses [20]. Incorporating commercial organisations in these networks provided greater access to internal resources for the public sector network members. No specific evidence of which operations management dimensions were facilitated by these relationships has been identify in the literature.

The operations management experiences of specific public sector industries with operations in other countries

This section considers the operations management experiences of the education public sector, in particular, and the limited remaining literature which applies to a variety of other public sector groups.

Education:

In many countries, there has been very significant shift towards an international perspective amongst public sector higher education providers. For example, development of Chinese

higher education since the 1980s has included a focus on incorporating an increased international perspective [21]. The Japanese higher education sector has also internationalised its curriculum continuously (but not its operations) since the 1980s [22]. The US higher education sector identified the value of internationalisation in the 1980s [23, 24]. This focus on an international perspective has provided a strong motivation for the subsequent transfer of operations to other countries in this industry.

Little consideration has been made of the management of operations in other countries, in this sector, however. For example, conducting US university operations to other countries is considered to be a philosophy, rather than a change to operations. The result is very poorly coordinated and opportunistic establishment of operations in other countries in this public sector [24]. Interestingly, the only apparent example of a strategic approach to establishing operations in other countries in a US higher education institution was the University of Indiana, whose president was in Australian [23]. Despite this, the sheer size of the US higher education sector has enabled this industry to transfer a reasonable amount of operations to other countries compared to other higher education industries. By comparison, the Japanese higher education industry has not transferred its operations to other countries to any significant level at all, even though it does have an objective of attracting large number of foreign students to study in Japan. The Japanese higher education sector has a very different approach to the countries in which it is prepared to operate compared to the Japanese automotive industry which, along with the US automotive industry, is one of the most internationally spread industries in the world.

Transferring operations to other countries from the UK higher education sector is based on establishing partnerships with commercial organisations already operating in other countries [25]. This has made its foreign operations efficient -- an objective of government policy for this sector. Canadian objectives for its higher education sector, however, are so short term, that there is almost support for foreign located operations this industry [26].

Other public sector groups:

The South Korean military exports equipment through marketing conducted by the South Korean Government Office of Defence Acquisition [27]. Japan Post, although being the country's largest employer, was unable to successfully transfer any operations to other countries until the government started to privatise it. Privatisation freed up revenue from its more lucrative mail services to support the transfer of its operations to other countries. The experience for Deutsche Post (the German postal giant) was very similar with its protected letter postal business enabling it to make a number of major acquisitions in other countries [28]. Both British Telecom and Deutsche Telekom were also successful in transferring operations to other countries once they had been partially privatised. Privatisation allowed them to improve the efficiency of their operations and change their structures to the point where they could successfully establish operations in other countries through acquisition [29]. By comparison, the Singapore government was unsuccessful in its attempt to establish an industrial park in Suzhou in China without private partners [30]. This government entity found it was unable to operate as efficiently as the commercial organisations operating other industrial parks. Transferring operations to other countries using domestic resources, however, has proved to be successful for public sector organisations such as the Montréal, Paris and Rome city governments [31]. The Chinese government is heavily involved in transferring six areas of its operations to other countries - central state bodies, State financial institutions, provincial governments, special economic zones, large state enterprises and state-owned defence manufacturing facilities. In almost every case, a private arm is

established to facilitate the establishment of offshore operations and gain access to local capital [2].

The research question this paper will examine is "Which dimensions of operations management are of particular relevance to public sector operations located in other countries?"

Framework of Analysis

The literature reviewed above suggests that research into the operations management of public sector operations located in other countries can be viewed through three core contemporary operations management perspectives: operations control, supply chains and technology and infrastructure. The literature also suggests that the following nine operations management dimensions may be relevant to operations management of public sector organisations in other countries and to the three operations management perspectives. The research will examine the extent to which each were found to be significant issues for the participants and the conditions under which they were significant.

- Operations control:
 - operations management issues
 - operations development
 - operations constraints
- supply chain:
 - logistical issues
 - supply chain management issues
- technology and infrastructure:
 - technology and systems transfer
 - technical skill levels
 - infrastructure and local resource differences
 - IP protection

METHODOLOGY

An interview protocol was developed for this research which addressed the following issues:

1. the nature of the public sector organisation and its operations
2. the reasons for establishing operations in other countries
3. the success of those operations
4. the staff and resources involved in be offshore operations
5. the operations and management controls used
6. the success experienced with these operations management controls
7. changes that have been made to those operations management controls
8. future plans

The interview protocol is available from the author. The interviews were conducted with representatives of eight Australian public sector organisations with operations in China. The participants were selected at random from organisations identified in the public domain media that had operations in China established either through direct investment or through partnerships. The organisations were contacted by e-mail with a telephone follow-up to determine whether they would be available to participate in an interview. This continued until eight organisations had agreed to be involved. The acceptance rate for involvement in the survey was 50%, however, some of the rejections were due to the unavailability of a suitable participant in the timeframe of the study, rather than a preference not to participate.

