An exploratory study of expectation in IT skills in a developing nation: Vietnam

S K. Lau
University of Wollongong, simlau@uow.edu.au

Graham K. Winley
Assumption University, gkwinley@scitech.au.edu

Nelson K. Y. Leung
Swinburne University of Technology

Nicole Tsang
Everich Resources Limited

Sim Yee Lau
Reitaku University

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Abstract
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Keywords
developing, vietnam, exploratory, nation, study, expectation, skills

Disciplines
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An Exploratory Study of Expectation in IT Skills in a Developing Nation: Vietnam

Sim Kim Lau, University of Wollongong, Wollongong, Australia
Graham Kenneth Winley, Assumption University, Bangkok, Thailand
Nelson K. Y. Leung, Swinburne University of Technology, Hawthorn, Australia
Nicole Tsang, Everich Resources Limited, Caroline Springs, Australia
Sim Yee Lau, Reitaku University, Kashiwa-shi, Japan

ABSTRACT

The purpose of this study is to explore expectations in information technology skills for organizations in Vietnam, a developing country in South East Asia. Previous research in Vietnam has mainly focused on information technology adoption; this study offers an insight into the demands of information technology skills in Vietnam. A theoretical framework consisting of five domains of expertise is used to examine the nature and structure of information technology profession in Vietnam. Results from the study show that there is an anticipated increase in demand for information technology professionals who possess deep skills in a broad scope of roles and experience both in information technology and other business domains. Technical skills in the technology infrastructure and services domain in combination with strong communication and problem solving qualities are highly valued by Vietnamese employers.

KEYWORDS
Demand of IT Skills, IT Professionals, IT Skills, IT Skills in Developing Country, Vietnam

1. INTRODUCTION

Vietnam is a lower middle income country in South East Asia with gross domestic products of USD 171.4 billion (The World Bank, 2014). It is positioned at the 34th percentile in the Information and Communication Technology (ICT) Development Index across 166 countries and has a relatively high Internet access compare to other developing South East Asia countries such as Philippines, Indonesia and Thailand (ITU, 2014). In terms of global competitiveness, Vietnam is categorized as a factor-driven
economy which relies on unskilled labor and natural resources and is placed at the 47\textsuperscript{th} percentile in the Global Competitiveness Index (an index that measures micro- and macroeconomic foundations of national competitiveness) across 144 countries (Schwab & Sala-i-Martin, 2014). It is also placed in the 44\textsuperscript{th} percentile across 148 countries in the Network Readiness Index; an index which measures the propensity for nations to exploit opportunities offered by ICT and assesses competitiveness by examining the impact of ICT on productivity and development (Bilbao-Osorio et al., 2014).

As Vietnam progresses from a factor-driven economy to an efficiency-driven economy, moving from low productivity manual jobs to more skill-intensive non-manual jobs, equipping the workforce with the right skills is vital for economic modernization of the country. However Vietnamese employers are reporting shortages of skilled workforce. They find it difficult to employ new workers due to inadequate skills of job applicants (Bodewig & Badiani-Magnusson, 2015). It is also suggested that graduates in Vietnam not only should possess the right job-relevant technical knowledge, they should also possess cognitive and behavioral qualities such as problem solving, critical thinking, teamwork and communication skills. There is limited research on comprehensive analysis of ICT skills demand in Vietnam and research reported in literature has mainly focused on specific area of ICT adoption such as outsourcing (Huong et al., 2011; Nahar & Kuivinen, 2010), Internet innovation policy (Boymal et al., 2007), knowledge management (Pham & Hara, 2011), e-commerce (Pham et al., 2011; Van Huy et al., 2012), e-banking (Pham et al., 2013) and enterprise resource planning (Pham & Teich, 2011). Against this background, this study aims to investigate expectations in information technology (IT) skills demand in Vietnam and research reported in literature has mainly focused on specific area of ICT adoption such as outsourcing (Huong et al., 2011; Nahar & Kuivinen, 2010), Internet innovation policy (Boymal et al., 2007), knowledge management (Pham & Hara, 2011), e-commerce (Pham et al., 2011; Van Huy et al., 2012), e-banking (Pham et al., 2013) and enterprise resource planning (Pham & Teich, 2011). Against this background, this study aims to investigate expectations in information technology (IT) skills in Vietnam using a theoretical framework developed by Winley and Wongwuttiwat (2012). This framework was extrapolated from a report on IT professional outlook prepared by Morello (2005) and consists of five domains of IT professional expertise: technology infrastructure and services, information design and management, process design and management, relationship and sourcing management and professional characteristics of IT professionals. Specifically, the study will examine the nature and structure of the IT profession based on three components: domains of professional expertise; scope of knowledge, skills and experience; and domain specific knowledge and skills. In addition the sourcing strategy (in-house or outsource) used by the organizations in acquiring these skills and knowledge are also explored.

