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A review of studies on information systems and SMEs in high ranked IS journals (2000-2014)

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Abstract

This paper identifies novel approaches to future small and medium enterprise (SME) research from a review of articles, and then introduces the papers in this AJIS special section which evidence these approaches. More specifically, the paper makes an important contribution by reviewing 61 articles in high ranked IS journals (2000-2014) and introducing three new facets which are used to analyse research on SME adoption/use of IS (units of analysis, SME sizes and SME types) not considered in previous literature review studies. These facets provide the basis for proposing various future research opportunities. The editorial then introduces the four papers in this special section covering the research theme on SMEs, and highlights the contributions they make using the three facets.

Keywords: Information systems; small and medium enterprises (SMEs); units of analysis; literature review; high quality journals; SME sizes; SME types.

1 Introduction

Small and medium enterprises (SMEs) are not just small versions of large organisations. They have unique characteristics with regard to their adoption and use of IS, such as limited resources for implementing IS and the dominance of owner-managers in IS-related decision-making (Cragg et al. 2011). Small businesses in particular contribute between 40-50% of private sector employment in various countries (e.g. Australian Government 2014, Federation of Small Businesses UK 2014, United States Census Bureau 2012). However, the number of SME-related articles published in leading IS journals (see Keller and Coulthard 2013) is much less than the value contribution they make, so that continuing studies on SMEs are needed to advance the IS discipline. It is important that SME research is undertaken which results in new theoretical and empirical directions to be taken up by scholars in the future. To that end, this editorial prefaces this 'research theme on small and medium enterprises' by identifying novel approaches to future SME research, and by showing these new approaches are evidenced by the papers in this AJIS special section.

This editorial therefore serves two aims which will advance future IS research relating to SMEs. First, we review 61 articles on SME adoption/use of IS in high quality 'A*' ranked IS journals (see the list of journals in the Appendix) from 2000 to 2014 according to three facets (units of analysis (UOAs) they use, the SME types studied and SME sizes used) to identify opportunities for future research. Earlier reviews of articles on IS and SMEs have focused on other facets of articles. For instance, Parker and Castleman (2007) analysed four facets of articles from 2003 to 2006 (research approaches, types of IS, and countries studied, and primary research objective), and Powell and Woerndl (2008) reviewed the research approaches used in IS

articles on SME adoption/use of IS from 1995 to 2005. This editorial makes a contribution to knowledge by conducting original research into three new facets, which were not analysed in these past reviews, and by identifying new research opportunities. In addition, it presents current insights into state of the literature when compared to past reviews, which are now seven or more years old.

The second aim of the editorial is to introduce the four papers in this special section in AJIS covering the research theme on SMEs. We highlight that each paper makes a contribution to knowledge through their use of novel UOAs and/or their focus on specific SME types or SME sizes. This give the papers unique perspectives when compared to the A* journal articles reviewed in this editorial.

The editorial is structured as follows. First, it justifies the approach used to select and analyse the A* IS journal articles for review. Then, it reports on each facet of the selected articles (the UOAs employed and the SME types and sizes studied) in separate sections, including the future research opportunities revealed by this analysis. Finally, the editorial introduces the papers included in this AJIS special section covering the research theme on SMEs.

2 Research Approach

Our overall approach to this review was informed by Schultze's (2015) useful framework outlining a continuum of pluralistic literature review methods. In particular, we followed the principles associated with the 'interpretive literature review' end of this continuum to guide our article selection and analysis, as explained further in the next section. This was because the interpretive approach is most suited to identifying new future research opportunities (Schultze 2015) and to dealing with complexities in literature reviews (Boell and Cecez-Kecmanovic 2010), such as interpreting units of analysis (as explained later).

3 Criteria employed in article selection

Twelve 'A*' ranked journals were identified from the Australian Council of Professors and Heads of Information Systems' (ACPHIS 2013) IS journal ranking list. We chose this list because it was revised recently to evaluate the quality of international IS journals, it subsumes the eight journals in the *Senior Scholars' Basket of Journals* (AIS 2011) into the 'A*' category of journals, and it resulted in a wider range of A* IS journals to increase the scope for finding relevant articles (compared to the basket of eight) whilst retaining a focus on high quality journals. While the focus on A* IS journals means the review is not exhaustive, IS journal editorials and reviews often use A* IS journals (e.g. Sarker et al. 2013) because they are representative of high quality IS research (Shen et al. 2014). We investigated articles from 2000 to 2014 to cover a longer period than previous literature reviews. This meant we could identify many high quality articles, gauge the state of IS research on SME types, SME sizes and the articles' UOA used, and then identify future research opportunities.

In order to ensure that we identified high quality IS journal articles related to IS use by SMEs, we searched the A* journals for articles whose title or abstract contained the terms "SME", "SMEs", "small" or "micro". Articles were removed if they used the terms in other contexts, such as an article that referred to a "small sample size" or one that referred to a "micro-level analysis". We did not do a full-text search because we anticipated only articles with these terms in their titles/abstracts would have an SME focus. This resulted in 95 articles being selected initially.

4 Approach to analysing the articles

An interpretive, hermeneutic circle approach, similar to that proposed by Schultze (2015) and Boell and Cecez-Kecmanovic (2010) was used to enable new themes and future research opportunities relating to the three facets of the articles to emerge inductively. After initial cycles of reading, interpreting and coding the articles, the research aims and the methods used lead us to conclude the importance of the three facets focused on in this editorial: the UOA

used; the types of SMEs and sizes of SMEs examined. This hermeneutic process resulted in excluding articles which did not support our objective of exploring these three facets in articles focusing on the AJIS research theme on SME adoption/use of IS. The types of IS studied by the articles included Enterprise Resource Planning (ERP) systems, electronic commerce systems, websites, anti-malware software, electronic marketplaces, decision support systems and software-as-a-service.

Some articles were excluded because they had little focus on SMEs. Two of these developed models which provided little insight into SME-specific issues (Chen and Wu 2013, Kauffman and Mohtadi 2004). Six included only one hypothesis (Ada et al. 2012, Bose and Leung 2013, Bose and Pal 2012, Kuk 2004) or research question (Zhu et al. 2003) relating to company size, or controlled for firm size (Baird et al. 2012), but again provided almost no SME-related insights nor examined SME-specific issues. However, we included studies which compared SMEs and large firms (e.g. Daniel and Grimshaw 2002, Francalanci and Morabito 2008) if there were clear analyses and insights focused on SMEs. Nine articles purportedly focused on SMEs but provided no SME details to enable us to explore how they characterised SME types and sizes. For example, they did not specify SME sample selection criteria, characterise the firms as SMEs, or engage with the IS literature on SMEs to characterise their sample (Dahl and Derigs 2011, Delen et al. 2013, Hung et al. 2011, Lee and Myers 2004, Paolucci et al. 2002, Tallon 2010). This was because the SME context appeared to be incidental to the article's research aims. For example, Tsatsou et al. (2010) focused on trust, Vidgen (2002) focused on a website development methodology, and Bandyopadhyay and Bandyopadhyay (2009) focused on online auction results.

We also excluded articles which were not relevant to our focus on SME adoption/use of IS, as well as articles which studied IS use by large businesses to manage SME clients (Tsaih et al. 2004) or online user activities on websites (McCart et al. 2013), because these did not relate directly to SME adoption/use of IS. Additionally, we excluded 13 articles on SME software developer firms (e.g. Ågerfalk and Fitzgerald 2008, Butler and Murphy 2008, Carlo et al. 2012, Ceccagnoli et al. 2012, Mehra et al. 2014) because the study in this editorial related to how SMEs in general adopt/use IS. However, we included studies relating to (SME) software vendors (e.g. Liang and Xue 2004) if the article reported on any aspect of their relationship with SME clients. Finally, we excluded a non-empirical literature review (Powell and Woerndl 2008) and an editorial (Chau et al. 2007) relating to SME adoption/use of IS because these articles did not enable us to explore the main facets of our interest, such as unit of analysis.

