The Malaysia IT Outsourcing industry skill-sets requirements of future IT graduates

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Abstract: IT changes very quickly and influences business, industry and the public in an enormous manner. The issue of IT outsourcing (ITO) impact on IT workforce has been discussed widely in many developed countries so much so that the concerns have been tense in that more IT jobs will be transferred to developing countries which provide IT outsourcing services. In addition, with the growth of IT outsourcing and emerging new outsourcing business models such as utility demand, application service provider, business process outsourcing, offshore outsourcing and many more servicing different industry vertical sectors increase the demand for multiple IT skills and capabilities of IT workforce. In this study, we review relevant literature, newspapers and non-academic articles, websites of companies, governments and non-governmental organisations and others. An outsourcing Malaysia (OM) CEO roundtable discussion is also held to get inputs from the practitioners on the topic. In addition, we seek in-depth insights from seven senior executive managements in service provider firms on the skill sets requirements of fresh IT graduates to fulfill the market needs of IT outsourcing in Malaysia. The four-member research team found that technical, soft and problem-solving skills are the main concerns raised by the key informants. This is in line with the literature review and also the present higher education policy concerns by the Malaysia government.

Keywords: Malaysia, IT outsourcing, skill-sets, workforce, curriculum, developing country

1. Introduction

Information Technology (IT) changes very quickly and influences business, industry and the public in an enormous manner. Outsourcing of IT jobs to cheaper overseas labor and globalization of IT companies become a common practice nowadays. An excerpt from Society for Information Management (SIM) [19] Report, 2006: "Paradigm shifts from rapidly changing technological and business environments dictate that IT professionals adjust their skills and capabilities to effectively support their organization's mission. Global IT sourcing, the shift from IT services to business process services, pending baby-boomer retirements and declining IT enrollments in U.S. and European universities are prompting fundamental changes in the nature of IT skills and capabilities available to and desired by both vendor and client organizations. The resulting potential for a mismatch of supply and demand is a source of concern for business executives and academics alike." The study reports of increased IT hiring and also of evolving needs for more business knowledge and project management skills in the US IT workforce. Experts predict that although many entry-level jobs are being moved offshore, there is a looming shortage of technical workers in the US [9] [14] [16].

Recent media reports on the aggressive initiatives by Malaysia to become the top shared services and outsourcing (SSO) hub in Asia has opened up the issue on IT workforce to complement this noble business move by the government. The global worldwide SSO market is expected to grow at a CAGR of 15 per cent over the next few years, reaching USD1.43 trillion by 2009 as compared to USD930 billion in 2006. "The outsourcing need is growing and we intend to fully leverage on our achievements to meet this need," said Multimedia Development Corporation (MDec) Chief Executive Officer. He added that ICT services like SSO contributed MYR2.8 billion to the Malaysia Gross Domestic Product of MYR495.6 billion. Outsourcing Malaysia and PIKOM chairman, cited that the local SSO industry is currently worth USD300 million growing at a CAGR of 30% year on year, compared with the current global IT outsourcing size of USD24 billion. In 2012, the Malaysian SSO industry is targeted to be worth USD2 billion providing 300,000 jobs.[1]

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Multimedia development Corporation (MDeC) is a government arm charging the MSC Malaysia flagship initiatives since 1994. "The MSC Malaysia Initiative was launched as a catalyst to the national ICT agenda and Multimedia Development Corporation (MDeC) was formed to drive the development of the MSC... ", said The Fourth Prime Minister of Malaysia on 10th MSC Malaysia Anniversary. There are seven flagships being developed under this initiative which includes Telehealth, eGovernment, MyKad and Smart Schools. Thus, MDec has been promoting SSO in different vertical sectors, such as finance, logistics, transportation, energy, technology, manufacturing and healthcare, either domestically or internationally. To ensure high standard of services and capabilities, 60 MSC-status companies, out of a total of 2,600 in MSC directory, are from world-class organizations. In addition, local companies having Capability Maturity Model (CMM) certificates level 2 at least are rising.