The rest of the paper is organized as follows. Section 2 presents components of the theoretical framework and related literature and Section 3 discusses research design. Analysis and discussion of results are presented in Section 4, follows by conclusion in Section 5.

2. THEORETICAL FRAMEWORK AND RELATED LITERATURE

The theoretical framework of Winley and Wongwuttiwat (2012), which describes the nature and structure of the IT profession, can be illustrated using three components consisting of domains of professional expertise; scope of knowledge, skills and experience; and domain specific knowledge and skills. This framework had been applied in Thailand and Myanmar to analyze the skills demand of ICT professionals (Lau et al., 2013; Winley & Wongwuttiwat, 2013; Winley & Lau, 2012; Winley & Wongwuttiwat, 2012).

The first component of the framework includes five domains of IT professional expertise, namely technology infrastructure and services, information design and management, process design and management, relationship and sourcing management and professional characteristics of IT professionals. According to Morello (2005), the technology infrastructure and services domain represents the historical foundation of the IT profession. IT professionals working in this domain must demonstrate mastery of complexity in IT, operational consistency and standardization. They must be excellent in their grasp of technology in areas such as enterprise architecture, infrastructure, systems integration and applications.

On the other hand, professionals in the information design and management domain take on business roles. They require a deep understanding of when and how a particular organization needs,
uses, manages, analyzes and distributes information. In this domain IT professionals work in business integration, information design and information management and they need to be skillful in knowing what constitutes the right information.

The process design and management domain calls for multifaceted, versatile IT professionals who can visualize and understand process components and establish critical and strategic business processes to promote differentiation and innovation. In the relationship and sourcing management domain, the skills required are of soft skills such as negotiation, alliances, persuasion and social networking. Technical expertise is not essential for this domain and non-technology soft skills related to experience in driving change, arbitrating conflict, overcoming customer skepticism and communicating are important. The fifth domain, professional characteristics of IT professionals, represents personal attributes of IT professionals that include problem solving, teamwork, communications and scope of individual’s skills and experience (Winley and Wongwuttiwat, 2012).

In relation to the domains of expertise described above, Morello (2005) predicted that over the period 2005 to 2010 there would be an increased demand associated with each domain except for the technology infrastructure and services domain where no increase was expected for technologically advanced countries. Morello (2005) further predicted that by 2010, the information design and management domain was expected to account for 15 to 30 percent of ICT professionals; the process design and management domain 20 to 25 percent; and the relationship and sourcing management domain 10 percent. Wongwuttiwat (2009) reported that there was partial support for Morello’s predictions in Thailand where over the period 2009 to 2013 both ICT provider- and user-organizations anticipated an increase in demand for domains of information design and management, process design and management and professional characteristics of IT professionals but no increase in demand in the relationship and sourcing management domain. In addition, the ICT user-organizations in Thailand expected an increase in demand in the technology infrastructure and service domain while the ICT provider-organizations agreed with Morello’s prediction of no increase in demand in this domain. Winley and Wongwuttiwat (2012) also compared changes in demand experienced by organizations from eight business sectors in Thailand over the period 2006 to 2011. Again, there was partial support for Morello’s predictions with at least half of the sectors experiencing an increased demand in domains that include information design and management, process design and management and professional characteristics of IT professionals but no increased demand in the technology infrastructure and services and relationship and sourcing management domains. In a study that investigates IT skills in Myanmar, Lau et al. (2013) found that there were strong predicted demands for skills in the domains of technology infrastructure and services, and information design and management. In particular this applied to skills that were specialist in nature such as technical specialist skills necessary for systems development and implementation, database management systems along with networks and communications.