Table 1 summarises the 61 A* articles satisfying our selection criteria by publication year and journal (see the Appendix for the journal names corresponding to the abbreviations). The table reveals interesting insights. First, it shows that a few journals published the majority of articles of interest (EJIS and I&M, and to a lesser extent JSIS, ISJ and JIT), and that articles on SMEs and IS adoption/use have appeared fairly consistently over the years. Second, the table shows some journals in the 2000-2014 analysis period had no articles which matched our criteria for inclusion, as explained above. It should be noted, however, that the remainder of the editorial does not analyse the articles further by year because there are too few articles each year to comment on any yearly trends.

Further hermeneutic cycles of reading, interpreting and coding of the 61 articles were carried out by the first and second authors, consistent with the approach by Schultze (2015) and Boell and Cecez-Kecmanovic (2010), to understand how the three facets were manifested in the articles, and to develop emergent coding themes. The first author started the hermeneutic approach by reading the full text of all articles to identify initial coding themes relating to each facet. Cycles then involved both authors: 1) discussing and refining the coding themes; 2) dividing and examining the articles using the refined coding themes; and 3) documenting the themes in a spreadsheet with articles in rows and coding themes in columns. Cycles were undertaken until agreement was formed between the authors. Further details of the coding themes and interpretations relating to each facet are expanded upon in later sections.

Journal	Year 20xx															Total
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	
ACM																0
DSS					1											1
EJIS	1	1	2	2	2	1	1	3		2	1		1			17
I&M	1	2		2	4	1		1				1	1	1		14
I&O					1							1				2
ISJ			1				2	1	2					1		7
ISR																0
JAIS		1									1	1				3
JAIST																0
JIT	1	1	1		1				2			1				7
JMIS																0
JSIS	1	1	1		1		2			1		1				8
MISQ					1									1		2
Total	4	6	5	4	11	2	5	5	4	3	2	5	2	3	0	61

Table 1: IS A journals and the number of articles on SME adoption/use of IS each year*
Note: Blank cells are "0" and have been left blank to aid table readability.

5 Facet 1: units of analysis used in A* IS articles on SMEs

5.1 Interpreting units of analysis (UOAs)

Determining the unit of analysis (UOA) of a study is important because it helps to determine, for instance, the type of data to collect (Singer 1961). Various UOAs can be used such as the individual, group, organisation, inter-organisation, industry, state/province, nation, event, government policy (Singer 1961, Yin 2014), artefact, social interaction (Herring 2004, Trochim 2006), activity or practice (Nicolini 2012), as well as sentences in websites and social media content (Herring 2004, Parker et al. 2011). It must be noted that case studies of SMEs do not always mean that the UOA is the firm (or SME), because the firm examined in a case study can be the context for focusing on group interactions, events and other UOAs (Grunbaum 2007, Yin 2014).

Table 2 lists and describes each UOA identified from the 61 articles. We anticipated that examining the UOAs in the A* articles, and identifying those which have received little attention, could help to identify future research avenues. Yin (2014) points out, however, that if authors do not explicitly state their UOA, readers often come to different conclusions. Indeed, Table 2 shows that 51 articles did not explicitly state their UOA. In these instances we inferred UOAs using the hermeneutic circle approach of repeated reading and interpretation of each article's research objectives, research questions and/or hypotheses. This often led us to lean toward, for instance, two UOAs such as the firm or process/activity for an article. In some cases we settled on the IS process/activity as the UOA when the research objectives and questions/hypotheses focused on a process/activity and used SMEs as case studies. However, there were articles where the distinction was still not clear. In these instances, the findings and, if available, survey and interview questions, were examined. Where the majority of these focused on the process/activity (as in our example), this was selected as the UOA.

UOA	Explicit	Not stated	UOA description
External to firm			
Vendor-SME relationship	1	4	Nature of the relationship between an SME and IS vendor-consultant(s) such as delegation, knowledge sharing, etc.
Industry	1		IS-related events, discourse, etc relating to the SME sector within or external to the industry.
Cluster		1	A location-specific cluster and IS-related events, governance, knowledge sharing, etc relating to SME members.
Intervention	1		IS-related aims, management, success, etc of an intervention targeting the SME sector or a specified group of SMEs.
E-marketplace		1	Socio-technical factors (e.g. ownership, management) of an e-marketplace (involving SMEs) explaining its success/failure.
Firm-level			
Firm	4	26	Impact of IS, including internal and external circumstances, which influence SME: IS (non-)adoption; or owner-manager views on the ability of the firm to achieve firm-level benefits from IS.
Process/daily activity		12	Nature of a process/daily activity relating to IS or influenced by IS in an SME, excluding the firm-level impact of the process/activity.
IS capability		2	Nature or development of an IS-related resource (capability, skill, competency) in an SME, excluding the firm-level impact.
IS artefact		2	Design of artefacts (e.g. IS architectures, website, social media) used by SMEs, excluding the firm-level impact of these artefacts.
Group	1		Team/group dynamics in an SME on IS-related matters.
Sentence	1		Sentence level analysis (e.g. text, images, videos) in an SME's IS artefact, report output by IS, etc (excluding artefact design level).
Multiple UOAs			
Combination 1		3	Process and vendor-SME relationship
Combination 2	1 (firm)		Firm and process
Total	**10**	**51**	

Table 2: Units of analysis used in IS A journals*

5.2 Findings from the analysis of UOAs

Table 2 shows the most common UOA was the SME or *firm*, with five articles stating this explicitly. Four of the articles examined factors affecting the firm's adoption (Li et al. 2011, MacKay et al. 2004, Mehrtens et al. 2001, Reardon and Davidson 2007) and use of IS (Li et al. 2011, Reardon and Davidson 2007). In other words, these articles investigated, and included firm-level findings and data collection questions about, the (anticipated) positive and/or negative impact of IS on various aspects of the firm. The fifth article, included as Combination 2 under multiple UOAs, explicitly stated the *firm* as its UOA was Pob-Nzaou and Raymond (2011). We examine this article in more detail later because our analysis suggests they combined the *firm* UOA with a second unstated UOA (*IS process*).

Table 2 shows the remaining A* articles without explicit statements about their UOA included 26 with a *firm* UOA (31 articles in total). Many of these were adoption factor studies (e.g. Caldeira and Ward 2002, Eikebrokk and Olsen 2007, Lee and Larsen 2009, Quaddus and Hofmeyer 2007) like the articles with an explicit *firm* UOA. But other studies examined the impact of business-IT alignment (Bergeron et al. 2004, Cragg et al. 2002), IS integration (Francalanci and Morabito 2008), IT capability (Zhang et al. 2008; 2013), software-as-a-

service use (Lee et al. 2013) and IS in general (Rivard et al. 2006) on firm performance. Others looked at IS/IT investment and impact on firm-level costs, benefits and risk (Love and Irani 2004, Love et al. 2005).

Our analysis in Table 2 shows that the next most common UOA inferred from 12 A* articles without explicit statements of their UOA was an *IS process* or a *daily activity* within SMEs:

- IS strategy formulation process (Duhan et al. 2001, Levy and Powell 2000, Ray and Ray 2006, Walters et al. 2003);
- IS adoption process (Molla et al. 2006);
- IS/vendor selection process (Chang et al. 2012, Olsen and Sætre 2007);
- IS implementation process (Newman and Zhao 2008, Ray and Ray 2006);
- improvements or changes to daily activities using IS (Choi et al. 2004, Harwood 2011, Levenburg and Klein 2006); and
- IS governance process and activities (Huang et al. 2010).

These articles focused on describing or exploring SMEs' processes or daily activities, not the broader impact which these processes/activities had at the firm-level. Some reported on the internal and/or external issues which influenced these processes/activities (Molla et al. 2006, Newman and Zhao 2008, Olsen and Sætre 2007, Ray and Ray 2006), but these firm-level issues were used to provide context for understanding, in detail, the process/activity.