Due to high and rising demand for new breed of entry-level IT workforce supporting middle and higher management levels in ITO industry, the government has embarked on many drives and initiatives to enhance the skill-sets and capabilities of new IT graduates through the MDec's Knowledge Development Institute's (KDI) programmes for instance. "An ICT Development Institute will be established to increase the supply of K-Workers by providing the skill sets required by the ICT industry, especially shared services and outsourcing companies" said YAB Dato' Seri Abdullah bin Haji Ahmad Badawi, The Prime Minister of Malaysia in Budget 2006 Speech. Nonetheless, it is clear that industry involvement is a very valuable part of the educational process, particularly in technical fields that are prone to rapid change.

In search for current and future skill sets required for these ITO vertical sectors, we aim to investigate in Malaysia context the following research question:
R1: What are the skill sets of IT graduates required by the ITO industry in the different vertical sectors?

The study is exploratory-descriptive in nature over a period of two years. This report presents the literature review and findings to answer the research question on skill-sets and capabilities of IT graduates.

2. Literature review

Past studies on IT skills often debate whether IS personnel should have technical skills, business skills or both [5]. Some studies note the importance of technical skills [15] [20] [21]. Other studies also note the criticality of "soft" skills such as business knowledge and interpersonal skills [4] [10] [15]. The only common finding from past studies is that over time IS professionals are expected to have more diversified skill sets [8]. IT taxonomies used in the previous studies anchored on different career levels, job domains, task types, and responsibility levels. While there are some commonalities among them at a bird's-eye view, details are different.

Skills are defined by what someone has to accomplish, by the tasks that need completion, and/or by business goals. That is, a skill is directly tied to a task outcome. Proctor and Dutta [18] characterize skills as something that are not innate but must be learned. In their view, skills are developed to meet task needs. Thus, they define skills as "goal-directed, well-organized behavior … acquired through practice and performance with economy of effort."

Benamati and Mahaney [3] investigated current and future entry-level IT workforce needs in organisations. They attempted to answer two prevailing questions: (1) How are entry-level IT positions evolving? and (2) How well prepared are today's MIS graduates for these positions? In doing that, they interviewed thirteen IS executives in the US organizations to learn their views on the state of the entry-level IS job market and what skills IS graduates lack most at that time. Their findings revealed that programming skills are still needed, and project management skills are both highly desired and lacking. Other soft skills, such as communications skills, business knowledge, and leadership skills are also desired and, like project management, projected to increase in importance.

SIM 20-US and European investigator-team conducted the research in 2005 and found that the skills and capabilities identified by respondents as being sourced to independent contractors or third-party providers are technical in nature. Overall, the data paints a picture of IT managers building an organization of IT professionals who know the industry and business and who can work well with clients and colleagues. However, of significant concern is the apparent divergence between entry-level skills sought by organizations and skills identified as critical to keep in-house, raising questions about how to

groom staff from one to the other as they move through the pipeline.

• The majority of respondents indicated that they primarily sought technical skills in entry-level hires. When skills sought in entry-level hires are compared to the skills identified as critical to keep inhouse in 2005 to 2008, there is a striking disconnect.

• Communication was identified as the skill most lacking in entry-level hires.

• Typical entry to the IT workforce is from college graduates although many organizations accelerate this process through internship programs, resulting in college graduates that can enter the workforce at a more advanced level, due to the skills and experience acquired during their internship.

• Overall, respondents are not concerned with the supply of entry-level candidates; which may be a result of lower levels of hiring over the past few years and a lack of awareness of diminished IT-related enrollments.

Hence, graduates of IT university courses must be well prepared to address the needs and expectations of business, industry and everyday life. Many factors in an Information Technology curriculum influence graduates' professional preparation and image. The most important of them is to reflect technology change, the current state of knowledge of computing, business and industry demands and students' expectations.

