The Extent of IT-Enabled Organizational Flexibility: An Exploratory Study among Australian Organizations

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Abstract

The intensity of market competition, the ever increasing demand for shortening time to market and the pressure of first mover advantage are forcing businesses to develop non-imitable sources of value creation. Information technology (IT) plays a key role as a necessary, but not sufficient, source of value. For IT to generate business value, it has to adapt itself to a firm’s continuously changing competitive environment. The strategic value of IT can be defined as an enabler of organizational flexibility. Hence, IT-enabled organizational flexibility is of strategic importance to organizations and has been found to affect competitive advantage. This study uses an enhanced concept of IT-enabled flexibility to investigate IT-enabled organizational flexibility among Australian organizations. The findings show that, even though Australian companies exhibit IT enabled organizational flexibility, company and IT department size are influencing the flexibility of IT. The paper provides an indication of the extent to which Australian organizations are poised to exploit the value generating potential of IT. Practitioners can use the result to benchmark where they stand in regards to the flexibility of their IT.

Keywords

IT infrastructure flexibility, flexible IS, IT personnel flexibility, IT-enabled organizational flexibility

INTRODUCTION

Since the mid 1990s, researchers have been investigating the strategic value of IT-enabled organizational flexibility as a source of competitiveness (Byrd & Turner 2001b; Duncan 1995a; Sambamurthy, Bharadwaj & Grover 2003). IT-enabled organizational flexibility refers to the ability of a firm’s IT to respond to both internal business requirement and external market demands. Previous researchers used a variety of approaches and variables to investigate the complex, and still not totally understood factors that determine IT’s ability to cope with change. Even though, these findings have given insights into what constitutes IT-enabled organisational flexibility and added to the knowledge of these variables and their contribution to the competitiveness of a firm, we identified some research gaps that motivated our enquiry. Firstly, previous study used a limited set of variables to operationalize IT-enabled organizational flexibility. Indeed, many researchers used IT infrastructure flexibility and IT personnel flexibility as variables in their studies. We note that there is a difference between information systems (IS) and information technology (IT). IT processes, transmits and stores information, whereas IS represents a set of integrated software that uses IT to support individual, group and business goals. Therefore, the flexibility of IS should be considered as an essential element of IT-enabled organisational flexibility. So far there is no study known to the authors that investigated the flexibility of IS in this context. Considering the contribution of IS to sustainable and competitive business, this is a serious shortcoming. IS flexibility refers to the ability of firm’s IS to adapt quickly and efficiently to changes in its competitive environment (e.g. market, integration and network related changes) and has been identified as a strategic value to organizations (Gebauer & Schober 2006).

Secondly, most studies of IT-enabled organizational flexibility, have been conducted in the North American context, and there is less known about the experience of IT-enabled organizational flexibility in Australia. Even though the characteristics of IT are similar all over the world, competitive environments and demographic variables (e.g. average company and IT department size) differ. As technology is socially constructed and technological developments and deployments are sensitive to contextual differences, studying the status of IT-enabled organisational flexibility in Australia provides not only additional data, but also an opportunity to cross validate if and which North American findings apply in the Australian context. It also enables to identify new insights. This research therefore intends to address the above gaps. The specific research questions the paper answers include (1), what is the extent of IT-enabled organizational flexibility, including IS flexibility, in
Australian organizations? (2), what is the effect of demographic variables on IT-enabled organizational flexibility in Australian organizations.

This paper addresses these research questions and adds to the body of knowledge in several ways. Firstly, this paper enhances methods of evaluating IT-enabled organizational flexibility by introducing the multidimensional construct of IS flexibility. Secondly, this paper empirically examines the enhanced concept of IT-enabled organizational flexibility within Australian firms. Thirdly, this paper takes explicit account of demographic differences between companies and, hence, enables evaluation of the effect of demographic factors on IT-enabled organizational flexibility. Finally, all the above-mentioned points can enable practitioners to benchmark the flexibility of their own IT.