The *firm* and *process/daily activity* UOAs can be considered firm-level UOAs or, in other words, looking at the firm or a narrower aspect of the firm. Table 2 shows there were a range of other firm-level UOAs stated explicitly in, or inferred from, other articles:

- *Group*: The case study by Street and Meister (2004) reports on how the management team in a small firm handled IS-related change in response to planned firm growth.
- The *IS capabilities* which SMEs can develop (Cragg et al. 2011), with another article examining how SMEs developed these *IS capabilities* (Caldeira and Ward 2003). These capabilities do have implications for firm-level success, but this aspect was not the focus of these two articles. Indeed, Caldeira and Ward (2003) stated this aspect had been examined in their earlier work (Caldeira and Ward 2002);
- The *IS artefact*, which related to the design of SMEs' IS architectures (Bidan et al. 2012) and contents of their websites (Merono-Cerdan and Soto-Acosta 2007). The dominant focus of these articles was on the IS architectures and websites, although a second UOA of the latter could also be considered the firm-level because they examined the impact of website content on overall firm performance;
- *Sentence*: Alonso-Mendo et al. (2009) investigated the reasons SME owner-managers stated for changes the researchers observed in the SMEs' websites over time, and characterised their UOA as "*website change reason sentences*".

The *vendor-SME relationship* UOA was the next most common in Table 2. It was evident in only five articles, and is the first example of a UOA which bridges the firm-level and external context of the SME. Three of these articles, without an explicit UOA statement, explored intermediary e-business models to encourage SMEs to engage in e-commerce (Brown and Lockett 2004), a non-government organisation's attempt to develop IS solutions for SME farmers (Dobson et al. 2013), and an ERP vendor's methods of engaging with SME clients (Liang and Xue 2004). The fourth non-explicit article, McGovern and Hicks (2004), was similar because it examined the power relationships between the authors, who acted as IS consultants, and the owner-manager of a small business during an action research project. Only Currie et al. (2004) explicitly stated their UOA as the business model between vendors and SMEs, which we labelled *vendor-SME relationship*. They explored the business models

(strategic positioning, product/service portfolios and value propositions) offered by Application Service Provider (ASP) vendors to SME clients.

Table 2 shows there were a range of *other* UOAs stated explicitly in, or inferred from, other articles which focused on examining areas outside the context of a single SME:

- *Intervention*: Vega et al. (2008) reported on a policy intervention aimed at encouraging SME adoption of e-business, and aimed to understand the mechanisms and effectiveness of the intervention itself.
- *Industry*: Currie (2004) examined the ASP industry and how its marketing discourse during the late 1990s and early 2000s affected the adoption of ASP by SMEs.
- *E-marketplaces* (websites facilitating SME-to-business/government/consumer trade) and the socio-technical factors (e.g. ownership structure, profile of the rural regional locations) influencing their success and failure (Gengatharen and Standing 2005). We did not consider the UOA to be the *IS artefact* because the article did not focus on the design, features or functionality of the e-marketplace websites (see Table 2), but instead focused on socio-technical factors associated with managing e-marketplaces.
- IS-enabled *clusters* involving SMEs and the communication, intellectual property and research collaboration issues between stakeholders in these clusters (Jaegersberg and Ure 2011). We did not consider the UOA in this article to be the industry-level, because the clusters were location specific. Thus, the focus is more on the location than the 'IS' itself. An industry-level analysis, as in the case of Currie (2004), explores the entire industry at the national or international level.

The difficulties of inferring UOAs was notable for three articles because they reported in-depth findings relating to two UOAs (Adam and O'Doherty 2000, Howcroft and Light 2006; 2010). They all described in-depth an IS selection or implementation *process*, but also examined in some detail aspects of *vendor-SME relationships* associated with these processes. Similarly, a fourth article, Pob-Nzaou and Raymond (2011), stated that their UOA was the *firm-level*, but the article mainly detailed the activities within the ERP implementation *process* of four SMEs. An alternative interpretation, therefore, is that the UOA in this article was the process-level and that the internal firm-level and external influences they examined contextualised the execution of the processes.

5.3 UOA-related future research opportunities

While our interpretation of the articles' UOAs is subjective, our analysis makes three important contributions. First, it suggests the need for article authors to have clear statements of and rationale for their UOA(s) so that it is not left to interpretation. Second, it provides the starting point for a scholarly debate on what constitutes different UOAs in the context of SME adoption/use of IS, including the notion that an article could potentially have more than one UOA. Third, Figure 1 illustrates the interrelationships between firm- and non-firm-level UOAs which we identified above, and highlights areas requiring further research; the darker the shading, the greater the opportunity because fewer A* articles have used the particular UOAs.

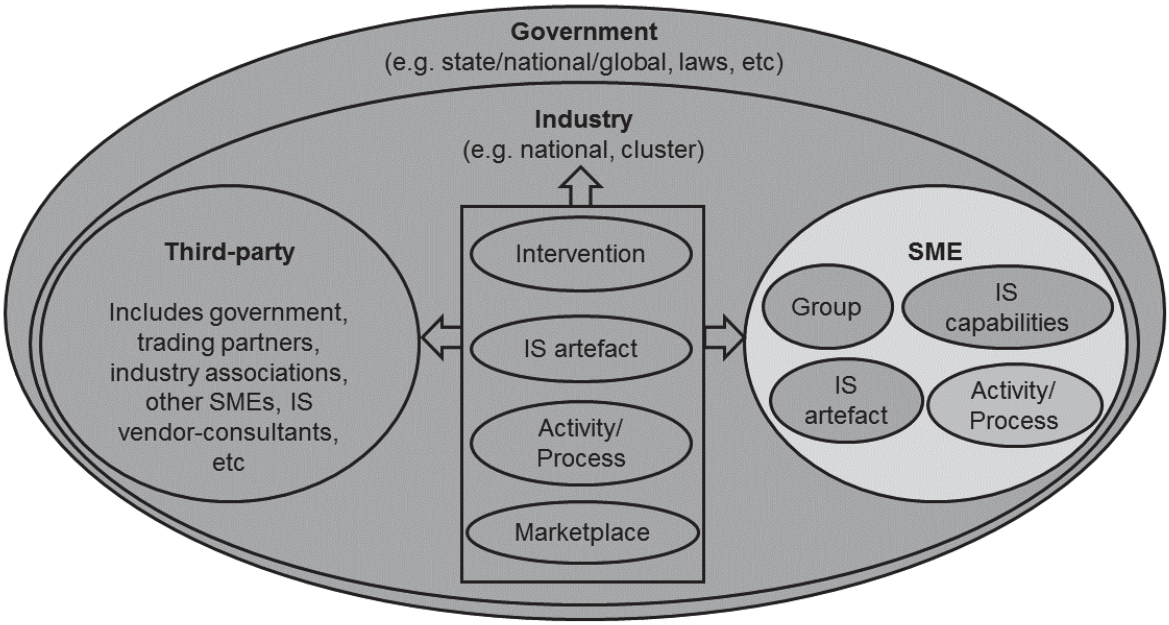


Figure 1: Interrelationships between units of analysis in the context of SME adoption/use of IS

Figure 1 suggests there are various future research opportunities arising from firm-level UOAs. For example:

- Our analysis shows there is a lack of research on post-implementation *IS activities* by SMEs and how these change over time. Harwood (2011) was one of few A* studies in this area. It shows the value of such research because it provides insights into the complex socio-historical issues which shape *IS activities* and how IS (fails to) become embedded or 'invisible' in SME daily work, which is so far not well understood. Such studies could also explore in detail how SME *IS capabilities* evolve/develop over time.
- There are opportunities for research into the design, architectures, content, etc of *IS artefacts* used by SMEs. This could include exploring information outputs of their IS, whether it is used and understood by SME owner-managers, whether it is in a form suitable for their use, etc. Another example is studying the content of SME social media presences (including client postings) to examine the effectiveness of use.

Figure 1 illustrates that SMEs can have *marketplace* relationships with third-party firms and they can use inter-organisational *IS artefacts*, and that third-parties can engage in IS-related *processes/activities* with SMEs or initiate *interventions* to support SMEs with IS. Additionally, it shows that SMEs operate within industry and government level contexts which can influence perceptions and use of IS. Whilst this is not new and is well acknowledged in the IS literature on SMEs, our analysis of the A* articles adds that these can be UOAs in their own right and the source of future research opportunities. For example:

- There is emerging, but still limited, in-depth analysis of interactions between SMEs and IS vendors-consultants (VCs) during IS (post-)implementation. For example, future studies can explore how (post-)implementation *processes/activities* of VCs help SMEs develop, or obviate the need to develop, *IS capabilities* when VCs sustain ongoing relations with SMEs, and with various *groups* (e.g. management) in larger SMEs. This can include, as per Howcroft and Light (2010), observing (and interviewing) VCs, and treating the *SME-vendor relationship* as the UOA. Another example is exploring the processes/activities used by VCs to gather SME information needs for, and design/develop, packaged software (e.g. ERP systems)

for SME markets to determine, for instance, possible improvements to these processes and designs of their *IS artefacts*.

