An Assessment of K-Workers Among SMIs in Malaysia

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ABSTRACT

This paper is based on a research study to assess the development of human resource based on the application of Information Technology in the industrial sector, specifically the small-medium enterprises in Malaysia. This is a field study in the form of a survey research using a cross-sectional approach where a sample of SMIs representing the production and manufacturing firms listed in the Federation of Malaysian Manufacturers were sought. Sampling technique in the form of proportionate random sampling was used taking into account the different sample frame sizes according to the industries. A total of 200 firms were selected in which questionnaires were sent and 84 usable returns were received representing a 42 percent response. Results of the study showed a small number of K-Workers present in the SMI firms with only 33 percent of the firms in the sample reported having knowledge workers. There is also a low degree of technology and IT adoption among the SMI firms with only half of the firms invested in technology and/or IT. However, there is a positive indication towards increasing the number of K-Workers among SMIs in the study as all respondents have access to e-mails. This can be seen as a motivating factor towards encouraging more SMIs to adopt IT and changing the way employees perform their business activities moving towards achieving the long-term competitiveness in the knowledge economy.

Keywords

Knowledge Economy, IT Adoption, IT Skill, IT Training, High Technology

INTRODUCTION

Malaysia is fast moving towards the knowledge economy underpinned by innovation and enterprise. This can be further expedited by the small and medium industries (SMIs) known to encourage innovation, promote competitiveness, create employment and wealth across society (DTI, 1997). The SMIs can play an important role in leveraging the nation's economy by having a workforce that is highly skilled, trainable in new technology, and knowledgeable. They have the capability to be more innovative and can provide greater flexibility to the economy and encourage the creation of new jobs. They also encourage healthy competition both within the domestic market and internationally. Recent findings have shown that the small and medium industries are now going international with the help of IT, especially the Internet, to enable e-commerce (Westhead et al., 2002).

A knowledge-based economy would require a workforce that is highly skillful, learned, possess a positive motivation and attitude, innovative and possess entrepreneurial skill to grab the many opportunities that are widely available as a result of globalization and the proliferation of advanced technology. To achieve this, greater emphasis should be given in enhancing the workforce equipped with academic credentials, technical requirements and the right skill set that can increase the work efficiency with positive attitude and creativity. These so-called knowledge workers (K-Workers) are vital ingredients for the nation to transform itself into a knowledge-based economy.

Reports on the current scenario of human resource development of SMIs in Malaysia have not been encouraging. SMIs in Malaysia are still operating in the traditional way with mostly family-based (Hodge, 2001), using traditional and obsolete technology to produce cheap and low quality products with limited market penetration. Among the problems faced by SMIs include lack of able personnel to negotiate fundings (Chee, 1979), lack of expertise in using and managing technology (Raymond, 1990 and Anderson, 1987), lack of skilled workers (Moha Asri et al., 2000), and poor user attitude towards technology (Lees and Lees, 1987).

Previous studies have shown a close relationship between the individuals and the organizations they belong. This is linked to the characteristics of human resource as contributing to the organizational development, which include flexibility and adaptability (Waterman et al., 1994; Atkinson, 1984; Blyton and Morris, 1991); increase in individual competency (Cappbeli and Crocker-Hetter, 1996; Gorsline, 1996; Holms, 1995; Lei and Hitt, 1996); Individual workability (Arthur and Rousseau, 1996; Bates and Bloch, 1995; Ellig, 1998; DeFillippi and Arthur, 1996); and High Achievement (Sandberg, 2000). In today's era of k-economy, human resource development is focused on the capability of individuals and the organization they support to adapt themselves with the latest information and communication technology (ICT).

This is to ensure that the organization is able to compete globally in accordance with the current demands. This paper attempts to make an assessment of the presence of k-workers in SMIs by examining their usage of ICT and other related technology.

IT ADOPTION IN THE SMIs

In the developed countries, an increasing number of SMIs are adopting IT in their effort to develop a competitive advantage and maintain their position in the marketplace. A study in the UK found that all small firms with less than 100 employees adopt IT using at least one PC to support their business (Dahalin and Golder, 1998). Lees and Lees (1987) found that the reasons small firms adopt IT are to improve operational procedures, to produce information at a lower cost, to make available new management tools for decision making, to facilitate billing and invoicing, to facilitate business growth, to facilitate inventory control, and to be innovative. The benefits derived include better record keeping, timely, accurate, and expanded information, improved customer service, increased productivity, and enhanced management control and decision making. This many benefits may have prompted many SMIs to adopt IT.