Not-for-profit organisations providing a coordinating role for industries were included in the study in recognition of the fact that some not-for-profit representative organisations operate in exactly the same manner as their public sector counterparts. Industries which lack a government owned coordinating agent typically establish their own, using the same model as the government owned coordinating agencies.

In total, ten interviews were conducted with either the CEO, international operations director or the Chinese operations manager of these eight public sector organisations, depending upon how many participants the organisation elected to provide for the research data collection. The relevant features of these organisations are shown in Table 1.

FINDINGS

Some of participants had established operations in China 30 or more years prior. Only a small number of Australian organisations had established operations in China prior to the 1980s. This suggests that the transfer of public sector operations to China did not significantly lag behind the transfer of private sector operations to China from Australia.

Table 1 summarises the characteristics, the nature of the operations and the number of staff involved in the offshore operations of the participants. In each case, a number of staff allocated to the offshore operations were also located within Australia, but travelled frequently to China. In the case of organisations 3-8, a number of additional staff were contracted through agencies on a permanent basis, but were not considered to be staff members. Each organisation is identified in the following discussion by the Identification Number (ID) in Table 1.

Background to the establishment of operations in other countries

Some participants were motivated to transfer operations to other countries to achieve global scale operations to head off major international competitors from entering their domestic market. Organisation one established a partnership with nine sister organisations in countries including China, US, Japan and Korea to extend their operational capacity into the international environment to enable them to take up new market opportunities. Other participants were motivated to establish operations in China because of the extensive trade that the constituencies they represented had with China. Organisation three was particularly motivated by this factor and the fact that other public sector organisations in its vicinity in Australia had operations in China. Organisations five and six established operations in China to enable them to take advantage of the resources of partners in China. Organisation seven entered establish operations in China so that it could enter a partnership with local Chinese organisations to service the Chinese market. Organisation eight established operations in China to directly support its constituency's operations in China.

Operations management issues:

The participants experienced relatively few critical operations management problems once their international operations were established, with the exception of organisation seven. This participant's experience of establishment operations in China was that it was generally challenging. It took several years to finalise because of the difficulty in meeting local regulations and the time it took to establish the necessary local relationships. Participants representing organisations with operations spanning larger areas of China experienced a large variation in local regulations. In the case of organisation one, operations coordination was achieved by adopting a standard product design and shared logistics IT system which

serviced every organisation within the alliance's needs. This participant described the arrangement as follows:

“What they did was align their product offer, put in place an IT system that they all operated off so that they could track and manage information, because those sort of things are key to being able to compete...”

Organisation six found that the quality of education they wished to provide in China could not be maintained through local partners and that it was necessary to attract all students to Australia. In other words, it had to focus its Chinese operations purely on marketing its exports. It did, however, conduct research activities as partnerships with Chinese organisation in universities on a project basis. Organisation seven found that quality and profitability was hard to maintain when delivering their program in China with local partners. They reverted to exporting their service to China as well. Subsequent to this, they found that an office in China was not required and used local agents for their marketing, instead. Organisation seven found that maintaining the quality of its Chinese students severely constricted the flow of Chinese students into its degrees. Organisation eight found that the textile industry it supported needed to focus much more on innovation and product evolution to remain a viable part of the Chinese market. The textile industry's weakness in innovation was causing demand in China to drop significantly.

| ID | Description | Nature of operations in China | Number of staff in China | Total number of staff dedicated to China | Used local agents for marketing |
|----|---|---|--------------------------|--|---------------------------------|
| 1. | Government utility involved in distribution | Network Alliance, partnerships, WOFE | 120 | 150 | no |
| 2. | Commerce NGO | Exporting, WOFE | 10 | 30 | no |
| 3. | Large municipal Council | WOFE, Network Alliance, exporting | 4 | 8 | yes |
| 4. | Agricultural NGO | Exporting, network alliances, local contractors | 1 | 5 | yes |
| 5. | University | Exporting, partnerships | 0 | 20 | res |
| 6. | University | Exporting, partnerships | 0 | 15 | yes |
| 7. | University | Exporting, partnerships | 0 | Closed down China office | yes |
| 8. | Research centre | Exporting | 0 | 3 | yes |