- There are opportunities to build on the work of Vega et al. (2008) to explore in-depth the design, execution and impact of IS-related *interventions* initiated at government and industry levels. For instance, future research can explore the impact of 'green' IS/IT regulations (Parker and Scheepers 2012) to explore the impact on the SME sector (e.g. their IT purchasing decisions). Other examples include examining the impact of government, industry and trading partner led IS-related information campaigns on SME behaviours, including the impact of different designs (e.g. types of messages, media used, etc).
- The work of Currie (2004) highlights the opportunity to explore how IS-related industry norms evolve and become known to and practiced by SMEs. For example, it is unclear in the A* articles how *best practices* are selected and embedded in ERP systems, whether these are based on the practices of large firms rather than those of SMEs, and how these industry-level norms affect innovation in the SME sector.

6 Facet 2: SME types studied in A* IS articles

We analysed the types of SMEs studied in the A* IS articles by examining, for instance, the industries studied to identify future research opportunities, as shown in Table 3.

Industries	Total	Percent
Multiple	29	47.5%
Two	4	6.6%
Three	5	8.2%
One	23	37.7%
Total	**61**	**100.0%**

Business focus within an industry	Total	Percent
Export-focus	2	3.3%
Business growth	1	1.6%
Family-run	1	1.6%
None	57	93.5%
Total	**61**	**100%**

Table 3: SME types studied in A IS articles*

Table 3 shows we found that nearly half of the articles studied SMEs across a range of industry sectors (e.g. Khazanchi and Sutton 2001, Kuan and Chau 2001, Levy et al. 2003, Levy et al. 2001, Poon 2000, Riemenschneider et al. 2003). Very few of these articles (exceptions included Lee and Larsen 2009, Love et al. 2005, Quaddus and Hofmeyer 2007, Riemenschneider and Mykytyn Jr 2000) examined the impact of SME industry on SME adoption, use or experiences of IS, and instead researched their aims without considering the impact of industry. Those that did compare industries quantitatively reported differences among the industries regarding aspects such as IT investment (Love et al. 2005) and business-to-business trading exchange adoption (Quaddus and Hofmeyer 2007).

Table 3 also shows that four articles examined two broad industry sectors:

- manufacturing and oil (Olsen and Sætre 2007); and
- manufacturing and service (Bergeron et al. 2004, Francalanci and Morabito 2008, Pob-Nzaou and Raymond 2011).

A further five articles studied three broad sectors:

- manufacturing, service and one each of the following sectors:
  - not-for-profit (Huang et al. 2010),
  - retail (Lee et al. 2013, Merono-Cerdan and Soto-Acosta 2007) or
  - trade (Kendall et al. 2001); and
- transport, tourism and food-beverage (Eikebrokk and Olsen 2007).

Interestingly, Merono-Cerdan and Soto-Acosta (2007) was the only article among those examining three industries which quantitatively examined the impact of industry, and found some differences in website design by industry. This article, and those cited earlier, highlight the need for future research to investigate whether there are industry-specific idiosyncrasies among SMEs with respect to the UOA research opportunities identified above, such as their response to IS-related *interventions* or the evolution of 'best' *IS practices*.

Finally, the existence of industry-specific idiosyncrasies is emphasised further by the observation that the remaining 23 articles focused on a specific industry sector. Eight articles studied SME manufacturers (Caldeira and Ward 2002; 2003, Choi et al. 2004, Cragg et al. 2002, Hussin et al. 2002, McGovern and Hicks 2004, Street and Meister 2004, Walters et al. 2003, Zhang et al. 2008). Some articles examined similar industry sectors such as engineering (Cragg 2002), construction (Love and Irani 2004) and solar energy (Jaegersberg and Ure 2011). The remaining industries were career management (Howcroft and Light 2006; 2010), farming (Dobson et al. 2013), knowledge-based (Duhan et al. 2001), hotel (Harwood 2011), not-for-profit (MacKay et al. 2004), wine (Molla et al. 2006), retail (Newman and Zhao 2008), sporting (Ray and Ray 2006) and medical physician (Reardon and Davidson 2007) SMEs. In many cases, authors emphasised unique characteristics of SMEs in their chosen industry relative to other industries. For example, MacKay et al. (2004) points out that small not-for-profit businesses have unique dilemmas compared to for-profit firms which may result in different IS uses, such as recruiting/servicing volunteers and competing for grants/donations, in addition to providing (selling or donating) their products/services to beneficiaries. When combined with the UOA future research opportunities above, this raises interesting questions such as whether their everyday *IS activities*, interactions with third-parties to develop *IS capabilities* and *IS artefact* use are different to other SMEs.

Interestingly, three of the 29 articles examining various industry sectors focused upon specific types of SMEs irrespective of their industry: 'born global' and export-focused SMEs (Zhang et al. 2013); SMEs focused on business growth (Levy and Powell 2000) and family-run SMEs (Wang and Ahmed 2009). Similarly, an additional article examining a single manufacturing sector narrowed the focus further to export-focused SMEs (Zhang et al. 2008). These SME types were justified in the articles on the basis they were more pertinent to the articles' research goals (Levy and Powell 2000, Zhang et al. 2013), or because the articles argued these SMEs had characteristics differentiating them from other SMEs (Wang and Ahmed 2009). Given the heterogeneous nature of SMEs, future research can explore these and other idiosyncrasies (e.g. home-based businesses) to determine if these SME types use and experience IS differently to other types of SMEs. These SME types could also be considered within the context of UOA research opportunities identified earlier. For example, do the everyday *IS activities* of home-based SMEs differ manifestly from those of otherwise similar SMEs working out of dedicated business premises? How do *IS capabilities* or *IS artefacts* evolve and develop as SMEs grow?

7 Facet 3: SME sizes studied in A* IS articles

Table 4 summarises the A* articles in terms of how they characterised the SME sizes they examined. The table shows that over half the articles focused on SMEs broadly, while the next common size was small business. Table 4 also reports on the types of SME size stated in the articles (e.g. staff numbers) determined hermeneutically by analysing SME definitions or descriptions in article introductions and method sections (e.g. sample selection criteria).

SME sizes studied	Total	Percent
SMEs and Large	2	3%
Small, Medium and Large	1	2%
SMEs	35	57%
Medium	1	2%
Small and Medium	2	3%
Micro, Small and Medium	2	3%
Small	16	26%
Micro and Small	1	2%
Micro	1	2%
Sole-operators	0	0%
Total	**61**	**100%**

Size definition/description types	Total	Percent
Precise staff numbers and revenue	6	9.8%
Precise staff numbers	36	59.0%
Precise revenue or assets	1	1.6%
Imprecise staff numbers	2	3.3%
Industry specific size definition	2	3.3%
Size evident only from case overview	4	6.6%
SMEs size described in generic terms	10	16.4%
Total	**61**	**100%**

Table 4: SME sizes studied and size definition/description types used in A IS articles*

Our analysis suggests that a major issue facing IS scholars is the various SME size definitions. 44 articles used staff numbers. Others (Adam and O'Doherty 2000, Alonso-Mendo et al. 2009, Bergeron et al. 2004, Cragg et al. 2011, Kendall et al. 2001, Molla et al. 2006) combined staff numbers with, or solely (Chang et al. 2012) used, annual turnover and/or level of assets. Most articles used previous studies or regional definitions to derive upper limits on staff numbers and/or revenue, but this resulted in inconsistencies. For example, the upper limit for *SMEs* was typically 450-500 (15 studies) or 249/250 staff (8 studies), reflecting North American/Asian or European Union (EU) focus (respectively). Similar differences were evident for *small* and *micro* firms: some articles defined small firms as up to 100 staff (9 articles) and others up to 50 (Alonso-Mendo et al. 2009, Levenburg and Klein 2006); and micro firms having up to 10 staff (3 articles) and another up to 50 staff (Molla et al. 2006). The challenge of varying definitions was notable in Cragg et al. (2011) who defined SMEs in USA, Portugal and New Zealand as less than 500 staff; and a large firm in New Zealand using the definition of less than 200 staff from other articles (Mehrtens et al. 2001). Some articles were imprecise because they did not specify an upper limit (Merono-Cerdan and Soto-Acosta 2007, Zhang et al. 2008) to clarify if large firms were omitted, while others had no definition and described their case studies with 'staff' numbers (Duhan et al. 2001, Howcroft and Light 2006, McGovern and Hicks 2004, Street and Meister 2004). These issues make cross-national comparisons difficult both across studies, and with future research. Further difficulties with comparisons occurs with the 10 articles noted in Table 4 without a clear SME size definition, and instead only characterising SMEs or small firms in more general terms.

