Information and communication technology workforce employability, Khyber Pukhtunkhwa, Pakistan

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Abstract

The purpose of the study is to know information and communication technology workforce employability in Pakistan, to spot the causes that persuade the development of skill gaps in the information and communication technology workforce, and to find out ways to reduce these gaps. The methodology of the study comprises project reports and a literature review. The findings show that not only Pakistan but also China and Sri Lanka are facing the challenges of demand-supply gap as regards a quality information and communication technology-connected workforce. The study also shows that these countries do have similar obstacles and issues of satisfactorily qualified and practiced information and communication technology graduates. This study suggests that in light of the skills demanded by industries and organizations, information and communication technology workers could be trained through an updated course curriculum in line with the needs of industry. The employability of the workforce in general has been discussed in many papers. This paper specifically discusses employability issues of the information and communication technology workforce, and provides standards to information and communication technology educators and employers, as well as to possible information and communication technology graduates.

Key words: Information technology, Educational institutions, Training, Curriculum, Skills, Pakistan, China, Sri Lanka, Labor specialty.

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Introduction

Information and telecommunication technology has developed into a key enabler in business success, and an important element in the base of today's forceful business environments (Bailey & Mitchell, (2006). As information and telecommunication technology offers more opportunities and tactical value to organizations, the demand for quality information and telecommunication technology professionals is growing every day. Although institutions create information technology graduates, there is a scarcity of quality information and telecommunication technology graduates (workforce) produced by institutions to meet unmet demand (Birrell et al., 2003). As a result, the issue of the non-employability of the information and telecommunication technology workforce has risen. The accepting of employability should be clear in this facet and can be defined as the degree to which employees have skills that the marketplace and employers regard as desired features (Scholarios et al., 2004).

The reasons for the back focusing on information and telecommunication technology workforce employability are:

• The sufficient supply of a skilled information and telecommunication technology workforce.

• The operation of information and telecommunication technology skills to a greater degree, since they help to drive economic growth in every country (Scholarios et al., 2004).

From the overall viewpoint, the information and telecommunication technology workforce has established itself to be a vital resource as a business and information technology strategy are professed to be probably allied to each other.

The skills gap among the information and telecommunication technology workforce creates differences in earnings. Over the past 30 years the earnings inconsistency between high and low skilled workers has increased in the USA and to a lesser degree in Europe (Mahony et al., 2008). This factor has led to the increased demand for skilled employees and the demand for an information workforce has increased greater than the supply of a skilled workforce. Although many

developing and developed countries are supplying information and telecommunication sectors workforce at a high rate to meet demand, the gap between demand and supply is still widening owing to information and telecommunication sectors graduates (soft and technical skills). The situation of information and telecommunication sectors workforce employability in the framework of Pakistan is quite similar to China and Sri Lanka. The demand for information workforce in Pakistan has increased in the recent years, but supply has not. Those graduates who are unemployed are those who do not meet industry necessities.

Information and telecommunication sectors workforce

Before comparing and communicating the similarities along with Sri Lanka, China and Pakistan on the issue of information and telecommunication workforce employability, it is necessary to provide a brief and simple definition of an information and telecommunication workforce. An information and telecommunication workforce is composed of organizational employees undertaking designing, building, testing, maintaining and operating organizational applications and infrastructure. People who perform similar tasks to those mentioned above but who are positioned in a functional area within the organization, such as marketing, are also information technology workers. However the definition sometimes is unclear, as more workers in all fields increasingly attempt to shift their roles toward information processing (Pfeffer, 1998). Central to the concept of the information technology workforce are employees who are assigned to manage information systems (IS) or data processing departments for developing new applications, integrating diverse vendor products and maintaining an information infrastructure at firms whose main products may not be information and computer oriented (Niederman and Crosetto, 1999). Hence, the definition and nature of the information and telecommunication workforce for this study will refer to those workers who are honestly concerned with the creation of new information technology and the preservation of accessible processes. However, this boundary of understanding of the information and telecommunication workforce may vary from organization to organization depending on the type of organization and roles of its employees.

Information and telecommunication sectors workforce employability

Following we outline the conclusion concerning the demand and supply of information and telecommunication workforce mutually with the skills gap, bridging this gap, and government initiatives in the context of China, Sri Lanka and Khyber, Pakistan.

Information and telecommunication workforce demand in China, Sri Lanka and Pakistan.