The second component of the theoretical framework concerns the depth and scope of recognition of an IT professional’s skills, roles and experience which are categorized into three roles: specialist, versatilist and generalist (Morello, 2005; Plummer et al., 2005). Specialist possesses deep skills and a narrow scope of roles and experience within the ICT domain only; versatilist has deep skills and a broad scope of roles and experience within the ICT and other work domains; and generalist holds shallow skills and a broad scope of roles and experience within the ICT and other work domains. The difference between specialist and versatilist can be explained as follows. A specialist possesses highly specialized and deep technical knowledge within a narrow scope of domain and is often not recognized outside their narrow area of expertise. A versatilist has deep skills that can be applied to a wide range of situations and possesses diverse experiences in assuming multiple roles in different projects. They usually possess professional qualifications and experiences beyond technical realms. Finally, a generalist has relatively shallow skills, works in a broad scope of tasks and their works often do not generate a lot of confidence due to lack of depth (Morello, 2005). Morello (2005) and Plummer et al. (2006) expected more versatilists to be employed by organizations in technologically
advanced countries such as United States and United Kingdom. Previous studies by Wongwuttiwat (2009) and Winley and Wongwuttiwat (2012) found that an increase in demand was predicted for versatilists and specialists by IT user- and provider-organizations in Thailand with no change to demand for generalists. However for less developed country such as Myanmar, Lau et al. (2013) concluded that there will be an increase in demand for specialists in Myanmar in the next five years.

The third component of the theoretical framework in the study was derived from prior studies that include Glenn and Gordon (2004), Catanio (2005), Morello (2005), Plummer et al. (2005), Aasheim et al. (2006), Australian Government (2006), Collett (2006), Ekstrom et al. (2006), Westervelt (2006), Bullen et al. (2007), McAdams (2007), Srinutapong (2007), Winley et al. (2007), Wongwuttiwat et al. (2008) and Wongwuttiwat (2009). These sources were used to identify 147 specific knowledge and skill items classified into five categories of domains of expertise. Due to page limitation, the 147 knowledge and skill items are not included in the paper; readers can refer to Lau et al. (2013) for the complete list of the items.

3. RESEARCH DESIGN

A cross-sectional field study was used to collect data from organizations in Vietnam. The questionnaire has been validated in the studies by Wongwuttiwat (2009), Winley and Wongwuttiwat (2012), Lau et al. (2013) and Winley and Wongwuttiwat (2013). Due to page limitation the questionnaire is not included in the paper. Readers can contact the authors for a copy of the questionnaire. Section 1 of the questionnaire addressed characteristics of the respondents and their organizations. In sections 2 and 3 of the questionnaire, respondents rated the current and future importance of each of the 147 skills items associated with the five domains of expertise on 5-point scales with 1 as unimportant and 5 as very important.

The target populations were medium to large organizations operating in eight business sectors: government; banking/finance; manufacturing/engineering; wholesale/retail; tourism/transport; health; education; and ICT. Senior IT professionals were asked to respond to the questionnaire based on their in-depth knowledge of their organizations. Approximately 500 questionnaires were distributed to organizations in Ho Chi Minh City using Vietnam Business Directory in 2011. Valid responses were obtained from 45 organizations with five to six organizations from each of the eight sectors. The response rates of 9 percent was lower than expected and contact with some organizations which did not respond to the questionnaire suggested that this was due to its length and detail.

4. RESULTS ANALYSIS

4.1. Characteristics of Organizations and Respondents

Table 1 shows breakdown of organizations by business sectors. The average number of employees in the participating organizations is 199 and the average number of IT employees is 16; 27 percent of respondents are from local organizations and 73 percent are from international organizations. The ICT sector has the highest ratio of number of employees to IT professionals. On average, the respondents have eight years’ experience in their current position and eleven years’ experience in IT positions. It was evident that the respondents were well qualified and hold IT-related positions in their organizations and possessed the capacity to provide valid responses to the issues examined in the study.