However, studies have also shown that SMIs generally have end-users with low level of computer literacy and received elementary formal education. In addition, SMIs also lacked qualified IT personnel, no specific policy and planning on IT adoption, lack of formal IS methodology, lack of end-user participation and minimal technology diffusion throughout the firm (Montazemi, 1987). It is also the intention of this paper to assess the level of IT adoption of the Malaysian SMIs in terms of the end-users, IT personnel, education and training, and the types of technology and IT products used.

METHODOLOGY

The study was based on a field study in the form of a survey research using a cross-sectional approach where a sample of SMIs representing the production and manufacturing firms listed in the Federation of Malaysian Manufacturers (FMM, 2002) were sought. The size of the firms chosen was based on the definition of small and medium industries as suggested by Abdul Aziz Latif et al. (2000) that specify a firm with full-time employees of not exceeding 150. Sampling technique in the form of proportionate random sampling was used taking into account the different sample frame sizes according to the industries (Kerlinger, 1986). A total of 200 firms were selected in

which questionnaires were sent and 108 returns were received. Out of this 24 firms have more than 150 employees hence they were discarded from the sample and the remaining 84 firms were deemed usable representing a 42% response.

Questionnaires with self-address stamped envelopes were sent to the selected firms based on the FMM list together with a cover letter describing the aims of the study and instructions on filling the questionnaire. A supporting letter from the Ministry of Science Technology and Environment (MOSTE) was also included to support the study and to encourage better response. The 42% rate of return was considered good as it far exceeded the typical response reported by other studies involving SMIs which was between 10% to 20% (Palvia et al., 1994; Lai, 1994; Raymond and Bergeron, 1992).

Data entry was carried out using SPSS within which a database of the returns was created. Data analysis was then carried out using descriptive statistics on the firms' demography, manpower requirements, technology and IT adoption, and training.

ANALYSIS OF FINDINGS

Table 1 presents the distribution of the firm's demography and background information. Part I of the table shows that almost three-quarter of the sample firms are Malaysian owned with 50% fully Malaysian and 21.4% owned majority by Malaysian. The remaining 28.6% of the sample is foreign owned with less than 50% local equity. In terms of location, half of the sample is located in Penang, and the remaining 28.6% in Kedah and 21.4% in Perak. Penang is an industrial state with high concentration of industries particularly in Prai whereas in Kedah a new industrial area has been developed in Kulim. Together, both these areas formed the majority of the sample firms in this study with 71.5% respondents. In terms of the firms' size, more than 90% of the sample firms employ between 50 to 150 employees. All small firms with less than 50 employees are located in Perak.

Table 1. Distribution of the Firms' Demography and Background Information

	Freq	%	Cum. %
Ownership			
Fully Malaysian	42	50.0	50.0
Malaysian owned (> 51% local)	18	21.4	71.4
Foreign owned (< 50% local)	24	28.6	100.0
Location			
Kedah	30	28.6	28.6
Pulau Pinang	54	50.0	78.6
Perak	24	21.4	100.0
Number of Employees			
Less than 50	6	7.1	7.1
50 to 150	78	92.9	100.0

Table 2 shows the background information of the respondents. The instruction has specifically requested the employer or his/her representative to respond to the questionnaire. It is assumed that the respondents of this study are the key people in the firm. Managerial level personnel made up the majority of the respondents with 57.1%. However, in terms of job category, operational level personnel made up the largest group with 42.9%. This is followed by the top level management with 35.7% and middle level management with 21.4%. Overall the distribution of respondents is divided almost equally among the three levels of job category. It is interesting to observe that all the top level management executives owned a university degree with a significant majority (60%) has post graduate degrees. A majority of the middle level management also has a tertiary education and two-third of the low level management has diplomas and first degrees. Only one-third in each of the middle and low level management categories are school leavers. Chinese made up the largest respondents with 64.3%. This is followed by Indians with 21.4% and Malays with 14.3%. A closer look at the data also revealed that all the top management respondents were Chinese.

Table 2. Background Information of the Respondents

	Freq	%	Cum. %
I. Job Category			
CEO/Top Management	30	35.7	35.7
Managerial/Professional	18	21.4	57.1
Clerical/Operational	36	42.9	100.0
II. CEO/Top Management Qualification			
Post Graduate	18	60.0	60.0
First Degree	12	40.0	100.0
Diploma	0	0	100.0
High School (STPM/SPM)	0	0	100.0
III. Middle Level Management Qualification			
Post Graduate	0	0	0
First Degree	12	66.7	66.7
Diploma	0	0	66.7
High School (STPM/SPM)	6	33.3	100.0
IV. Lower Level Management Qualification			
Post Graduate	0	0	0
First Degree	6	16.7	16.7
Diploma	18	50.0	66.7
High School (STPM/SPM)	12	33.3	100.0
V. Race			
Malay	12	14.3	14.3
Chinese	54	64.3	78.6
Indian	18	21.4	100.0

Table 3 shows the manpower requirements of the sample firms categorized according to managerial level, technological skill and IT skill. Manpower requirement at the managerial level shows high percentages of current fulfillment of manpower across the three levels with the lowest level scored the most at 94.5%. This may suggest that the SMIs in the sample have currently

almost fulfilled their manpower requirements in terms of filling the job vacancies across all levels of the firm. There is a higher demand for manpower at the higher managerial level both currently and five years down the line. However, greater job demands are expected in the future in all three categories, perhaps due to anticipation of high staff turnover and company expansion due to the recent economic recovery.