3. Methodology

In the effort to undertake this exploratory study, we reviewed past literatures, newspaper and non-academic articles, relevant websites such as companies, universities, ministries, government and non-governmental organisations and others. We also held an outsourcing Malaysia (OM) CEO roundtable focus group discussion. From the roundtable discussion, we arranged series of in-depth unstructured interviews (similar to methodology adopted by Nakayama and Sutcliffe [17]) with seven senior executive management in ITO service provider firms in Klang Valley to get in-depth insights and ascertain the nature of entry-level positions and expectations in the ITO field. The sample was carefully selected from a list of ITO service provider firms in two relevant and well-known directories. These two groups were selected to represent diverse industries

and organizations of different sizes and vertical scope to ensure that the researchers observed a broad view of the evolving entry-level positions in the field.

The research employed unstructured interviews with seven senior executive management in ITO service provider firms in Klang Valley to get in-depth insights and ascertain the nature of entry-level positions and expectations in the ITO field. The sample was carefully selected from a list of ITO service provider firms in two relevant and well-known directories. These two groups were selected to represent diverse industries and organizations of different sizes and vertical scope to ensure that the researchers observed a broad view of the evolving entry-level positions in the field.

Subjects were solicited via emails containing a brief explanation of the study and formally soliciting participation in an interview. The letter guaranteed the anonymity of each individual. Willing subjects then received follow up phone calls or emails from the researchers to answer any questions and schedule interviews at a convenient time and place. All seven of the executives contacted agreed to participate for the study. This enthusiastic participation indicated great interest in the research topic.

No interview questions were given to each interviewee prior to any appointment. This is purposely planned to avoid any creative or inventive biased responses and also to really get their in-depth valuable and rich insights and experience on the topic. The interviews lasted an average of one hour. In most of the meetings, at least two researchers were present. The researchers began the interviews by explaining the purpose of the study and clarifying the subject's role in the study before asking questions. The interviews started with general questions and where appropriate the researchers guided them to get more focused and enough explanation on the areas. All the interviews were audio-recorded and transcribed except in three occasions due to technical problems. Subject demographic is shown in Table 1 below.

4. Findings

Client services department of MDec in 2004 conducted a survey to 760 MSC-status companies with 87% response rate. The survey shows that 59% of the respondents indicated that Malaysia does have the ability to supply sufficient number of ICT talents for MSC status companies. The most wanted technical skills are (i) Software Programming, (ii) Database & E-Commerce, (iii) Software Engineering & Project Management, (iv) System Administration, Networking & Telecommunications and (v) Creative Multimedia and Security. Writing and communication skills, however, seem to be the major skills that we are lagging in [2].

We then arranged a meeting with a few MDec Knowledge Development Institute's (KDI) executives to get more information on their initiatives. KDI is a department within MDec solely responsible on development of knowledge workers. We were informed that KDI has launched and offered a few programmes for skills developments such as USP, GSP and Job camp. They are also building up a Development Centre for this purpose. It is informed that, in 2007, MDec conducted a similar survey to 2004 survey. No detailed information on the methodology or any theoretical foundation for the survey is available to us. The summary result shows that, not surprisingly, the top most sought after skills by employers are ability to communicate effectively in English. This is because English is the business language in Malaysia and most local and foreign clients prefer using English as a medium. The second top skill responded by the respondents are Java technologies skills. This is probably due to Java is the latest fourth generation language adopted in businesses and universities. This is then followed by Microsoft technologies. Even though open source is fast catching up with Microsoft, the business communities are largely still using Microsoft proprietary technologies with a little premium. Other top ten skills listed in the survey are Animation, Operating Systems, Helpdesk Management, Business Analyst, Network Design/Management, Project Management, Data Warehousing and SAP Packaged Implementation. However, these skills categories are not according to those categorized in past literature.

To support the MDec's 2007 survey findings, we further interviewed seven ITO firms senior management. The respondents described a variety of knowledge and skills desired in fresh IT graduates entering their organizations. One thing was obvious, company needs vary. There were, however, common themes that emerged from the discussions to help answer our research question. The summary of the common themes, skills and capabilities and entry-level positions matching are tabulated in Table 2.

The overall views of the respondents are the need for technical, soft and problem-solving skills. Communication and multi-lingual are mostly cited responses.