The paper is organised as followed. Firstly, the theoretical background based on a review of previous research is presented. Secondly, the research model is presented and the methodology explained. Thirdly, the research findings are illustrated and, finally, conclusions are drawn and suggestions for future research presented.

**IT ENABLED ORGANIZATIONAL FLEXIBILITY FRAMEWORK**

The theoretical background for this study is based on the IT literature, especially the IT literature that investigates IT infrastructure flexibility, IT personnel flexibility, the flexibility of organizations and IT-dependent competitiveness. Prior research has investigated the relationship between flexible IT infrastructure and competitive advantage (Byrd, Lewis & Turner 2004; Byrd & Turner 2001b); IT capabilities, business-IT partnerships and business process flexibility (Tallon, PP 2008); the mediating role of IT infrastructure capabilities on flexibility and IT personnel capabilities (Fink & Neumann 2007); the relationship between IT infrastructure flexibility, mass customization and business performance (Chung et al. 2005); IT dependent strategic Initiatives and sustained competitive advantage (Piccoli & Ives 2005), and IT competence, digital options, flexibility and competitive actions (Sambamurthy, Bharadwaj & Grover 2003).

From the synthesis of these previous works, we can identify two dimensions of IT flexibility, infrastructure and human resources, that make up IT-enabled organizational flexibility. The effects of IT human resources and technical IT infrastructure on firm performance, and their importance to the flexibility of organizations have been found to be positive (Chung et al. 2005; Fink & Neumann 2007). Both flexible IT personnel and flexible IT technical infrastructures have been identified as enhancing a firm’s flexibility and competitive advantage (Byrd & Turner 2001b; Fink & Neumann 2007) The combination of IT infrastructure and IT human resources can enable an organization to unleash the hidden value of complementary resources. Although technical infrastructure and basic IT skills can be considered as commodity-like, a business’s ability to integrate the infrastructure components and build systems that are responsive to its strategic context represents another attribute of how IT can enable organizational flexibility. We refer to such an attribute as IS flexibility. Figure 1 offers a schematic representation of the dimensions of IT-enabled organizational flexibility.

**IT infrastructure flexibility**

Since the mid 1990s the term “IT infrastructure” became increasingly popular (Chanopas, Krairit & Khang 2006). IT infrastructure consists of a set of technology resources that provide the foundation of present and future business applications (Duncan 1995a; Earl 1989; Niederman & Brancheu 1991). A highly capable IT infrastructure, as the foundation of firm-wide IT capacities and business processes, is, therefore, crucial (Kayworth, Chatterjee & Sambamurthy 2001). IT infrastructure flexibility definitions vary slightly in the literature, but most definitions have a common core. Thus IT infrastructure flexibility is defined as the ability of the IT infrastructure to support and enable the fast design, development and implementation of heterogeneous...
business applications as well as the ability to distribute any type of information (data, text, voice, image, video) across the organization and beyond (Byrd & Turner 2001b). Further, it refers to the ability of the IT infrastructure to support a wide variety of hardware, software and other technologies that can be easily diffused into the overall technological platform (Byrd & Turner 2001b).

The concept of IT infrastructure flexibility is based on Duncan’s two seminal works (Duncan 1995a, 1995b) measured IT infrastructure flexibility through shareable and reusable IT resource. The result of Duncan’s (Duncan 1995a) study was a framework for IT infrastructure and the definition of flexible IT infrastructure qualities through the dimensions of connectivity, compatibility and modularity. Other authors have investigated the construct of infrastructure flexibility since then (see table 1 for a summary).