It is important to note that staff numbers may be problematical in industries with a large casual or seasonal labour (Al-Qirim 2005, Burgess et al. 2009). This was evident in two articles which used an industry-specific size definition: number of rooms for hotels (Harwood 2011) and number of medical physicians without mention of other staff (Reardon and Davidson 2007). Another issue which emerged was that some articles included subsidiaries of large firms as SMEs (Adam and O'Doherty 2000, Huang et al. 2010, Olsen and Sætre 2007, Pob-Nzaou and Raymond 2011), others excluded them specifically (Cragg 2002, Cragg et al. 2011, Eikebrokk and Olsen 2007, MacKay et al. 2004, Reardon and Davidson 2007, Street and Meister 2004, Walters et al. 2003, Wang and Ahmed 2009), and most articles did not confirm if subsidiaries were included. Only two studies (Cragg et al. 2002, Hussin et al. 2002) compared independent and subsidiary SMEs and concluded the results were consistent, which means there is insufficient empirical evidence to conclude whether they are equivalent.

This analysis of the articles raises implications for future research. First, we implore IS scholars to include clear SME size definitions, including lower/upper staff numbers and (if relevant) revenue limits, and whether subsidiaries are included to enable comparisons of future research. Second, our analysis suggests that future research can explore the feasibility of consistent size definitions between nations. For example, is there evidence that SMEs up to 500 staff in the USA are equivalent to SMEs up to 200 in New Zealand due to national context?

Or are SMEs up to 200 staff (or micro firms up to 10, etc) similar regardless of national context? Third, future research can explore if independent SMEs are different, or equivalent, to subsidiaries. Fourth, research can potentially determine industry-specific differentiators which better describe SME size (instead of or in addition to staff numbers) and the impact of these on SME UOAs such as *IS activities*, *IS artefacts*, etc.

Another insight from Table 4 is that few A* IS articles *contrasted* their findings by SME size, which is often a categorical variable comprising micro, small and/or medium sized firms (e.g. Alonso-Mendo et al. 2009, Levenburg and Klein 2006) or continuous variable (e.g. Lee and Larsen 2009). This is important because SME size is one dimension on which heterogeneous SMEs can be differentiated. While some studies using SME size as a categorical (Alonso-Mendo et al. 2009) or continuous variable (Lee and Larsen 2009) did not find statistical differences, others did find differences which suggest further research is warranted. For example, Levenburg and Klein (2006) found significant differences between micro and medium firms regarding use of some IS applications. Others treated SME size as a continuous variable and found that firm size explained significant differences between SME adopters and non-adopters of e-commerce (Grandon and Pearson 2004) and between SMEs gaining some strategic benefits from IT and being willing to adapt to changes resulting from IT (Love et al. 2005). There is no consensus and this implies that there is potential for future research to identify peculiarities relating to how SMEs of different sizes adopt and/or use IS, and to compare findings relating to size to understand better differences between different sized firms.

8 Introduction of articles in the AJIS special section

The papers in this AJIS special section offer diverse insights into SME adoption or use of different IS, across various countries, and using different theories and methodologies. By shedding more light on the idiosyncratic features of the SME sector with respect to IS, it is evident from the papers that SMEs experience success with IS, but also face many challenges. The hurdles are in part due to fast-paced technological change, but also due to other issues specific to SMEs which can overwhelm an owner-manager and/or their venture. The papers introduced in this research theme on SMEs provide a broad picture about such advantages and challenges concerning IS and SMEs. Additionally, we state how they contribute to the future research areas identified above.

In the first paper, Kreuzer, Born and Bernius shed light on improving SME adoption of inter-organisational IS (IOIS) by exploring the under-studied area of firms' non-coercive persuasion strategies using a methodologically novel controlled experiment examining the outcome of a large German firm using information and expertise support with its SME business partners. The authors state their UOA is the SME partners, and address a knowledge gap relating to *interventions* we identified in A* IS articles. The initial analysis of 203 SMEs showed no significant result concerning the impact of the strategy on adoption. A cluster analysis, however, found two adopter configurations which varied in their response to the strategy, thereby addressing knowledge gaps we found relating to *SME size* (using the EU definition of less than 10, 50 and 250 for micro, small and medium enterprises respectively) and *SME type* (micro-sized service providers in a community-based configuration, and a dyadic configuration of medium-sized parts manufacturers). Their findings suggest the success of providing information and expertise to SME business partners about an IOIS to foster adoption may succeed or fail depending on adoption configurations of the SMEs. The findings support *adopter configurations* as an alternative conceptual view of adoption than that used in prior studies, which examine factors influencing individual SME owner-managers' IOIS adoption decisions without considering the firm's adopter configuration context.

The second paper by Bradshaw, Cragg and Pulakanam explores how consultants affect the IT knowledge of SMEs when consultants and SMEs managers interact by exploring relations between IT consultants and SMEs, using the New Zealand size definition of less than 50 staff, during IT implementation projects. The authors thus address a UOA knowledge gap relating

to *SME-vendor (i.e. consultant) relationships* which we identified in A* IS articles by interviewing IT consultants and SME staff with knowledge of the project. Further, the paper sheds light on the knowledge gap we report concerning how SMEs develop *IS capabilities* by exploring the processes by which IT knowledge is acquired by SMEs, shared between SMEs and consultants, the barriers to knowledge transfer, and the types of knowledge that consultants help SMEs to create. Another important contribution of the paper is modifying an existing theoretical framework of knowledge sharing mechanisms to include three types of knowledge assets that were shared between consultants and SME clients during IT implementation projects.

Salim, Sedera, Sawang, Alarifi and Atapattu, in the third paper, point out that most IS literature treats SME adoption of IS as a single activity when examining the impact of adoption factors, rather than as a multi-stage process whereby each factor in each adoption stage will have a different level of importance. The paper explores this notion in a survey of 162 Malaysian SMEs (using the size definition of less than 200 full-time staff for manufacturers, and 75 staff for other sectors) across various industry sectors using the Theory of Planned Behaviour to explore factors which influence two stages of cloud-based Enterprise Resource Planning (ERP) adoption: evaluation and trial. The authors state that the UOA for this study was the SME owner-manager, because they represented the views of the firm as a whole. The study sheds light on a knowledge gap we identified in IS A* articles relating to *IS processes/activities* by finding that the factors (attitude, subjective norms and perceived behavioural control) influencing the intention to adopt cloud-ERP vary significantly across the two adoption stages.

In the final paper, Bi, Davison and Smyrnios argue that the ability of SMEs to gain IT business value depends on how they employ IT resources to develop IT capability, because it facilitates partnership processes along inter-organisational value chains. The paper focuses on fast-growth, independent (non-subsidiary) SMEs across multiple industries with turnover greater than 500,000 AUD (and not greater than 50% of sales from one customer) and less than 200 full-time staff. The authors address a knowledge gap we identified in A* IS articles relating to *SME type* based on the argument that fast-growth SMEs are different to other SMEs because they are risk takers, more entrepreneurial, and active in leveraging their IT resources. The paper uses specific *SME size* criteria (i.e. staff numbers and revenue, excluding subsidiaries) which will help future IS scholars compare their findings against this study. The paper tests and finds support for a research model linking IT resources, IT capabilities, IT-enabled inter-firm processes and firm performance, based on the resource-based view theory, from their survey of 310 fast-growth SMEs (i.e. firm-level UOA). The paper thus addresses another knowledge gap relating to *IS capabilities* which we identified in A* IS articles.

The editors of this AJIS special section, covering the research theme on SMEs, commend these papers to the readers of AJIS.