TABLE 1: SUMMARY OF PARTICIPANT'S CHINESE OPERATIONS

Operations development:

Some of the participants had reached the maximum operational size that was possible within the context of Australia. Establishing operations in China provided an opportunity for substantial overall development of their operations for all the participants. This enabled them to achieve efficiencies and adopting operations that would not have been possible solely within Australia. In the case of organisation one, establishing operations in China led to it

establishing new operations in a number of other attractive industries, such as public sector banking.

Operational constraints:

In some cases, the opportunities for operations development were far greater than the participant could accommodate and so operations were limited by either geographical locations or by targeting specific industries. Organisation three chose to focus on the aerospace, automotive, creative and biotechnology industries:

“TV, film, games – ... It’s a huge industry. And there are a lot of Australian graphic designers doing a lot of work. There’s also platform base work. So they are the ones that we’re trying to promote and look for opportunities.”

Organisation six found that Chinese government changes to policies significantly affected the amount of activity it undertook in China. Organisation seven noted that their ability to approve and implement changes limited the amount of internationalisation that could occur in China. Factors limiting the quality standards that the organisation could achieve affected all eight participants. These provided a significant operational constraint where the quality standards could not be brought up to levels acceptable to the organisation and its commitments (which included regulatory requirements).

Logistical issues:

Logistical issues were quite significant, predominately due to Chinese infrastructure and the layout of Chinese cities. Organisation three noted that Chinese cities tend not to have a central business district which made it difficult for them to choose the location from which they could have a significant impact on business relationships in that city. Organisation four found that their operations needed to extend across China to support their constituency. In Japan, by comparison, this participant found that trade interfaces were much more geographically concentrated and much less geographical coverage was required:

“With Japan basically, you go to Tokyo and stay in a nice hotel and do all your business from a nice hotel. Maybe you hop on the beautiful Shin-Kan-Sen bullet train and sit in luxury for an hour and you’re then 200kms away and you visit some other very nice, well-developed city, and it’s very easy to do business there.”

Logistical constraints for organisation six meant that in country operations were not profitable and only exports to China generated profit. Organisation seven found that the Internet and computer access resources were quite adequate to support their programs in the major cities, but were not adequate in the smaller cities. This made it harder to manage successful partnerships in the provincial cities, even though the competition was much lower there. Organisation eight found that, in its industry, the dominance of Chinese domestic standards over international standards could seriously impact with creating sales in the Chinese market.

Supply chain management issues

Supply chain management issues proved to be challenging, particularly in relation to local regulations in China. These regulations varied across the country significantly and created many complications for the participant's supply chains. Organisation one, for example, established an alliance of nine large national scale utilities involved in distribution. The IT system used to track the distribution was central to the success of the alliance's operations. In the case of organisation three, 30 years of connections provided a range of opportunities for dealing with the supply chain management issues. IT also proved to be a useful resource for

dealing with international coordination amongst the respondents. Organisation five outsourced its marketing in China to generate demand for its exports to China. It found that a small numbers of agents generated more export demand than large groups of agents which had limited commitment:

“... we are better off to work with an agent that sees that [company] is their route to making money than working with a thousand agents who see [company] as just another one.”

Organisation eight found that poor information flow within the market interfered with supply through the buyers and traders making up the supply chain in its Chinese market. This resulted in a significant supply chain bullwhip affect. Poor knowledge of the Australian industry and a reluctance to make any investment in acquiring this knowledge made the Chinese section of the supply chain operate ineffectively in organisation eight's industry.

Technologies and systems transfer:

The experience of the participants was similar to that of international manufacturing companies, in that technological systems and intellectual property formed a basis for internationalising into China. Organisation one established jointly owned operations with its sister organisation in China, to take over some of the operations of that organisation. This was attractive to organisation one because it generated further revenue and provided international experience. It was attractive to the Chinese organisation because it provided access to systems and technologies that were more advanced than those the Chinese organisation was using. It also enabled the Chinese organisation to extend its supply chain as it was operating at its natural limits. China represented a bigger market than its supply chain could manage. There was some technology and system exposure risk for organisation one, however, because it was a public sector organisation, its IP and systems were not well protected even in its domestic market. Secondly, it was able to extend and develop these systems more quickly using the experience from its Chinese operations.