Table 1. IT infrastructure dimensions from research literature

<table>
<thead>
<tr>
<th></th>
<th>Connectivity</th>
<th>Compatibility</th>
<th>Modularity</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gibson (1993)</td>
<td>Communications connectivity</td>
<td>Computing compatibility</td>
<td>Application functionality</td>
<td>Data transparency</td>
</tr>
<tr>
<td>Duncan, 1995 b</td>
<td>Network connectivity</td>
<td>Platform compatibility</td>
<td>Modularity</td>
<td></td>
</tr>
<tr>
<td>Byrd &amp; Turner 2000</td>
<td>Connectivity</td>
<td>Compatibility</td>
<td>Application functionality</td>
<td>Data transparency</td>
</tr>
<tr>
<td>Schwager (2000)</td>
<td>Connectivity</td>
<td>Compatibility</td>
<td>Modularity</td>
<td></td>
</tr>
<tr>
<td>Chung et al. (2005)</td>
<td>Integration</td>
<td>Modularity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connectivity</td>
<td>Compatibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bhatt (2005)</td>
<td>Network connectivity</td>
<td>Network flexibility</td>
<td></td>
<td>Data integration</td>
</tr>
<tr>
<td>Bradley (2006)</td>
<td>Integration</td>
<td>Modularity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chanopas (2006)</td>
<td>Connectivity</td>
<td>Compatibility</td>
<td>Modularity</td>
<td>Scaleability, rapidity, facility, modernity</td>
</tr>
</tbody>
</table>

Although not all researchers have referred directly to the term “IT infrastructure flexibility”, their concepts and items are relevant to the flexibility of IT infrastructures. Three variables that have appeared on most studies of IT infrastructure flexibility are connectivity, compatibility and modularity. Many researchers included an extra dimension for data transparency/integration/management. This data dimension is part of Duncan’s (Duncan 1995a) original classification and falls into the categories of compatibility and modularity. Connectivity and compatibility are sometimes integrated into a new dimension called IT integration (Byrd & Turner 2001a; Chung et al. 2005). On the basis of these two variables, modularity and integration are selected to operationalize IT infrastructure flexibility. These selected items have been tested and validated in a number of studies (see table 1).

IT integration consists of IT connectivity and IT compatibility. IT connectivity is “the ability of any technology components to attach to any of the other components inside and outside the organizational environment” (Byrd & Turner 2000). This enables seamless and transparent organizations (Byrd, Lewis & Turner 2004). IT compatibility is “the ability to share any type of information across any technology components” (Byrd & Turner 2000). This helps to breakdown organizational walls and make data, information and knowledge in the organization readily available (Byrd, Lewis & Turner 2004). IT modularity is “the ability to add, modify and remove any software, hardware or data components of the infrastructure with ease and with no major overall effect” (Byrd & Turner 2000).

**IT human resources flexibility**

The IT skills of the personnel working in the IT department are an intangible capability. On the one hand, highly specialised IT personnel are needed to solve today’s complex IT problems and on the other hand, IT personnel need general knowledge to cope with changing demands from the business side. IT personnel flexibility defines
the ability of IT personnel to have the skills and knowledge to perform tasks outside their original area of training and original domain (Byrd, Lewis & Turner 2004). Knowledge about business processes is sought to help the alignment with the business (Byrd, Lewis & Turner 2004). Prior studies of IT flexibility discovered links between IT personnel flexibility, IT infrastructures, competitive IS and firm performance (Byrd, Lewis & Turner 2004; Chung et al. 2005).

The IT personnel flexibility construct is mainly based on research from previous studies, especially that of Byrd and Turner (2000). As described above, Byrd and Turner (2000) derived their model from a content analysis of previous research, mainly from a study by Lee et al. (Lee, Trauth & Farwell 1995), and conducted several pilot studies to develop a pool of 29 items related to IT personnel flexibility (Byrd, Lewis & Turner 2004). Two constructs which will be examined in this study as part of IT human resources flexibility are derived from the work of Byrd et al. (Byrd, Lewis & Turner 2004). Firstly, the broad IT knowledge and skills of the IT personnel is essential to develop and maintain a capable and flexible IT infrastructure (Byrd, Lewis & Turner 2004). Broad technical knowledge and skills are necessary to deliver data across locations and applications, bridge old and new systems and to identify technical opportunities from new technologies (Ross, Beath & Goodhue 1996). The increasing rate of change in new technology opportunities require even more varied and in-depth technical skills (Fink & Neumann 2007). Secondly, the business knowledge and skills of the IT personnel are important to understand and solve business problems. IT personnel do not have to be expert in business knowledge, but to a certain extent IT personnel should understand the goals, languages and processes of their organization (Feeny & Willcocks 1998).