The information and telecommunication field is flourishing by almost any standard worldwide. The scenario in China is not different from that growth. "The number of workers in the computer and software industries has almost tripled in the past decade" (Freeman and Aspray, 1999), and according to the projections by the Bureau of Labour Statistics for the period 2000-2010 (Noll and Wilkins, 2002), computer-related vacancies occupied eight of the top ten positions among the fastest growing occupations. Those computer-related occupations included software applications engineers, support specialists, systems software engineers, network and systems administrators, network systems and data communications analysts, desktop publishers, database administrators, and systems analysts (Noll and Wilkins, 2002). From the projection by the department of Labor Statistics above, it is clear that the demand for information and telecommunication workforce will be elevated in China in the coming years. The situation in Sri Lanka is not much different from the China perspective. Although the number of information and telecommunication graduates has enlarged quickly in the past decade, it is still a very small number compared to the overall number of graduates emerging in various fields in Sri Lanka. On average each year, more than 2.5 million university graduates are produced in India, out of whom 20 per cent (0.50 million) are from technical majors. According to the National Association of Software and Services Companies (NASSCOM; only 25 per cent of those technical graduates (125,000 out of 0.50 million) are from engineering majors, and approximately 15 per cent of the rest of the two million graduates (300,000) are considered employable by fast-growing IT companies. However, the remaining 75 per cent of technical graduates (375,000 out of 0.50 million) are unemployable. Therefore, the demand for a skilled information and telecommunication workforce remains high in China due to information and telecommunication graduates' deficient soft and technical skills. From the Pakistani perspective, information and telecommunication or computer-related work opportunities have increased rapidly, even though there was a worldwide economic downturn in 2009.

Information and telecommunication workforce supply in China, Sri Lanka and Khyber Pakistan.

Knowing the demand, it is then necessary to know the supply side of the information and telecommunication workforce. From the China perspective, the current demand for skilled telecommunication workers is greatly exceeding predictions, whereas the supply of skilled information and telecommunication graduates is not that high. One of the main causes is that the capacity of China's training institutions is not sufficient to meet demand. This helps us understand the clear evidence of both the increased number of job vacancies that evidences the high demand, and on the other side, recruitment problems in the computing field due to a lack of a supply of skilled workers. As a result of that evidence, alarm bells have been ringing in both industry and government sectors in China. The situation is that if China cannot produce the required number of information and telecommunication professionals, then its capacity to be a competitive global player in knowledge industries may be under threat (Birrell et al., 2009). The supply of the information workforce in Sri Lanka seems to be the same as China. There was a shortage of supply in previous years. The National Association of Software and Services Companies (NASSCOM) predicted that India's IT sector was expected to face a shortfall of half a million professionals by 2010, while it was suggested by an International Data Corporation (IDC) report (Cisco, N.D.) that Sri Lanka was expected to experience a shortage of 118,000 skilled IT networking professionals in the year 2008 alone. The situation for the years 2009 and 2010 is still unknown, but perhaps through forecasting of the information and telecommunication workforce in Sri Lanka, it may have been that current demand was met. The scenario in

Pakistan is surprising too, as Pakistan has addressed the shortage of a skilled information and telecommunication workforce.

Skill gap among the information and telecommunication graduates

A skill gap is defined as a shortage of skills in any graduate needed by industry, at the time of appointment as an information and telecommunication worker. There is a huge shortage of skilled information and telecommunication workforce in China, although universities are producing quite a large number of graduates; however, the skills gap among these information and telecommunication or computer related graduates is wider. A similar scenario is also found in Sri Lanka. There is a wide skills gap among the information workforce in Sri Lanka. One of the main causes for the skills gap lies in the quality of talents being produced(Cisco, N.D.). It is not surprising that Pakistan too has a huge skills gap in the information and communication technology workforces. Government and industry have addressed the information and telecommunication skills shortage, and Pakistan Higher Education commission (HEC) has signed an agreement with networking solutions firm Cisco to help address the country's growing information and communication technology skills shortage (Kumar, 2010). Thus, it is clear that in all three countries (i.e. China, Sri Lanka and Pakistan) there is a shortage of skilled information and telecommunication graduates among the overall workforce.