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References

ACPHIS (2013) *IS journal ranking: rank order*, Australian Council of Professors and Heads of Information Systems. Available from http://www.acphis.org.au/index.php/is-journal-ranking/rank-order [accessed 19 May 2015].

Ada, S., Sharman, R. & Balkundi, P. (2012) "Impact of meta-analytic decisions on the conclusions drawn on the business value of information technology", *Decision Support Systems*, 54(1): 521-533. DOI: 10.1016/j.dss.2012.07.001

Adam, F. & O'Doherty, P. (2000) "Lessons from enterprise resource planning implementations in Ireland – towards smaller and shorter ERP projects", *Journal of Information Technology*, 15(4): 305-316. DOI: 10.1080/02683960010008953

Ågerfalk, P.J. & Fitzgerald, B. (2008) "Outsourcing to an unknown workforce: exploring opensourcing as a global sourcing strategy", *MIS Quarterly*, 32(2): 385-409.

AIS (2011) *Senior Scholars' Basket of Journals*, Association for Information Systems. Available from http://aisnet.org/?SeniorScholarBasket [accessed 19 May 2015].

Al-Qirim, N.A.Y. (2005) "An empirical investigation of an e-commerce adoption-capability model in small businesses in New Zealand", *Electronic Markets*, 15(4): 418-437. DOI: 10.1080/10196780500303136

Alonso-Mendo, F., Fitzgerald, G. & Frias-Martinez, E. (2009) "Understanding web site redesigns in small- and medium-sized enterprises (SMEs): a U.K.-based study on the applicability of e-commerce Stage Models", *European Journal of Information Systems*, 18(3): 264-279. DOI: 10.1057/ejis.2009.14

Australian Government (2014) *Small business data card*, The Treasury, Australian Government, Canberra. Available from http://www.treasury.gov.au/PublicationsAndMedia/Publications/2012/sml-bus-data [accessed 29 September 2015].

Baird, A., Furukawa, M.F. & Raghu, T.S. (2012) "Understanding contingencies associated with the early adoption of customer-facing web portals", *Journal of Management Information Systems*, 29(2): 293-324.

Bandyopadhyay, S. & Bandyopadhyay, S. (2009) "Estimating time required to reach bid levels in online auctions", *Journal of Management Information Systems*, 26(3): 275-301.

Bergeron, F., Raymond, L. & Rivard, S. (2004) "Ideal patterns of strategic alignment and business performance", *Information & Management*, 41(8): 1003-1020. DOI: 10.1016/j.im.2003.10.004

Bidan, M., Rowe, F. & Truex, D. (2012) "An empirical study of IS architectures in French SMEs: integration approaches", *European Journal of Information Systems*, 21(3): 287-302. DOI: 10.1057/ejis.2012.12

Boell, S.K. & Cecez-Kecmanovic, D. (2010) "Literature reviews and the hermeneutic circle", *Australian Academic & Research Libraries*, 41(2): 129-144. DOI: 10.1080/00048623.2010.10721450

Bose, I. & Leung, A.C.M. (2013) "The impact of adoption of identity theft countermeasures on firm value", *Decision Support Systems*, 55(3): 753-763.

Bose, I. & Pal, R. (2012) "Do green supply chain management initiatives impact stock prices of firms?", *Decision Support Systems*, 52(3): 624-634. DOI: 10.1016/j.dss.2011.10.020

Brown, D.H. & Lockett, N.J. (2004) "Potential of critical e-applications for engaging SMEs in e-business: a provider perspective", *European Journal of Information Systems*, 13(1): 21-34. DOI: 10.1057/palgrave.ejis.3000480

Burgess, S., Sellitto, C. & Karanasios, S.S. (2009) *Effective Web Presence Solutions for Small Businesses: Strategies for Successful Implementation*, Information Science Reference, Hershey, Pennsylvania.

Butler, T.B. & Murphy, C.M. (2008) "An exploratory study on IS capabilities and assets in a small-to-medium software enterprise", *Journal of Information Technology*, 23(4): 330-344. DOI: 10.1057/jit.2008.19

Caldeira, M.M. & Ward, J.M. (2002) "Understanding the successful adoption and use of IS/IT in SMEs: an explanation from Portuguese manufacturing industries", *Information Systems Journal*, 12(2): 121-152. DOI: 10.1046/j.1365-2575.2002.00119.x

Caldeira, M.M. & Ward, J.M. (2003) "Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises", *European Journal of Information Systems*, 12(2): 127-141. DOI: 10.1057/palgrave.ejis.3000454

Carlo, J.L., Lyytinen, K. & Rose, G.M. (2012) "A knowledge-based model of radical innovation in small software firms", *MIS Quarterly*, 36(3): p865-A810.

Ceccagnoli, M., Forman, C., Huang, P. & Wu, D.J. (2012) "Cocreation of value in a platform ecosystem: the case of enterprise software", *MIS Quarterly*, 36(1): 263-290.

Chang, S.-I., Yen, D.C., Ng, C.S.-P. & Chang, W.-T. (2012) "An analysis of IT/IS outsourcing provider selection for small- and medium-sized enterprises in Taiwan", *Information & Management*, 49(5): 199-209. DOI: 10.1016/j.im.2012.03.001

Chau, P.Y.K., Kuan, K.K.Y. & Liang, T.-P. (2007) "Research on IT value: what we have done in Asia and Europe", *European Journal of Information Systems*, 16(3): 196-201. DOI: 10.1057/palgrave.eijs.3000666

Chen, P.-Y. & Wu, S.-Y. (2013) "The impact and implications of on-demand services on market structure", *Information Systems Research*, 24(3): 750-767. DOI: 10.1287/isre.1120.0451

Choi, H.R., Kim, H.S., Park, B.J., Park, Y.J. & Whinston, A.B. (2004) "An agent for selecting optimal order set in EC marketplace", *Decision Support Systems*, 36(4): 371-383. DOI: 10.1016/S0167-9236(03)00027-7

Cragg, P.B. (2002) "Benchmarking information technology practices in small firms", *European Journal of Information Systems*, 11(4): 267-282.

Cragg, P.B., Caldeira, M.M. & Ward, J.M. (2011) "Organizational information systems competences in small and medium-sized enterprises", *Information & Management*, 48(8): 353-363. DOI: 10.1016/j.im.2011.08.003

Cragg, P.B., King, M. & Hussin, H. (2002) "IT alignment and firm performance in small manufacturing firms", *The Journal of Strategic Information Systems*, 11(2): 109-132. DOI: 10.1016/S0963-8687(02)00007-0

Currie, W.L. (2004) "The organizing vision of application service provision: a process-oriented analysis", *Information and Organization*, 14(4): 237-267. DOI: 10.1016/j.infoandorg.2004.07.001

Currie, W.L., Desai, B. & Khan, N. (2004) "Customer evaluation of application services provisioning in five vertical sectors", *Journal of Information Technology*, 19(1): 39-58. DOI: 10.1057/palgrave.jit.2000006

Dahl, S. & Derigs, U. (2011) "Cooperative planning in express carrier networks - an empirical study on the effectiveness of a real-time decision support system", *Decision Support Systems*, 51(3): 620-626. DOI: 10.1016/j.dss.2011.02.018

Daniel, E.M. & Grimshaw, D.J. (2002) "An exploratory comparison of electronic commerce adoption in large and small enterprises", *Journal of Information Technology*, 17(3): 133-147. DOI: 10.1080/0268396022000018409

Delen, D., Zaim, H., Kuzey, C. & Zaim, S. (2013) "A comparative analysis of machine learning systems for measuring the impact of knowledge management practices", *Decision Support Systems*, 54(2): 1150-1160.

Dobson, P., Jackson, P. & Gengatharen, D.E. (2013) "Explaining broadband adoption in rural Australia: modes of reflexivity and the morphogenetic approach", *MIS Quarterly*, 37(3): 965-991.

Duhan, S., Levy, M. & Powell, P. (2001) "Information systems strategies in knowledge-based SMEs: the role of core competencies", *European Journal of Information Systems*, 10(1): 25-40.