4.2. Comparison of Present and Future Skills in Each Domain

Table 2 shows the percentage of organizations which have indicated an expected change in the demands across four domains (technology infrastructure and services, information design and management, process design and management and relationship and sourcing management) during the next five years in relation to the demand for IT skills associated with the four domains of expertise. The results
show that the majority of organizations have indicated there will be significant increase in demand expected for all four domains.

Cronbach’s alpha is used to test internal consistency of each domain. Table 3 shows the values of Cronbach’s alpha for each domain, indicating high reliability.

For each of the 147 skills items the importance rating was calculated as the mean of the ratings assigned by the respondents. Then based on the value of the mean ratings, the relative importance of the specific item among considered items was determined by its rank position ranging from 1-most important to 147-least important. These ranks were then classified as high, medium or low according to whether the rank was in the top, middle or bottom one third of the distribution of the ranks. Kendall’s tau was used as a coefficient of the correlation between present and future rankings of the items by organizations for each domain separately as well as across all of the five domains. The results are shown in Table 4 indicating high correlation.

### Table 1. Profile of respondents by business sectors

<table>
<thead>
<tr>
<th>Business Sectors</th>
<th>Number of Organizations</th>
<th>Number of Local Organization</th>
<th>Number of International Organization</th>
<th>Average Number of Employees (NE)</th>
<th>Average Number of IT Professionals (NIT)</th>
<th>NIT/NE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>214</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Banking and Finance</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>288</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>ICT</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>68</td>
<td>43</td>
<td>63</td>
</tr>
<tr>
<td>Manufacturing/Engineering</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>68</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Wholesale/Retail</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>62</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Tourism/Transport</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>410</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Health</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>145</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>411</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>45 (100%)</td>
<td>12 (27%)</td>
<td>33 (73%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td>199</td>
<td>16</td>
<td>8</td>
</tr>
</tbody>
</table>

### Table 2. Change in demands of four domains expected in the next five years

<table>
<thead>
<tr>
<th>Domain</th>
<th>Change in Demand Expected by Organizations (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Significant Increase</td>
</tr>
<tr>
<td>Technology infrastructure and services</td>
<td>73</td>
</tr>
<tr>
<td>Information design and management</td>
<td>64</td>
</tr>
<tr>
<td>Process design and management</td>
<td>64</td>
</tr>
<tr>
<td>Relationship and sourcing management</td>
<td>62</td>
</tr>
</tbody>
</table>

### Table 3. Cronbach’s alpha of five domains

<table>
<thead>
<tr>
<th></th>
<th>Technology Infrastructure and Services</th>
<th>Information Design and Management</th>
<th>Process design and Management</th>
<th>Relationship and Sourcing Management</th>
<th>Professional Characteristics of IT Professionals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s alpha</td>
<td>0.93</td>
<td>0.95</td>
<td>0.94</td>
<td>0.96</td>
<td>0.96</td>
</tr>
</tbody>
</table>
Table 5 indicates skills that were ranked of high importance both at present and in the future.

4.3. Sourcing Strategies for the Technology Infrastructure and Services Domain

Respondents were asked to indicate sourcing strategy (in-house or outsource) used by their organizations for the technology infrastructure and services domain. T-test is used to identify skills where the measure for sourcing strategy was significantly different from 3 (p < 0.05). For skills with a measure for sourcing which was significantly less than 3, the strategy is categorized as using in-house approach. Alternatively, for item where the measure for sourcing is significantly greater than 3, the strategy is categorized as outsourcing the provision of the skills. If the measure is not significantly different from 3 then a mixed-sourcing approach, which comprises of in-house as well as outsourcing strategies, is used.

Table 6 shows present and future sourcing strategies and Table 7 shows the twenty-four skills in which the main sourcing strategy identified as using a mixed-sourcing approach at present and in the future. From Table 6 it can be observed that a large proportion of skills in the category of using in-house strategies are also skills that have been categorized as low in importance at present and in the future.