All the key informants describing the services offered by their firms indicate that both technical and non-technical skills are necessary for ITO implementation. Technical skills and capabilities include programming, databases, multimedia subject, laboratory simulation, practical exposure, professional certification while non-technical/soft skills include communication skills, English and other languages proficiencies, writing skills, thinking ability and business skills.

Most entry levels are given trainee positions, assistance of senior personnel, office duties and others initially. The vast majority of companies still put high priority on graduates with programming skills of some sort. The preferred current programming languages mentioned include Java, php, visual basic, C#, SQL server and .Net while SAP knowledge is still widely sought for by employers. In SP3 firm, the respondent highlighted the firm's noble intention in retraining the staff with new skills or certification, efforts by MDec to certify as many MSC-status member companies and equip their staff with relevant professional certificates, recommended for ITO practices. SP2 informant stresses that his firm only sent senior experienced staff to meet, negotiate, solve problems or work onsite at clients' premises. The new inexperienced or little experienced hires are commonly given basic or introductory responsibilities in order for them to be more comfortable and confident with the tasks. They are most often placed to work in the firm's offices under supervision of each line supervisors or managers.

SP5 informant said "we prefer professionals … who can communicate and solve problems well". In another instance, SP1 interviewee mentioned on the skills such as ability to express, high confidence, problem solving, multi-lingual as the important skills in IT graduates. He continues "in universities, students do laboratory

simulation but in practical works, they do it live… Like surgeons who do heart operation live, engineers also do live operation on clients' systems, workstations or data. They cannot make mistakes which is detrimental…".

5. Discussion

Past researches on skills and capabilities of IT graduates emphasize more on the technical knowledge and capabilities. Clearly, there is still a need to understand programming by IT/CS undergraduates majors. Although many of the companies were not hiring graduates to write programs, most felt an understanding of programming was essential. One subject stated, "We look for technical expertise, a good foundation in programming - .Net, Visual Basic, C#, or SQL Server, [although] we are not looking for 'heads down' programmers." Another stated, "They must understand programming, but not necessarily be good at it." Other technical skills that were mentioned multiple times were Web knowledge, database, security, and hardware [19].

Not forgetting the recent ITO phenomenon and the changing business strategies and technologies, the emphasis on non-technical or soft-skills begin to appear. IT graduates are nerd but instead a representation of their organizations. Practically, companies appear to be looking for real-world experience in either internships or volunteer work. There is a consensus of the importance of oral and written communication, and teamwork. Companies also desire that recent graduate exhibit the potential to become project leaders with backgrounds in project management and business knowledge.

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Ferguson's [6] [7] survey reveals a greater importance of almost all background areas. Without adding courses the challenge to educators in the field becomes how to integrate the development of oral and written communication, teamwork, project management and business knowledge in addition to the technical skills in an already crowded curriculum.

The recommendations for academia to do differently to help prepare students include increased focus on experiential learning. This means that there should be more and formalized internship and coop programs to help students gain experience. Several of the companies rely on internships and coops heavily in their current recruiting models, hiring the majority of their entry-level workers after "test driving" them through internships or coops [19]. In addition, most companies suggest for the increased focus in MIS curricula. Consistent with earlier responses, suggestions for non-technical skills or knowledge outnumbered technical skills and knowledge more than two to one.

Non-technical skills – project management, business knowledge, and understanding methodologies – were the most agreed upon areas for improving the preparation of MIS graduates. This is very consistent with the experiential learning suggestion above. These skills take experience to really understand and master. Communication and a global awareness or perspective was also identified by multiple companies.

Technical skills were a mixed bag of mostly infrastructure technologies. This was consistent with answers to the earlier questions. Surprisingly, two subjects discussed a growing need for mainframe skills that is currently not filled. Although eight of the ten companies specifically identified programming as a currently desired skill, none suggested that more programming was necessary. A director of Application Development for a consumer research firm did ask that MIS should "…not simply produce consultants…" and stated "… MIS professionals must be passionate about both technology and business [19]."