**Information systems flexibility**

As business processes adapt to changes in the competitive environment, information systems (IS), as the foundation of business processes, have to adapt as well, and be flexible enough to evolve with changing business processes. The ability of IS to adapt themselves to changes in the organization’s environment, henceforth referred to as IS flexibility, has been identified as a strategic value to organizations (Gebauer & Schober 2006). To measure IS flexibility, we focused on the ability of IS to support the fast-changing competencies of firms. Three variables were defined. First, IS market flexibility is the ability of the organizational IS to quickly respond to market and functionally related changes, which can be required due to enabling innovative opportunities and competitive actions in the market. Second, IS integrity flexibility is the ability of organizational IS to quickly adapt and renew internal organizational processes and structures to react to changes in the competitive environment (e.g. new organizational processes and structures due to restructuring of the organization). It measures the ability of firms’ IS to quickly enable and support organizational changes, something which can be required to adapt to a changing environment. Third, IS network flexibility is the ability of firms’ IS to quickly reconfigure, adapt and support new strategic networks (e.g. new partners, changes in the supply chain).

The process of development of the three IS flexibility variables included several steps. Firstly, as our definition of IS flexibility relates to IS ability to enable support for firms’ fast changing competencies, we looked at research instruments that have measured IS support for firm competencies (Ravichandran & Lertwongsatien 2005). Then, we developed variables and items which measure IS ability to enable flexibility of this support. The result was a draft research instrument. Secondly, we used a panel of experts survey of IS researchers and a pilot test to improve and ensure the soundness of the newly developed IS flexibility variables.

**METHODOLOGY**

Data for this paper were extracted from a PhD research project. As part of the project, an online survey was administered to a sample of Australian businesses during November-December 2007. The population of the main survey was comprised of Australian CEOs and CIOs. Because it was not possible to survey every Australian CEO/CIO, a representative sample frame was selected. A typical response rate in this kind of survey with senior executives is about 5-10%. Therefore, in order to obtain an adequate response rate, a sample size of 3500 CIOs and CEOs was selected form a database bought from a company called Impact 500. To encourage response, participants were addressed personally in the invitation email, and their importance and expertise were acknowledged. Participants were also promised a summary of the results of the survey. After three weeks, a reminder email was sent out, leading to another flow of responses. Two months after the first invitation email was sent out, the survey was closed.

**Profile of respondents and estimating non response bias**

The research design is based on the assumption that it is possible to generalize from the sample to the population. As with most survey data, there is always a non-response problem, as not all addressed participants return the questionnaire. Non-response leads to missing data. The data may be biased and thus not representative of the population. Therefore, the researcher has to estimate if a non-response bias exists. One way of doing this
is to follow the suggestions of the literature to compare early respondents with late respondents. Participants that respond later to the questionnaire are perceived to have similar characteristics to non-respondents. An independent sample t-test on the averages of the IT infrastructure flexibility and the IT personnel flexibility construct showed no significant relationships between early and late respondents. Hence, even if non-response bias exists, it does not appear to be statistically significant, and generalization from the sample to the population is possible. From the received responses, 228 were used in further data analysis. Table 2 illustrates the profile of the respondents. 184 large organizations (more than 200 employees) and 44 medium size organizations (20-200 employees) were represented in the sample. No small organizations (<20 employees) were present in the sample. The respondents came from all industry sectors, with manufacturing (46) as the biggest industry group.