Table 5. Skills ranked as high in importance at present and in the future

<table>
<thead>
<tr>
<th>Domain</th>
<th>Skills that are Ranked High in Importance at Present and in the Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology infrastructure and services</td>
<td>Design Skills understand current/emerging technologies, determine systems requirements. Applications management information (MIS). Networks and Communications Local area network (radio/wireless), Internet, Intranet, file server architectures, email systems. Technologies for Security Networks, data/information. Technical Support Services Networks, end-users.</td>
</tr>
<tr>
<td>Information design and management</td>
<td>The Organization and Its Functions Information requirement, information flows, knowledge management, privacy.</td>
</tr>
<tr>
<td>Process design and management</td>
<td>The Organization and Its Functions Quality assurance. Managing Finances Determine the costs of processes.</td>
</tr>
<tr>
<td>Relationship and sourcing management</td>
<td>The Organization and Its Functions Relationships with partners/alliances.</td>
</tr>
<tr>
<td>Professional characteristics of IT professionals</td>
<td>Personal Traits Organizational awareness, professional and ethical behavior, service oriented, innovative, manage conflict, form good relationships. Problem Solving Expertise Deal with ambiguity, deal with complexity, deal with intangibles, understand organizational/social implications of ICT. Work Environment In multi-disciplinary teams, in cross-functional teams, in cross-cultural environments, with vendors/suppliers, with customers/clients, on multiple tasks. Communication Skills Reading, writing, listening, speaking, fluency in more than 1 language. Scope of Skills and Experience Deep skills and a broad scope of roles and experience.</td>
</tr>
</tbody>
</table>
4.4. Importance of Specialists, Versatilists and Generalists

Table 8 shows the relative importance of the items that characterize specialists, versatilists and generalists. The results show that there is an expected increased in importance in the role of versatilists compared to generalists and specialists.

4.5. Discussions

The discussion in this section is organized according to the five domains of IT professional expertise, namely technology infrastructure and services, information design and management, process design and management, relationship and sourcing management and professional characteristics of IT professionals.

Morello (2005) explained that IT professionals must have an excellent grasp of technology in the technology infrastructure and services domain. Many of the skills associated with this domain are required for technical aspects of systems development and support, especially tasks that involve enterprise wide systems that are critical for continuous operations and functions of the organizations.
Vietnam is a factor-driven economy which relies on cheap labor force and abundant natural resources. Porter et al. (2002) explained that organizations in factor-driven economy have limited role in value chain and are focused on assembly or labor intensive manufacturing activities. The challenge for organizations is to get basic business and production systems working properly. Winley and Lau (2012) also explained that Vietnam may still be lagging behind other more developed country in the region such as Thailand with respect to operational level system. Thus tasks that include design skills in understanding current/emerging technologies, determine systems requirement and management information applications are ranked high in importance at present and in the future. Networks and communications skills also show a similar trend in importance.

Results from this study show that there is an expected increase in importance for the ERP system from present to future. This result is consistent with the observations presented by Pham and Teich (2011) that organizations in Vietnam are beginning to implement ERP system. Pham and Hara (2011) also show that organizations in Vietnam are starting to use modern information systems such as ERP and supply chain management systems to help in standardizing business processes and to provide timely information for decision making. Therefore skills associated with technical aspects of enterprise wide information systems are highly ranked in importance by organizations in Vietnam.

From the sourcing perspective, mixed-sourcing strategy, which consists of in-house as well as outsourcing, is found to be widely used in the technology infrastructure and services domain particularly in systems development, integration of applications/systems, network and communications, technologies for securities and technical support services. Organizations often select outsourcing options when the outsourcing providers are able to provide greater capacity in terms of skills and expertise that are not available within the organizations. The current low ICT skills level in Vietnam, as indicated by the low skill sub-index of ICT Development index, may explain the need to use mixed-sourcing strategy to support an increased demand of specialist technical skills.

Skills in the information design and management domain involve a deep understanding of when and how an organization uses and manages information (Morello, 2005). Results in this study show that skills that are related to information requirement, information flow, knowledge management and privacy are ranked as highly important at present and in the future. The analytical capabilities of organizations can be categorized using five levels of maturity: reporting, analyzing, predicting, operationalizing and activating (Brobst & Rarey, 2003). Among these five levels, the reporting level has the lowest analytical capability. Batch reports are produced to summarize historical data and to answer predefined queries. On the other hand, the activating level has the highest level of analytical capability; capable of automatically link real-time data with business processes to develop dynamic business processes that enable learning and correction of business operations when necessary.