From the findings and literatures, we are able to induce that employers generally look for total package of personality, experience, general potential and aptitude in incumbent candidates. This is because none of the professionals were performing the same duties that they had when they graduated from school. This is probably the reason why they cannot pinpoint details of their personal IT skills portfolio. Too many changes in duties occurred to make such an exercise meaningful [17].

We, therefore, agree with many earlier researchers that, from the information obtained from the interviews and other sources, IT professionals and

managers do not need a micro-focused IT skills framework. They need a macro-focused, directional IT skills management framework that gives some focus on IT talent acquisition and management. This is in line with the holistic approach endorsed for IT retention policies.

6. Implications for future researches

The study provides inputs to the responsible ministries and agencies responsible for skill-sets developments among Malaysians to investigate further on the nationwide studies on skill-sets continuous improvements. As a result, the responsible agencies have sought for contract researches in the university to undertake further researches on all aspects of skills among Malaysian.

In [1], we studied on IT Education in light of ITO industry and compared two Malaysian public universities' Bachelor of IT and Computer Science curriculum which each course is designed for its specific purpose and not comparable like-with-like between the two curriculums. Institutes of Higher Learnings (IHLs) in Malaysia continuously revise their courses curriculum to suit current environment and the needs of industry. Dialogues and collaborations between IHLs, Industry and government bodies become the main agenda for continuous improvements.

On IS curriculum, Gorgone et al. [11] illustrate their curriculum examples in Table 3 which is based on model curriculum suggested by the AIS and ACM. This provides core or fundamental skills similar to our findings in Table 2. Business content covers what an information system should do, while the technically oriented content covers how to create a system that will do it. The technical content courses impart skills in specific implementations of information and communication technologies. Business-oriented content focuses on the environments in which information systems will be deployed and emphasizes skills in analyzing business needs and mapping them onto systems, software and network architectures. Typically, within every IS course, there is coverage of both technical and business issues, regardless of the course's primary classification and the option usually exists to shift the emphasis one way or the other.

Gorgone et al. [12] updated MSIS 2000. Features include increasing the number of required courses from 10 to 12 while revising prerequisites, introducing new courses and revising existing courses to modernize the curriculum, and alternatives for phased upgrading from MSIS2000 to MSIS 2006. MSIS 2006 is based on the educational system and degree structures common to the United States and Canada. The report, however, is claimed to be also relevant to institutions outside these systems for the reasoning and design process for curriculum development in other environments.

In the study, [12] found that essential career development skills including oral, written, and presentation skills; people and business skills; and ethics and professionalism are integrated throughout the curriculum and its individual courses. These are in line with our findings. This shows that core and additional skills do not differ much in requirement for many years and we believe it will stay that way for a few more years to come.

Their model proposed that at the foundation level, the curriculum is designed to accommodate students from a wide variety of backgrounds. In particular, the model specifies the business and information systems skills required as prerequisite to the rest of the curriculum. The next level, or core, is a set of technical and management courses. All graduates require this common core. Some of the core courses are similar in name to those in the 2000 curriculum but the contents are a major revision reflecting the changes in the Information Systems field. The core courses are:
i) Technical Courses
   • IT Infrastructure
   • Analysis, Modeling, and Design
   • Enterprise Models
   • Emerging Technologies and Issues
ii) Managerial Courses
   • Project and Change Management
   • IS Policy and Strategy
   • Implications of Digitization OR Human-Computer Interaction
   • Integrated Capstone

They recommended that individual institutions may choose either (or both courses) the implications of digitization and human- computer interaction.

Thus, from literature and findings, it is clear that industry involvement is a very valuable part of the

educational process, particularly in technical fields that are prone to rapid change. What is not so clear is how to make the connections needed to successfully and meaningfully integrate industry input into curriculums and courses [13]. In the forum program they presented, six individuals ranging from the CIO of a Fortune 500 company to a technical project manager spoke on the technological needs of their companies. Their presentations painted a very broad picture of technology in the area. Overall, their observations and advice was consistent with current wisdom, with the following major points:

• Business skills are just as important as technical skills;
• Good oral and written communication skills are a must;
• More collaboration is needed between industry and academia;
• Whether or not outsourcing is a problem depends on who you speak with; and
• IT professionals need a very broad range of skills.