**Table 2. Profile of respondents**

<table>
<thead>
<tr>
<th>Industry/Sector</th>
<th>Large</th>
<th>Medium</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitality</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Agrar, Forestry and Fishing</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Communication</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Construction</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Education</td>
<td>14</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Electric, Gas and Water</td>
<td>9</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Financial services</td>
<td>16</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Government, Defence</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>184</td>
<td>44</td>
<td>228</td>
</tr>
</tbody>
</table>

**RESULTS**

**Overview of IT-enabled organizational flexibility**

The purpose of this study was to empirically examine the extent of IT-enabled organizational flexibility among Australian organizations with the variables discussed in section 2. The measurement scale was a 5-point Likert scale (1-totally disagree – 5 totally agree). The results in Figure 2 show all variables above the average of 3.0. The highest average means were from the constructs of IT personnel flexibility, business knowledge and broad IT knowledge. This is especially interesting, as IT personnel flexibility has been found to have the highest impact on IT-enabled organizational flexibility in prior studies (Byrd & Turner 2001b). The IT personnel of Australian companies seem to have higher business knowledge than broad IT knowledge. The construct of IS flexibility, consisting of IS market flexibility, IS integrity flexibility and IS network flexibility has the second highest mean value. The differences between the three variables of IS flexibility are relatively small, which could be a sign that they measure the same factor. IT infrastructure flexibility, compromising IT integration and IT modularity has the lowest mean value. IT modularity seems to be especially low among Australian companies.

![Figure 2: Status of IT-enabled organizational flexibility among Australian organizations](image-url)

**The effect of demographic variables on IT-enabled organizational flexibility**

Before examining each indicator for IT-enabled organizational flexibility separately, we analysed the impact of demographic variables. As large organizations and large IT departments have often more complex and
integrated IT systems, IT personnel with higher and broader IT knowledge might be required. Hence, IT integration, IT modularity and broader IT knowledge can be expected to be sensitive to business and IT department size. We classified organizations with more than 200 employees as large, and those with 20–200 employees as medium sized companies. Table 3 illustrates the difference in means between the two classifications, company size and IT department size. All variables indicate that medium-sized Australian companies have a higher IT flexibility than large companies (see Figure 3).

Figure 3: Effect of demographic factors on IT-enabled organizational flexibility

Large organizations could have less flexible IT due to a higher degree of specialisation and more complex IT infrastructure. An independent sample t-test (see Table 3) revealed statistical significant differences for five (IT integration, broad IT knowledge, business knowledge, IS market flexibility and IS integrity flexibility) out of the seven variables (see Table 3). IT integration, which is operationalized by the ability of IT components to attach themselves to any other IT components inside and outside the organization (IT connectivity), as well as by the ability to share any kind of data across all IT components (IT compatibility), is a lot higher in medium-sized organizations, compared to large organizations (see Figure 3). The integration of the data and functionality with transparent access to platforms and applications and the compatibility of applications across platforms is most likely a lot more complex in larger organizations. This could be the reason for the higher IT integration among medium-sized organizations in comparison to large organizations. IT modularity, as the ability to add, modify and remove any software, hardware or data component of the IT infrastructure easily (Byrd & Turner 2000), and IS network flexibility, as the ability to adapt to changes in firms’ networks, are also affected by company size (see Figure 3), but are not statistically significant (see Table 3).