Table 8. Relative importance of specialist, versatilists and generalist

<table>
<thead>
<tr>
<th></th>
<th>Present</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specialists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep skills and a narrow scope of roles and experience.</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Skills recognized only within the ICT work domain.</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Versatilists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep skills and a broad scope of roles and experience.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Skills recognized in ICT and other work domains.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Generalists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shallow skills and a broad scope of roles and experience.</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Skills recognized in ICT and other work domains.</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

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It is likely that organizations in Vietnam are focusing on implementing basic reporting systems such as transaction processing, database and enterprise systems to improve business processes. Consequently, skills in demand are those that focus on internal operations and information flows. Nevertheless, as Vietnam progresses to an efficiency-driven economy in which the organizations will be focusing on achieving efficient production processes and increase product quality (Sala-i-Martin et al., 2011), the level of analytical capabilities in organizations is expected to progress to higher level of analytical capabilities which may result in more widespread use of business analytics tools in the future.

The process design and management domain attracts multifaceted, versatile IT professionals who can visualize and understand process components and establish critical and strategic business processes to promote differentiation and innovation (Morello, 2005). Pham and Teich (2011) reported that organizations in Vietnam have begun to implement enterprise-wide information systems to help in monitoring and evaluating financial performance of enterprises to improve operational and financial performances of the organizations. Thus versatilists who are skillful with technical issues and business strategy skills are expected to be high in importance. According to Morello (2005), it is advantageous for organizations to employ versatilists because a firm can easily redeploy IT professionals based on changes in business requirements. Results in this study show that there is an anticipated increase for demand of versatilists in Vietnam.

In the relationship and sourcing management domain, skills are driven by the need for organizations to work together effectively on growth in external sourcing, shared services, global service expansion, and business value chains (Winley & Lau, 2012). Mixed-sourcing strategy is found to be widely practiced by organizations in Vietnam in this study. Thus skill in relationships with partners/alliances is viewed as highly important at present and future.

Finally, in the domain of professional characteristics of IT professionals, skills that are viewed as highly important at present and in the future will include a wide range of personal and problem solving skills such as innovation; managing conflict; dealing with ambiguity, complexity and intangibles; working in multi-disciplinary, cross-functional, cross-cultural environments; and dealing with vendors and customers. The results presented in this paper show that IT professionals that possess deep skills and a broad scope of roles and experience will be in high demand. In addition communication skills such as reading, writing, listening, speaking and fluency in more than one language are also ranked as highly important in the domain of professional characteristics of IT professionals. In a study by Tran (2013), it is reported that current university curriculum and traditional teaching method in Vietnam have not positively supported soft skill development among university students and employers desire for employees who can demonstrate high levels of independence and flexibility in their thinking. The results in this study reflect similar trends and expectations for IT professionals in Vietnam. In addition Nguyen (2009) also identifies the importance of proficiency in English language in the ICT professions which is consistent with the importance of fluency in more than one language identified by the respondents in this study.

Although this study is limited by its small sample size, results presented in this study can help organizations in Vietnam to gain insight into IT workforce planning due to the extensive skills and knowledge items included in the questionnaire. For organizations that aim to progress from operational control to integration of enterprise systems to achieve better management control and standardization, skills which have been identified as highly important in the future can serve as an input for ICT workforce planning to enable organizations to respond to and facilitate strategic staffing planning for future IT workforce and to assist with identification and management of IT professionals with skills and knowledge critical for effective business processes. According to Bodewig and Badiani-Magnusson (2015) the skills of the workforce will determine the pace of Vietnam’s continued economic modernization. In order to equip the Vietnamese workforce with job-relevant skills that are demanded by the employers, it is important to identify job-relevant skills for future workforce planning. In a presentation by Nguyen (2009), it is explained that the ICT professionals in Vietnam
were trained by higher institutions such as universities. However Bodewig and Badiani-Magnusson (2015) reiterate the importance of working together with the employers to enhance capacity to build job-relevant skills and reduce acute skills gaps currently faced by employers. This study contributes to development of IT professionals in terms of expected important skills and knowledge relevant to organizations in Vietnam. It is proposed that future research is to be conducted by mapping skills and knowledge that have been identified as important in the future with the IT course curriculum offered by the universities in Vietnam; this analysis can reduce skills gaps between expectation of employers and potential IT graduates.