In [13]'s words, "connecting IT programs with industry is taken for granted but difficult to achieve. As we have found in the past, educators seem more interested in making connections with industry than the other way around, but such an event can definitely be helpful in making those connections."

7. Conclusion

The results of this study predominantly confirm the findings of [3] [17] [19] studies. We infer that employers look for a good personality graduates with multi-skills and right attitude to work and learn. It is true that employers look for certain technical skills before interviews but the skills must be updated and adapted accordingly to market and job changes. Hence, we concur [17] findings that IT professionals and managers do not need a micro-focused IT skills framework. They need a macro-focused, directional IT skills management framework that gives some focus on IT talent acquisition and management.

7. Acknowlegement

References

[1] Ahlan et al. (2008). Assessing the impacts of IT outsourcing phenomenon on IT education in Malaysia. Proceedings of WSEAS Transactions on Education Technologies, Corfu, Greece, 2008. [1]

[2] Ahmad, U.H (2004). Meeting The Demands of Global Firms: Survey Finding. Workshop on Enhancing Graduates Employability in a Globalised Economy. Economic Planning Unit, Malaysia. Putrajaya Shangri-La. 26 July 2004. [2]

[3] Benamati, J.S. and Mahaney, R.C. (2007). Current and Future Entry-Level IT Workforce Needs in Organizations. SIGMIS-CPR'07, April 19–21, 2007, St. Louis, Missouri, USA. Copyright 2007 ACM 978-1-59593-641-7/07/0004. [3]

[4] Benbasat, I., A. S. Dexter, and R. W. Mantha (1980). Impact of Organizational Maturity on Information System Skill Needs. MIS Quarterly, 4(1), 21-34. [4]

[5] Byrd, T. A., B. R. Lewis, and D. E. Turner (2004). The Impact of IT Personnel Skills on IS Infrastructure and Competitive IS. Information Resources Management Journal. 17(2), 38-62. [5]

[6] Ferguson, E. (2004). Journal of Computing Science in College, 19, 4, April 2004. [6]

[7] Ferguson, E. (2005). Changing Qualifications For Entry-Level Application Developers. Journal for Computing Sciences in Colleges. 106-111. JCSC 20, 4 (April 2005). [7]

[8] Gallivan, M., D. Truex, and L. Kvasny (2004). Changing Patterns in IT Skill Sets 1988-2003: A Content Analysis of Classified Advertisements. Database for Advance Systems, 35(3), 64-87. [8]

[9] Gibson, S. (2005) "IT Workforce Gap Looming," eWeek, 22(48), December 15, p. 37. [9]

[10] Gorgone, J.T.; Davis, G.B.; Valacich, J.S.; Topi, H; Feinstein, D.L. and Longenecker, H.E. (2003). IS 2002: Model curriculum and guidelines for undergraduate degree program in Information Systems. Communications of the Associations for Information Systems, 11.

[11] Green, G. I. (1989) Perceived Importance of Systems Analysts' Job Skills, Roles, and Non-Salary Incentives. MIS Quarterly, 13(2), 115-133. [10]

[12] J.T. Gorgone, P. Gray, E. A. Stohr, J.S. Valacich, and R. T. Wigand. (2006). MSIS 2006: model curriculum and guidelines for graduate degree programs in information systems. Communications of the Associations for Information Systems, Vol.17, Article 1, January 2006

[13] Jill Courte and Cathy Bishop-Clark (2005). Creating Connections: Bringing Industry and

Educators Together. SIGITE'05, October 20–22, 2005, Newark, New Jersey, USA.