Table 3. Independent sample t-test on demographic variables

<table>
<thead>
<tr>
<th></th>
<th>Company size</th>
<th>IT department size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p</td>
<td>Mean difference</td>
</tr>
<tr>
<td>IT integration</td>
<td>0.01</td>
<td>0.32</td>
</tr>
<tr>
<td>IT modularity</td>
<td>0.13</td>
<td>0.19</td>
</tr>
<tr>
<td>Broad IT knowledge</td>
<td>0.00</td>
<td>0.36</td>
</tr>
<tr>
<td>Business knowledge</td>
<td>0.09</td>
<td>0.21</td>
</tr>
<tr>
<td>IS market flexibility</td>
<td>0.02</td>
<td>0.29</td>
</tr>
<tr>
<td>IS integrity flexibility</td>
<td>0.03</td>
<td>0.25</td>
</tr>
<tr>
<td>IS network flexibility</td>
<td>0.16</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Broad IT knowledge is also sensitive to organizational size differences, with larger organizations having less broadly skilled IT personnel. This could be due to the fact that larger organizations, often having a more complex IT infrastructure, will probably need more specialised IT personnel. Smaller organizations on the other hand, are more likely to have fewer IT personnel and more broadly trained IT personnel. IT employees in smaller organizations have to handle a broader variety of jobs and often substitute for each other, therefore performing tasks out of their original area of training. Organizational size also has an effect, although only statistically significant on a 90% confidence interval, on the business knowledge of the IT personnel. As with broad IT knowledge, IT personnel from larger organizations are not as broadly skilled as IT personnel from medium sized organizations. Understanding the business environment can enable IT personnel to develop...
business-relevant IT solutions, and improve the flexibility and time-to-market of IT systems. The three variables of information system flexibility measure how well an organization can adapt its information systems to support new or changed business process or organizational structures. These changes can be related to firms’ market, integrity and network related adaptations. The flexibility of all three variables shows similar effects as regards to company size. All three variables indicate that larger organizations have less information system flexibility than medium sized ones.

Even though many large organizations often have large IT departments, and smaller organizations tend to have smaller IT departments, this is not always the case. Hence, the effect of the two organizational variables (company and IT department size) on IT-enabled organizational flexibility might differ. Hence, we investigated the effect of IT department size on IT-enabled organizational flexibility. The size of the IT department was classified as small where IT departments had less than 20 employees and large for IT departments with over 20 employees. These classifications split the sample into two groups. The effect of IT department size on the seven variables that measure IT-enabled organizational flexibility is similar to the effect of company size (see Figure 3). Organizations with small IT departments showed higher mean values on all variables than those with larger IT departments. In comparison to the effect caused by company size, statistically significant effects were identified on all variables, except IS network flexibility and IT modularity. Even though the graph shows a higher IS network flexibility for larger IT departments, this effect is not statistically significant. The different effect the two organizational variables (company size and IT department size) have on the flexibility variables are, in our opinion, mainly due to two reasons. Firstly, organizations vary in their intensive use of IT. The strategic value an organization expects from IT will vary across organizations, and is probably influenced by the industry and the strategic role of IT. For example, even if an organization might be classified as large, because IT plays only a support role, it tends to have a rather small IT department. With more statistically significant effects on the variables, the size of the IT department seems to take the importance of the IT for the organization into account and, therefore, reflect higher effects on IT-enabled organizational flexibility than the company size. Secondly, the size of the IT department is also dependent on the degree of outsourcing. A large organization that has outsourced parts of its IT services will have a smaller IT department (and be classified as small IT department) than a comparable similar organization without outsourcing. The degree of outsourcing could, therefore, influence the effect of IT department size on the variables.

**Extent of IT-enabled organizational flexibility in Australian organizations**

IT Infrastructure flexibility was identified from previous research as a multidimensional construct, consisting of IT integration and IT modularity. The status of these two constructs among Australian companies is illustrated in Figure 4. The five different items, that measured IT integration, varied from 64% approval for system interconnectivity to only 31% approval for the use of middleware to integrate key enterprise applications. Even though, only around half of the organizations stated that their data was available across the whole organization in real time, Australian companies seem to have a high percentage of IT interconnectivity, enabling them to link IT infrastructure components together and to establish links to external parties. This enables Australian organizations to connect their IT infrastructure to other organizations, thus contributing to organizational flexibility. One of the main issues in the flexibility of IT infrastructure among Australian organizations seems to be the ability to share and access data across the organization (see Figure 4), also referred to as IT compatibility (Byrd & Turner 2000). Through the instrument development process, two items were identified which are relevant for IT compatibility, transparent user interfaces and the use of middleware. Many organizations use a variety of heterogeneous systems. The use of middleware to integrate key enterprise applications and user interfaces that provide transparent access to all platforms and applications, are possible remedies to integrate these heterogeneous systems. Only less than one third of the sample organizations had implemented middleware and had transparent access to all platforms and applications (see Figure 4).