Bridging the skills gap and government initiatives

In China, in response to the shortage of skilled information and telecommunication workforce, the government has announced a series of initiatives and approaches related to information and telecommunications. First of all, these initiatives included more research on the skills needed and a survey to understand student demand for computing courses in universities, as many qualified students cannot secure a place in particular courses. Secondly, there was expected to be better information flow between industry and the higher education institutions to encourage more appropriate training programs for the students of computing on a regular basis. The third initiative was to improve communications between industry and educational institutions, such as industry-funded internship programs for undergraduates and graduate students and perhaps industry-university partnership in teaching and learning. Finally, the Chinese government launched an initiative from an immigration point of view to understand the opportunity of overseas students to go to Australia to study in computing-related fields that would allow those students to apply for permanent residence under the skilled Chinese linked and independent categories directly upon completing their courses. In all these ways, the Chinese government initiated essential steps to reduce the gap in the information and telecommunication skilled workforce (Birrell et al., 2001).

In the context of Sri Lanka, a good initiative has been undertaken to engage industry and academia to develop an updated curriculum focusing on industry demands for students in information and telecommunication-related fields. The current state of the information and telecommunication workforce in Sri Lanka shows a compelling case for public-private partnership through industry-academia alliances to enhance capacity development amongst university students. As well as the industry-academia memorandum, NASSCOM's IT Workforce Development (ITWD) program is specifically designed to address the issues and concerns of the industry as well as the challenges and opportunities of the higher learning institutions. Many IT companies have partnerships with engineering colleges, and about 20 universities have established expanded engagement between industry and the academic world to create universally accepted benchmarks such as some certifications and policy-driven changes in academic curriculum (Cisco, 2003). Therefore, educational institutions can now update their syllabus for certain specialized academic courses in order to make them more relevant to meet industry needs, with regular revisions and updates from high-profile corporate professionals who have a deep understanding of current business developments and various technical standards around the world.

Discussion on findings

China has a lack of IT training institutions as well as low enrolment opportunities for talented students in universities for information-related programs. Sri Lanka has a very low percentage of students entering higher education. However, Pakistan has a small number of skilled information and telecommunication professionals. Graduates are coming out of each higher learning institution, but the question is whether they have the quality skills that are required by employers, or whether there is a skills gap between what skills are currently in demand and the skills that university graduates possess. The answer is yes, there is a huge gap between demand and supply in the information and telecommunication workforce in Pakistan. In most cases top IT companies prefer graduates from certain universities due to the perceived good quality of their graduates. This scenario may not have happened if there had been a strong understanding and good relationships among universities and industry in Malaysia. India could be a good example here. In India links are maintained among the engineering colleges and industry, together with 20 universities collaborating in order to exchange ideas, information and knowledge to try to reduce the skills gap of the information and telecommunication workforce.

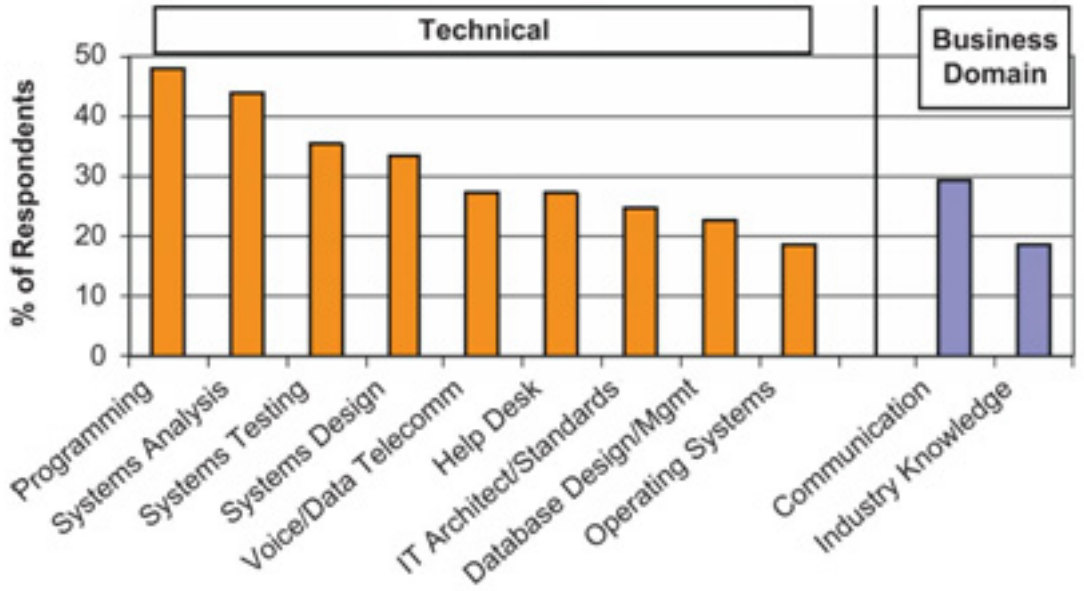
There is also a need to ensure that Pakistan's young people and graduates are sufficiently skilled and well trained to meet the demands of the job market. Information and telecommunication graduates should not only have the relevant paper qualifications but should be suitably skilled in the practical and commercial aspects of business. Therefore, the potential information and telecommunication graduates need to have a proper mindset based on the current and potential market demands. Some higher learning institutions have established training institutions or departments such as a Centre for IT Advancement to a Centre for IT Excellence in order to offer professional and practical IT courses, and vocational training courses, but they still are very few compared to the number needed to meet the demands of the market. Thus, creating and maintaining industry-academia ties is very important in this regard.