[14] Kamal, M. (2005) "Information Technology Workforce – Planning for the Future," The Journal of American Academy of Business, Cambridge, 7(2), pp. 23-26. [11]

[15] Leitheiser, R. L. (1992) MIS Skills for the 1990s: A Survey of MIS Managers' Perceptions. Journal of Management Information Systems, 9(1), 69-91. [12]

[16] Melymuka, K. (2006) "Workforce Crisis: Preparing for the Coming IT Crunch," Computerworld, July 3. [13]

[17] Nakayama, M and Sutcliffe, N.G. (2007). Perspective-Driven IT Talent Acquisition. Proceedings of SIGMIS-CPR'07, April 19–21, 2007, St. Louis, Missouri, USA. ACM 978-1-59593-641-7/07/0004, 2007. [14]

[18] Proctor, R. W., and A. Dutta (1995). Skill Acquisition and Human Performance. Thousand Oaks, CA: SAGE Publications. [15]

[19] Society for Information Management (2005). IT Workforce Executive Summary 2006. The Information Technology Workforce: Trends and Implications 2005-2008. [16]

[20] Todd, P. A., J. D. McKeen, and R. B. Gallupe (1995). The Evolution of IS Job Skills: A Content Analysis of IS Job Advertisements from 1970 to 1990. MIS Quarterly, 19(1), 1-27. [17]

[21] Watson, H. J., D. Young, S. Miranda, B. Robichaux, and R. Sheeley (1990). Requisite Skill for New MIS hires. Data Base, 21(1), 20-29. [18]

Co	Int'vwee's profile	Type of conglomerates	Services	Clienteles	Workforce size	Experience of int'vwee in outsourcing (no. of years)	Company's experience in outsourcing (no. of years)
SP1	Director	MNC	ITO, BPO	Overseas & Local	> 50K (Global group)	> 20	> 20
SP2	Vice President	Local (Sdn Bhd)	ITO, BPO	Overseas & Local	< 100	> 10	> 5
SP3	Vice President	Local with overseas presence	ITO - Offshore	Overseas	< 100	> 10	> 15
SP4	General Manager	MNC	ITO, BPO	Overseas & Local	> 50K (Global group)	> 20	> 30
SP5	Senior Manager	MNC	ITO, BPO	Overseas & Local	> 50K (Global group)	> 10	> 40
SP6	Director	Berhad	BPO	Overseas & Local	> 1K	> 20	> 10
SP7	Director	Sdn Bhd	BPO	Local	> 1K	> 10	> 5

Table 1. Demographics of the service provider firms

Themes	Responses on Skills/Capabilities	Entry-level Positions
A) Technical Skills	- Programming - Databases - Multimedia subject - Laboratory simulation - Practical exposure - Professional certification	1. Database / Networking support - Database administrator, system administrator, helpdesk analyst, network engineer, technical support, IT support and MIS executive 2. Software / Programming - Application developer, programmer, system analyst, web designer, game developer, software engineer, web developer. 3. Computer Engineering - Software architect, configuration engineer, IC design engineer, R&D engineer, software engineer, test engineer 4. Project management assistant/trainee 5. Junior Business IT consulting/trainee
B) Non-technical / Soft Skills	i) Communication skills - Ability to express, Self-confidence, Self-esteem, Courage, Culture understanding, Public speaking ii) Language subject - English, Japanese, Mandarin, Korean iii) Writing skills iv) Skills exposure vi) Thinking ability vii) Business skills	All positions Programmers, Helpdesk analyst and IT support Business consulting executive/trainee Project management assistant/trainee
C) Problem solving		All positions
D) Career-oriented thinking		All positions
E) Quality of talent		All positions
F) Right attitude		All positions
G) Employability		All positions
H) Training		All positions
I) Ethics		All positions

Table 2: Matching of skill-sets/capabilities with job positions for IT graduates.

Technical content examples	Business content examples
Application development • Programming • Algorithmic design • Client-server software development Internet systems architecture and development • Web page development • Web architecture design • Multi-tier architecture design Database design and administration • Construction, schema tools • Triggers, stored procedures, audit controls • Administration, security Systems infrastructure and integration • Hardware • Networking • Systems software • Systems configuration and operation	Strategic utilization of information technology and systems IS planning IT and organizational systems Systems analysis Logical and physical design Testing Deployment Use of IT Customer service Project management

Table 3: Technical vs business curriculum content, adapted from Gorgone et al. (2003)

[i] http://www.outsourcingmalaysia.org.my/index.php?pg=news accessed on 10.7.2008