Eikebrokk, T.R. & Olsen, D.H. (2007) "An empirical investigation of competency factors affecting e-business success in European SMEs", *Information & Management*, 44(4): 364-383. DOI: 10.1016/j.im.2007.02.004

Federation of Small Businesses UK (2014) *Small business statistics*, Federation of Small Businesses, Lancashire, UK. Available from http://www.fsb.org.uk/stats [accessed 29 September 2015].

Francalanci, C. & Morabito, V. (2008) "IS integration and business performance: the mediation effect of organizational absorptive capacity in SMEs", *Journal of Information Technology*, 23(4): 297–312. DOI: 10.1057/jit.2008.18

Gengatharen, D.E. & Standing, C. (2005) "A framework to assess the factors affecting success or failure of the implementation of government-supported regional e-marketplaces for SMEs", *European Journal of Information Systems*, 14(4): 417-433. DOI: 10.1057/palgrave.ejis.3000551

Grandon, E.E. & Pearson, J.M. (2004) "Electronic commerce adoption: an empirical study of small and medium US businesses", *Information & Management*, 42(1): 197-216. DOI: 10.1016/j.im.2003.12.010

Grunbaum, N.N. (2007) "Identification of ambiguity in the case study research typology: what is a unit of analysis?", *Qualitative Market Research: An International Journal*, 10(1): 78-97. DOI: 10.1108/13522750710720413

Harwood, S.A. (2011) "The domestication of online technologies by smaller businesses and the 'busy day'", *Information and Organization*, 21(2): 84-106. DOI: 10.1016/j.infoandorg.2011.03.002

Herring, S.C. (2004) "Computer-mediated discourse analysis: an approach to researching online behavior", In: S.A. Barab, R. Kling & J.H. Gray (eds) *Designing for Virtual Communities in the Service of Learning*, Cambridge University Press, New York, pp. 338-376.

Howcroft, D. & Light, B. (2006) "Reflections on issues of power in packaged software selection", *Information Systems Journal*, 16(3): 215-235. DOI: 10.1111/j.1365-2575.2006.00216.x

Howcroft, D. & Light, B. (2010) "The social shaping of packaged software selection", *Journal of the Association for Information Systems*, 11(3): 122-148.

Huang, R., Zmud, R.W. & Price, L.R. (2010) "Influencing the effectiveness of IT governance practices through steering committees and communication policies", *European Journal of Information Systems*, 19(3): 288-302. DOI: 10.1057/ejis.2010.16

Hung, Y.-H., Chou, S.-C.T. & Tzeng, G.-H. (2011) "Knowledge management adoption and assessment for SMEs by a novel MCDM approach", *Decision Support Systems*, 51(2): 270-291. DOI: 10.1016/j.dss.2010.11.021

Hussin, H., King, M. & Cragg, P.B. (2002) "IT alignment in small firms", *European Journal of Information Systems*, 11(2): 108-127. DOI: 10.1057/palgrave/ejis/3000422

Jaegersberg, G. & Ure, J. (2011) "Barriers to knowledge sharing and stakeholder alignment in solar energy clusters: learning from other sectors and regions", *The Journal of Strategic Information Systems*, 20(4): 343-354. DOI: 10.1016/j.jsis.2011.03.002

Kauffman, R.J. & Mohtadi, H. (2004) "Proprietary and open systems adoption in e-procurement: a risk-augmented transaction cost perspective", *Journal of Management Information Systems*, 21(1): 137-166.

Keller, S. & Coulthard, D. (2013) "Charting diversity and change in IS publications: a tri-continental journal analysis", *Australasian Journal of Information Systems*, 18(1): 5-35.

Kendall, J.D., Tung, L.L., Chua, K.H., Ng, C.H.D. & Tan, S.M. (2001) "Receptivity of Singapore's SMEs to electronic commerce adoption", *The Journal of Strategic Information Systems*, 10(3): 223-242. DOI: 10.1016/S0963-8687(01)00048-8

Khazanchi, D. & Sutton, S.G. (2001) "Assurance services for business-to-business electronic commerce: a framework and implications", *Journal of the Association for Information Systems*, 1(1).

Kuan, K.K.Y. & Chau, P.Y.K. (2001) "A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework", *Information & Management*, 38(8): 507-521. DOI: 10.1016/S0378-7206(01)00073-8

Kuk, G. (2004) "Effectiveness of vendor-managed inventory in the electronics industry: determinants and outcomes", *Information & Management*, 41(5): 645-654. DOI: 10.1016/j.im.2003.08.002

Lee, J.C. & Myers, M.D. (2004) "Dominant actors, political agendas, and strategic shifts over time: a critical ethnography of an enterprise systems implementation", *The Journal of Strategic Information Systems*, 13(4): 355-374. DOI: 10.1016/j.jsis.2004.11.005

Lee, S., Park, S.B. & Lim, G.G. (2013) "Using balanced scorecards for the evaluation of "Software-as-a-service"", *Information & Management*, 50(7): 553-561. DOI: 10.1016/j.im.2013.07.006

Lee, Y. & Larsen, K.R. (2009) "Threat or coping appraisal: determinants of SMB executives' decision to adopt anti-malware software", *European Journal of Information Systems*, 18(2): 177-187. DOI: 10.1057/ejis.2009.11

Levenburg, N.M. & Klein, H.A. (2006) "Delivering customer services online: identifying best practices of medium-sized enterprises", *Information Systems Journal*, 16(2): 135-155. DOI: 10.1111/j.1365-2575.2006.00212.x

Levy, M., Loebbecke, C. & Powell, P. (2003) "SMEs, co-opetition and knowledge sharing: the role of information systems", *European Journal of Information Systems*, 12(1): 3-17. DOI: 10.1057/palgrave.ejis.3000439

Levy, M. & Powell, P. (2000) "Information systems strategy for small and medium sized enterprises: an organisational perspective", *The Journal of Strategic Information Systems*, 9(1): 63-84. DOI: 10.1016/S0963-8687(00)00028-7

Levy, M., Powell, P. & Yetton, P. (2001) "SMEs: aligning IS and the strategic context", *Journal of Information Technology*, 16(3): 133-144.

Li, X., Troutt, M.D., Brandyberry, A. & Wang, T. (2011) "Decision factors for the adoption and continued use of online direct sales channels among SMEs", *Journal of the Association for Information Systems*, 12(1): 1-31.

Liang, H. & Xue, Y. (2004) "Coping with ERP-related contextual issues in SMEs: a vendor's perspective", *The Journal of Strategic Information Systems*, 13(4): 399-415. DOI: 10.1016/j.jsis.2004.11.006

Love, P.E.D. & Irani, Z. (2004) "An exploratory study of information technology evaluation and benefits management practices of SMEs in the construction industry", *Information & Management*, 42(1): 227-242. DOI: 10.1016/j.im.2003.12.011

Love, P.E.D., Irani, Z., Standing, C., Lin, C. & Burn, J.M. (2005) "The enigma of evaluation: benefits, costs and risks of IT in Australian small–medium-sized enterprises", *Information & Management*, 42(7): 947-964. DOI: 10.1016/j.im.2004.10.004

MacKay, N., Parent, M. & Gemino, A. (2004) "A model of electronic commerce adoption by small voluntary organizations", *European Journal of Information Systems*, 13(2): 147-159. DOI: 10.1057/palgrave.ejis.3000491

McCart, J.A., Padmanabhan, B. & Berndt, D.J. (2013) "Goal attainment on long tail web sites: an information foraging approach", *Decision Support Systems*, 55(1): 235-246.

McGovern, T. & Hicks, C. (2004) "How political processes shaped the IT adopted by a small make-to-order company: a case study in the insulated wire and cable industry", *Information & Management*, 42(1): 243-257. DOI: 10.1016/j.im.2004.01.004

Mehra, A., Langer, N., Bapna, R. & Gopal, R. (2014) "Estimating returns to training in the knowledge economy: a firm-level analysis of small and medium enterprises", *MIS Quarterly*, 38(3): 757-771.