Different systems more easily integrated in partnerships where the organisations performed similar services. In the case of organisation one, the fact that both partners were in exactly the same line of business enabled the substantial cultural gaps and differences in the systems within the organisations to be bridged within a period of eight months. In the early stages, however, cultural divides were particularly significant. Organisation three invested considerable effort in ensuring that Chinese cultural expectations both within China and Australia were met:

“We have all the documentation translated into appropriate Chinese, and official interpreters and translators that have NAATI approval – not just someone who happens to be bilingual. We know about the significance of certain practices and certain foods and so we just make sure that we adhere to that when they're here.”

Organisation seven relied extensively on its internal Chinese cultural and legal knowledge when establishing cooperative operations in China. Organisation seven also relied heavily on technology transfer for the success of its partnerships to enable the Web-based education it provided to be used by the partner in China. In a number of instances, this organisation found that its partner was unable to provide adequate computer and Internet access. Organisation eight found that the Chinese were particularly interested in technology transfer, sometimes on a scale and complexity greater than in Australia, and ignored technology management even though this organisation can provide world-class technology management education:

“...the focus has been very much on getting the best and latest equipment without really understanding how do we get the best out of that equipment by understanding, in more comprehensive terms, the process and technologies involved, best practice technologies.”

Technical skill levels:

Accessing equipment and general staff for subsidiaries in China was not a problem for the participants. Accessing staff with high levels of skill, however, was an issue. Skilled staff were particularly difficult to find, tended to move on fairly quickly and demanded relatively high salaries. Organisation one found that it was even more difficult for them to attract skilled staff because their Chinese operations were relatively small, new and not attractive to the type of skilled staff they were seeking: *“we have difficulty attracting the best people because it's a sort of fledgling organisation that who knows where it's going to end up?”*

Organisation eight found that, although the Chinese were particularly interested in technology transfer, there was far less interest in acquiring technology management skills. The industry which organisation eight supported was also focused on supplying Australian technology to China.

Infrastructure and local resource differences:

The variation in infrastructure and availability of local resources such as contractors and consultants was a significant issue for all of the participants. Organisation one chose to establish in large and economically developed regions such as Shanghai, Shenzhen and Hong Kong to gain access to sufficiently developed local infrastructure. Organisation three noted that the infrastructure was much more reliable than it was in the 1990s and the scale of many of the infrastructure projects was enormous by Australian standards: *“China's logistics and rail and road project is huge. Aside from the environmental concerns in terms of the speed of which they've built some of these major engineering things, it is just fascinating how quickly they've built that”*. Organisation eight found that Internet infrastructure outside the capital cities was a limitation to the development of partnerships there.

IP protection:

Legal constraints did not affect the operations that were set up in China except that, until fairly recently, regulation required the Chinese organisation to be the majority owner in a partnerships. Although organisation one established a partnership of nine large national scale utilities, no legal entity was established. Organisation two invested considerable effort in supporting Australian companies dealing with the day-to-day legal aspects of maintaining operations in China: *“...Australian companies who are doing business ... I suppose there are some precarious contacts”*.

Changing the status of subsidiaries as they develop can result a number of small legal difficulties as well, as organisation three experienced when they tried to change their local office to a fully representative municipal office. Legal constraints also impacted on intellectual property protection for the participants. Organisation four was very careful with the information they provided when in China and did not provide information directly to Chinese companies because of concerns for protection of copyright material and the intellectual property of the organisations that they represented. Organisation five's concern about the limited protective value of contracts in the Chinese context was a significant barrier to establishing jointly owned operations in China. By comparison, organisation seven's partners were given the IP material necessary to allow them to teach their part of the course locally in China. Although there was some concern as to what would happen to this material,

if the partnership was wound up, the potential loss of this IP was not considered to be a major issue.