Table 1 presents a summary of these discussions.

Table 1: Comparison based on the specific criteria found in the study

No.	Criteria	Pakistan	China	Sri Lanka
1	Low enrolment in IS program Public-private partnership: memorandum between	✓	✓	✓
2	Industry and academia	X	X	✓
3	Demand for skilled ICT workforce	✓	✓	✓

Figure 1: Top entry-level skills desired by the employers



Implications for higher education

According to the study conducted by Abraham et al. (2006), the top entry-level skills desired by employers are programming, system analysis, system testing, system design, voice/data telecommunication, help desk, IT architect, database design and management and operating systems in the technical domain; and communication and industry knowledge in the business domain (see Figure 1).

After determining which skills are very important for fresh information and communication technology graduates to obtain, we now aim to understand how the most desired entry-level skills provide useful insight into the value of IS or IT programs at the undergraduate and graduate levels. Initially, the basic technical skills are those required of entry-level employees; these are the most likely to be outsourced in larger organizations. Thus, we can conclude that there will be little opportunity for technical graduates at larger firms. This may vary depending on the curriculum of the IS program. The more significant message is that

in most cases IT senior management want to hire information and communication technology or information system (IS) graduates with a foundation in technical skills, but also with knowledge of the business domain and project management skills, and in addition, the capability to work closely in a team in non-technical departments.

From the context of higher learning institutions, having IS programs in business schools is the right approach to preparing tomorrow's information and communication technology workforce by teaching technical skills together with business fundamentals, analysis and design, and the capabilities to communicate and work on projects effectively through learning project management skills. In many universities, the information systems programs offered in the business schools are designed to emphasize a combination of skills and capabilities for students. The aim of IS programs is to produce graduates with adequate technical knowledge to manage IT and understand its critical role in the organizations.

Understanding the alignment of information systems to business is vital in IS programs. This orientation equips IS graduates with a diverse and more relevant set of skills and capabilities as compared to those acquired by a graduate with a computer science degree, which teaches technology without having a solid grounding in the areas of management and business. Thus, it is suggested that each business school has an IS program that is developed with an influence of both technical and soft skills that will suit IS graduates in any business organization.

Conclusion

Information and communication technology workforce employability is not only an issue for Pakistan, but also for China and Sri Lanka. The employment market for information and communication technology graduates in Pakistan is competitive, as are other sectors. It is important to realize that the demand for skilled information and communication technology graduates and IT professionals is very high, even though universities are producing quite large numbers of information and communication technology graduates per year. However, in terms of quality, most of those graduates do not meet the skill requirements desired by IT employers. The dilemma is that what industry expects from potential graduates in most cases is unknown to the universities, and what universities are producing seems not to be welcomed by IT employers in many companies. This scenario may not be true in all cases, but is in the majority. This study has pointed out why the demand-supply gap is getting wider, and how Pakistan especially could overcome this situation. While key players in the country, such as the government, universities and industry, are aware of and inclined to bridge the skill gap of information and communication technology graduates, there is no satisfactory strategy in the first place that would allow universities and industry to play their roles effectively. Therefore, this study provides some implications for higher education, and proposes recommendations for IS curriculum reform based on the business context in Pakistan.

In a triangulated approach, government, universities and industry need to sort out the shortage of a skilled workforce in the future. A collaborative link and an agreement to produce graduates with the required skills to meet the future demands and contribute to the economic growth of Pakistan is needed.

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