5. CONCLUSION

There is limited research on comprehensive analysis of ICT skills demand in Vietnam, whereas research reported in the literature have mainly focused on ICT adoption such as outsourcing, e-commerce, knowledge management and enterprise resource planning. This study has investigated expectation in IT skills in Vietnam based on five domains of expertise. Results from this study show that there is an expected increase in demand for skills in the technology infrastructure and services domain, in particular for technical skills that are necessary for systems development and networks and communications. Skills which emphasize transactions processing information systems reflect the expected IT demand in factor-driven economies such as Vietnam in which the challenge for any organization is to get basic business and production systems working properly. Mixed-sourcing strategy is reported to be widely used by organizations in Vietnam as a way to provide greater capacity in terms of skills and expertise that are not available within the organizations.

Other qualities that are ranked as highly important by IT professionals in Vietnam include skills in understanding current/emerging technologies, management information system, networks that include local area network, Internet and Intranet in the technology infrastructure and services domain; information requirement, information flows, knowledge management and privacy in the information design and management domain; quality assurance and determining the costs of processes in the process design and management domain; relationships with partners/alliances in the relationship and sourcing management domain. In the domain of professional characteristics of IT professionals, broad and extensive skills expected from the IT professionals include problem solving, working in multi-disciplinary teams, innovation and possessing deep skills and a broad scope of roles and experience. The important skills identified in the domain of professional characteristics of IT professionals are consistent with the expected increase in importance for IT professionals in the role of versatilist. The results also show that mixed-sourcing strategy is widely practiced by organizations in Vietnam as a way to support an increased demand of specialist technical skills.

This research contributes to the investigation of IT skills in developing countries in general and in Vietnam in particular. This study contributes to development of IT professionals in terms of important skills and knowledge relevant to organizations in Vietnam. Future research can be conducted by mapping skills and knowledge that have been identified as important in the future with the IT course curriculum offered by the universities in Vietnam with the aim to reduce skills gap between expectation of employers and potential IT graduates.
REFERENCES


**Sim Kim Lau** is a senior lecturer at the School of Information Systems and Technology, University of Wollongong. *She has published widely in the discipline of information systems. Her research interests include IT in developing countries, health informatics for the disability sector and ontology.*

**Graham Kenneth Winley** is the Professor of Information Technology in the Faculty of Science and Technology at Assumption University, Thailand. *He has published extensively on systems modeling, the adoption of information technology in organizations, and the knowledge and skills requirements for information technology professionals. He has a special interest in these issues in the context of developing nations.*
Nelson K. Y. Leung completed his PhD from University of Wollongong and is currently working as a lecturer at Swinburne University of Technology. He has taught and coordinated a variety of courses and published widely in refereed books, journals and international conferences. Additionally, he also serves as an Adjunct Researcher at Payap University, Editor for Interdisciplinary Journal of Information, Knowledge and Management and Editor-in-Chief for International Journal of Intercultural Information Management. His past professional activities include serving as the Conference Chair of ICIME 2013 and Founding President of the Vietnam Chapter of AIS.

Nicole Tsang has more than five years teaching experience in Australia and Vietnam. She completed a Master of Information Systems from Griffith University. Her interests have gravitated toward user experience and interaction design, ubiquitous computing, information visualization, knowledge management, and socio-cultural issues in technology. Her researches have been published in journals and international conferences.

Sim Yee Lau is a Professor at Reitaku University, Japan. He teaches international economics, development economics and Southeast Asian studies in the Faculty of Economic and Business Administration, and Asian economy in the Graduate School of Economics. In recent years, his research focus is on international cooperation and development in Southeast Asia, international trade and investment in Asia, regional cooperation and economic integration in Asia, East and Southeast Asian economic affairs. He holds a PhD in International Cultural Studies from Tohoku University, Japan. He also received a Master of Engineering and a Bachelor of Engineering from Tokyo Institute of Technology, Japan.