Mehrtens, J., Cragg, P.B. & Mills, A.M. (2001) "A model of Internet adoption by SMEs", *Information & Management*, 39(3): 165-176. DOI: 10.1016/S0378-7206(01)00086-6

Merono-Cerdan, A.L. & Soto-Acosta, P. (2007) "External web content and its influence on organizational performance", *European Journal of Information Systems*, 16(1): 66-80. DOI: 10.1057/palgrave.ejis.3000656

Molla, A., Heeks, R. & Balcells, I. (2006) "Adding clicks to bricks: a case study of e-commerce adoption by a Catalan small retailer", *European Journal of Information Systems*, 15(4): 424-438. DOI: 10.1057/palgrave.ejis.3000623

Newman, M. & Zhao, Y. (2008) "The process of enterprise resource planning implementation and business process re-engineering: tales from two Chinese small and medium-sized enterprises", *Information Systems Journal*, 18(4): 405-426. DOI: 10.1111/j.1365-2575.2008.00305.x

Nicolini, D. (2012) *Practice Theory, Work, and Organization: An Introduction*, Oxford University Press, Oxford.

Olsen, K.A. & Sætre, P. (2007) "IT for niche companies: is an ERP system the solution?", *Information Systems Journal*, 17(1): 37-58. DOI: 10.1111/j.1365-2575.2006.00229.x

Paolucci, M., Sacile, R. & Boccalatte, A. (2002) "Allocating crude oil supply to port and refinery tanks: a simulation-based decision support system", *Decision Support Systems*, 33(1): 39-54. DOI: 10.1016/S0167-9236(01)00133-6

Parker, C.M. & Castleman, T. (2007) "New directions for research on SME-eBusiness: insights from an analysis of journal articles from 2003 to 2006", *Journal of Information Systems and Small Business*, 1(1-2): 21-40.

Parker, C.M., Saundage, D. & Lee, C.Y. (2011) "Can qualitative content analysis be adapted for use by social informaticians to study social media discourse? A position paper", *22nd Australasian Conference on Information Systems*, 29 November - 2 December, Sydney, Australia.

Parker, C.M. & Scheepers, R. (2012) "Applying King et al.'s taxonomy to frame the IS discipline's engagement in green IS discourse", *23rd Australasian Conference on Information Systems*, 3-5 December, Geelong, Australia.

Pob-Nzaou, P. & Raymond, L. (2011) "Managing ERP system risk in SMEs: a multiple case study", *Journal of Information Technology*, 26(3): 170-192. DOI: 10.1057/jit.2010.34

Poon, S. (2000) "Business environment and internet commerce benefit - a small business perspective", *European Journal of Information Systems*, 9(2): 72-81.

Powell, P. & Woerndl, M. (2008) "Time to stop researching the important things?", *European Journal of Information Systems*, 17(2): 174-178. DOI: 10.1057/ejis.2008.11

Quaddus, M. & Hofmeyer, G. (2007) "An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses", *European Journal of Information Systems*, 16(3): 202-215. DOI: 10.1057/palgrave.ejis.3000671

Ray, A.W. & Ray, J.J. (2006) "Strategic benefits to SMEs from third party web services: an action research analysis", *The Journal of Strategic Information Systems*, 15(4): 273-291. DOI: 10.1016/j.jsis.2006.07.001

Reardon, J.L. & Davidson, E. (2007) "An organizational learning perspective on the assimilation of electronic medical records among small physician practices", *European Journal of Information Systems*, 16(6): 681-694. DOI: 10.1057/palgraveejis.3000714

Riemenschneider, C.K., Harrison, D.A. & Mykytyn Jr, P.P. (2003) "Understanding IT adoption decisions in small business: integrating current theories", *Information & Management*, 40(4): 269-285. DOI: 10.1016/S0378-7206(02)00010-1

Riemenschneider, C.K. & Mykytyn Jr, P.P. (2000) "What small business executives have learned about managing information technology", *Information & Management*, 37(5): 257-269. DOI: 10.1016/S0378-7206(99)00052-X

Rivard, S., Raymond, L. & Verreault, D. (2006) "Resource-based view and competitive strategy: an integrated model of the contribution of information technology to firm performance", *The Journal of Strategic Information Systems*, 15(1): 29-50. DOI: 10.1016/j.jsis.2005.06.003

Sarker, S., Xiao, X. & Beaulieu, T. (2013) "Qualitative studies in information systems: a critical review and some guiding principles", *MIS Quarterly*, 37(4): pii-xviii.

Schultze, U. (2015) "Skirting SLR's language trap: reframing the 'systematic' vs 'traditional' literature review opposition as a continuum", *Journal of Information Technology*, 30(2): 180-184. DOI: 10.1057/jit.2015.10

Shen, Z., Lyytinen, K. & Yoo, Y. (2014) "Time and information technology in teams: a review of empirical research and future research directions", *European Journal of Information Systems*, in press. DOI: 10.1057/ejis.2014.8

Singer, J.D. (1961) "The level-of-analysis problem in international relations", *World Politics*, 14(1): 77-92. DOI: 10.2307/2009557

Street, C.T. & Meister, D.B. (2004) "Small business growth and internal transparency: the role of information systems", *MIS Quarterly*, 28(3): 473-506.

Tallon, P.P. (2010) "A service science perspective on strategic choice, IT, and performance in U.S. banking", *Journal of Management Information Systems*, 26(4): 219-252.

Trochim, W.M.K. (2006) *Unit of analysis*, http://www.socialresearchmethods.net/kb/unitanal.php [accessed 24 May 2015].

Tsaih, R., Liu, Y.-J., Liu, W. & Lien, Y.-L. (2004) "Credit scoring system for small business loans", *Decision Support Systems*, 38(1): 91-99.

Tsatsou, P., Elaluf-Calderwood, S. & Liebenau, J. (2010) "Towards a taxonomy for regulatory issues in a digital business ecosystem in the EU", *Journal of Information Technology*, 25(3): 288-307. DOI: 10.1057/jit.2009.22

United States Census Bureau (2012) *Statistics of U.S. Businesses (SUSB) Main*, United States Census Bureau, Washington, DC. Available from http://www.census.gov/econ/susb/ [accessed 29 September 2015].

Vega, A., Chiasson, M. & Brown, D.H. (2008) "Extending the research agenda on diffusion: the case of public program interventions for the adoption of e-business systems in SMEs", *Journal of Information Technology*, 23(2): 109-117. DOI: 10.1057/palgrave.jit.2000135

Vidgen, R. (2002) "Constructing a web information system development methodology", *Information Systems Journal*, 12(3): 247-261. DOI: 10.1046/j.1365-2575.2002.00129.x

Walters, B.A., Jiang, J.J. & Klein, G. (2003) "Strategic information and strategic decision making: the EIS/CEO interface in smaller manufacturing companies", *Information & Management*, 40(6): 487-495. DOI: 10.1016/S0378-7206(02)00063-0

Wang, Y. & Ahmed, P.K. (2009) "The moderating effect of the business strategic orientation on eCommerce adoption: evidence from UK family run SMEs", *The Journal of Strategic Information Systems*, 18(1): 16-30. DOI: 10.1016/j.jsis.2008.11.001

Yin, R.K. (2014) *Case Study Research: Design and Methods*, 5th edition, Sage Publications, Thousand Oaks, California.

Zhang, M., Sarker, S. & Sarker, S. (2008) "Unpacking the effect of IT capability on the performance of export-focused SMEs: a report from China", *Information Systems Journal*, 18(4): 357-380. DOI: 10.1111/j.1365-2575.2008.00303.x

Zhang, M., Sarker, S. & Sarker, S. (2013) "Drivers and export performance impacts of IT capability in 'born-global' firms: a cross-national study", *Information Systems Journal*, 23(5): 419-443. DOI: 10.1111/j.1365-2575.2012.00404.x

Zhu, K., Kraemer, K.L. & Xu, S. (2003) "Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors", *European Journal of Information Systems*, 12(4): 251-268. DOI: 10.1057/palgrave.ejis.3000475

Appendix: List of A* IS journals

Abbreviation	Journal name
ACM	ACM Transactions on Computer-Human Interaction
DSS	Decision Support Systems
EJIS	European Journal of Information Systems
I&M	Information and Management
I&O	Information and Organization
ISJ	Information Systems Journal
ISR	Information Systems Research
JAIS	Journal of the Association for Information Systems
JAIST	Journal of the Association for Information Sciences and Technology
JIT	Journal of Information Technology
JMIS	Journal of Management Information Systems
JSIS	Journal of Strategic Information Systems
MISQ	MIS Quarterly

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