DISCUSSION

Table 2 below indicates the significant operations management dimensions for each of the participants. It shows that each of these dimensions was identified by at least 25% of the participants. Each of these operations management dimensions is therefore considered to be a significant component of operations management for Australian public sector organisations with operations in China.

| Dimension of Operations Management | Organisation | | | | | | | |
|---|--------------|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Operations development | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Operations constraints | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| IP protection | ✓ | | ✓ | ✓ | ✓ | | ✓ | |
| Logistical issues | | | | ✓ | | ✓ | ✓ | ✓ |
| Supply chain management issues | ✓ | | ✓ | | ✓ | | | ✓ |
| Operations management | ✓ | | | | | ✓ | | ✓ |
| Technology and systems transfer | ✓ | | ✓ | | | | ✓ | |
| Infrastructure and local resource differences | ✓ | | ✓ | | | | | ✓ |
| Technical skill levels | ✓ | | | | | | | ✓ |

TABLE 2: OPERATION STRATEGIES DIMENSIONS THAT WERE SIGNIFICANT ISSUES FOR EACH ORGANISATION

Both operations development and operations constraints were considered to be issues for 100% of the participants. This suggests that the challenge of establishing Chinese operations and the constraints that applied to them were the most critical factors influencing the participant's foreign operations, as opposed to secondary issues of IP protection, logistics, supply chain management, technology management or day-to-day operational control. Post operations establishment, the participants noted between 0% and 86% of the remaining identified operations management dimensions as being significant. Fifty percent of the organisations identified between 0 and 25% of the remaining operations management dimensions as being critical.

The next most frequently identified issue was intellectual property protection, identified by 63% of participants. In all cases, this involved concern regarding loss of IP to specific partners and the compounding fact that partnerships were frequently the most attractive method for establishing operations in China for the participants. This was also compounded by the participants concerned regarding the level of protection of IP provided by the Chinese legal system and the perception of the participants that foreign organisations were at a disadvantage in the system.

Fifty percent of participants identified both logistical and supply chain issues as being significant in the management of their operations in China. These reflected predominantly regional issues in which different regulations in different regions interfered with the reliability of supply chain process and, in a manner, conditions in Chinese cities outside the major cities such as Shanghai represented significant challenges for their local operations. For example, the lack of centralisation in most medium-size Chinese cities made selecting a suitable location for their operations which would provide the necessary profile and contacts, very difficult.

Thirty-eight % of respondents claimed that operations management, technology and systems transfer and infrastructure and local resources differences were critical issues that they faced in managing their Chinese operations. These concerns reflected a difficulty in accessing staff with technology management skills, even though actual technology levels available in China were quite high. They also reflected the limited availability of support services except in major cities and cultural differences which impacted upon the operations management approaches that could be utilised. Interestingly, although at the micro level infrastructure was frequently very limited and constituted a constraint to setting up operations in China, other infrastructure developments were of a scale much greater than experienced in Australia. In other words intermediate infrastructure was limited and represented an issue for some of the participants.

Having identified technology skill levels of staff as a major issue in relation to operations management, interestingly, only 25% of participants considered to be a significant issue in its own right. In a number of cases, the technology management skills required by these participants was eventually provided from the home country resources when it could not adequately be sourced in China. Where these skills could not be provided from the participant's home country operations, the operations in China experienced considerable difficulties. The shortage of support services was turned to the advantage of some participants. For example, one of the larger participants established extensive operations in partnership with its counterpart in China on its superior technology management and implementation skills.

CONCLUSION

This research identified significant evidence for the existence of nine operations management dimensions in the Chinese operations of eight Australian public sector organisations. These operations management dimensions were: operations management, operations development, operations constraints, logistical issues, supply chain management issues, technology and systems transfer, technical skill levels, infrastructure and local resource differences and IP protection. Their significance reflected the difficulties experienced around establishing operations in China and the regulatory constraints that the participants experienced. Other causes for identifying these operations management dimensions included concerns for loss of intellectual property, difficulty of establishing reliable supply chains, difficulty of accessing staff with sufficient technology management skills and difficulty in accessing support services except in major cities. This demonstrates that nine operations management dimensions have been justified as being relevant to the operations management of Australian public sector operations in China and answers the research question of "Which dimensions of operations management are of particular relevance to public sector operations located in other countries?" Future research into the operations management of public sector organisation operations in foreign countries should incorporate all nine of these dimensions.

The findings of this study and the analysis approach adopted warrant further empirical testing before the development of specific models can be considered. Opportunities for empirical examination of single public sector industries is limited as most public sector industries within a single country will contain very few organisations that may choose to establish operations in other countries. In addition, cross-country analysis of similar public sector organisations will be complicated by the different domestic competitiveness of the industry to

which that public sector organisation is connected. The education and tourism industries, however, provide potential for further and critical testing of these concepts.

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