IT modularity is the ability to add, modify and remove any software, hardware or data component of the IT infrastructure easily (Byrd & Turner 2000). Less than half of the sample organizations was able to add functionality quickly to critical applications and could handle variations in data formats and standards easily (see Figure 4). A problem many organizations face is the existence of legacy systems. Legacy systems refers to old IT systems, often based on proprietary hard- and software, and often obstructing the development of new IT applications. For nearly a third of the sample organizations, legacy systems caused this problem, with a further 35% of the sample organizations stating, that they did not have an issue with legacy systems.

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1 Industry effects on the variables are statistically significant for all variables, except broad IT knowledge and business knowledge.
The extent of IT-enabled organizational flexibility

The skills and knowledge of IT personnel have gained importance as their value has risen in modern organizations (Chung et al. 2005). In order to support today’s organizations, IT personnel should have both broad IT and business knowledge (Chung et al. 2005). Broad IT knowledge indicates that the IT personnel are able to support a variety of IT services. This tends to include skills in multiple operating systems and programming languages as well as being knowledgeable about IT products. The analysis of the data yielded insights into the knowledge and skills of IT personnel in Australian companies. Nearly 84% of the sample organizations stated that their IT personnel were knowledgeable about their IT products, around 60% stated that their IT personnel were skilled in multiple operating systems and were able to support other IT services outside their domain. Around 47% of organizations agreed that their IT personnel were skilled in multiple programming languages.

In order to be able to contribute to IT-enabled organizational flexibility, IT personnel have to be able to understand the business environment and to develop IT solutions (Chung et al. 2005). The study investigated the business knowledge of the IT personnel and discovered, that in 76% of the organizations IT personnel understood the business environment they supported, and in 71% of organizations the IT personnel were knowledgeable about the key success factors of their organization. Figure 5 indicates a relatively high IT personnel flexibility for Australian organizations, which enables these organizations to better support changes in business processes.

**Figure 4:** Status of IT-Infrastructure flexibility among Australian organizations

The ability of information systems to respond to changes in organizational environment is operationalized by the three variables, IS market flexibility, IS integrity flexibility and IS network flexibility. The results of our study are presented in Figure 6. Around half of the organizations have flexible information systems that can respond to market, integrity and network related adaptations.
CONCLUSION AND FUTURE RESEARCH

The purpose of this exploratory study was to answer the research questions by examining the enhanced concept of IT-enabled organizational flexibility among Australian organizations. The study used a framework consisting of two often-used and validated constructs, IT infrastructure flexibility and IT personnel flexibility, and introduced a new construct, IS flexibility. The empirical results if this study illustrated the current status of IT-enabled organizational flexibility among Australian organizations. According to the results, Australian organizations have an average level of IT infrastructure flexibility, and IS flexibility, but a fairly good level of IT personnel flexibility. Similar studies which have been conducted overseas (Byrd & Turner 2000; Tallon, P & Kraemer 2004) have used slightly different scales, sample populations, years and items and, therefore, the results of this study can not be compared with them one to one on the same scale. However, the overseas studies show the same tendencies for the IT infrastructure flexibility and IT personnel flexibility variables as revealed by the results of this study in Australia. The IS flexibility variables in this study have not been used in previous studies and, therefore, cannot be compared.

Furthermore, evidence has been provided that organizational variables do have an impact on the level of IT-enabled organizational flexibility, with large organizations and companies with large IT departments having less IT-enabled organizational flexibility than their smaller counterparts. These findings, and the introduction of the newly-developed IS flexibility construct, add to the body of knowledge in several ways. Researchers can use the newly introduced construct of IS flexibility in their research instruments, and compare their results to those reported in this study. Practitioners can use the findings of this study as a benchmarking tool for their own IT. Future research is needed to further investigate the flexible IS construct that was introduced here, and to examine the impact of IT-enabled organizational flexibility on IT competencies, and the market performance of organizations.

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The extent of IT-enabled organizational flexibility

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