Table 3. Manpower Requirements

	% Fulfill Current	% Fulfill Future
Managerial Level		
Top Level Management	88.9	72.2
Middle Level Management	88.9	72.2
Lower Level Management	94.5	77.8
Technological Skill		
Skilled Worker	88.9	55.6
Semi-skilled Worker	83.3	55.6
Unskilled Worker	88.9	61.2
IT Skill		
Computer Engineer	22.2	33.3
Computer Support Specialist	16.7	33.3
Systems Analyst	27.8	16.7
Database Administrator	27.8	33.3
Desktop Publishing Specialist	11.1	16.7

Data on technological skill suggests requirements for all categories of skilled and unskilled workers are currently almost being fulfilled. However, the future may see an increase in the demand for skilled and unskilled workers as the percentage of manpower requirements for technological skills decreases. This is even worse in the skilled and semi skilled categories which may suggest higher staff turnover among these categories as anticipated by the respondents.

In terms of IT skill there is an overall shortage of IT manpower requirements across all categories of IT professionals as shown in Table 3 above. The worse is Desktop Publishing Specialist with only 11.1% meeting the current manpower requirement. Computer Support Specialist is next with only 16.7% fulfilling the current demand. This is followed by Computer Engineer at 22.2%, Systems Analyst and Database Administration both at 27.8%. Similarly the shortage of IT manpower in the future is anticipated to remain with only slight increase in the percentage. However, the demand for Systems Analyst is expected to increase in the future as the percentage of fulfilling the manpower requirement for this category decreases as suggested by the 16.7% drop from 27.8% as shown in Table 3.

Data on technology adoption also shows an overall low level of automated technology used by the SMI firms in the sample. The use of fully automated high-technology products ranges from 5.6% to as high as 22.2% of the

respondents. The use of high-technology products at 22.2% includes Computer Aided Design (CAD), Automated Inspection and Testing Equipment (AITE) and Material Requirements Planning (MRP I). This is followed by the use of Numerical Control/ Computer Numerical Control/ Digital Numerical Control (NC/CNC/DNC) machines at 17.6%, Automated Storage and Retrieval System (AS/RS) and Computer Integrated Manufacturing (CIM), both at 16.7%, and robot technology, Automated Material Handling System (AMHS), Just-in-time (JIT) and Manufacturing Resources Planning (MRP II) at 11.1%. Among the lowest usage of fully automated high technology products are Flexible Manufacturing Cells/ Systems (FMC/FMS) at 5.9% and Material working laser at 5.6%.

Table 4. Usage of High Technology Products

High-Tech Products	Usage (%)			
	Manual & Semi-Automated	Fully-Automated	Not Used	Plan to Acquire
Stand Alone Technology Engineering & Design Technology				
- CAD	33.4	22.2	44.4	
- CAPP	18.8	6.3	68.8	6.3
Machine, Fabric & Installation				
- NC/CNC/DNC	5.9	17.6	58.8	
- Robots	16.7	11.1	72.2	
- Material working laser	16.7	5.6	77.8	
Intermediate Technology Material Control				
- AS/RS	33.3	16.7	50.0	
- AMHS	38.9	11.1	50.0	
Inspection & Testing Equipment				
- AITE	38.9	22.2	38.9	
Integrated Technology				
FMC/FMS	35.2	5.9	58.8	
CIM	33.4	16.7	50.0	
MRP I	33.4	22.2	33.3	11.1
JIT	55.5	11.1	27.8	5.6
MRP II	38.9	11.1	22.2	27.8

Most of the respondents also did not indicate any plans to acquire these high-tech products in the future, with the exception of MRP II, MRP I, Computer Aided Process Planning (CAPP) and Just-in-time. This clearly indicates the use of high technology products among the SMIs is still in its infancy stage. Table 4 shows the usage rate of the high technology products of the

participating firms in the sample. It is also interesting to observe that the percentage of high technology products not used was also high across all categories, especially in the Machine, Fabric and Installation category such as Material Working Laser, Robots and NC/CNC/DNC machines; Engineering and Design Technology category such as CAPP; Integrated and Flexible Manufacturing category such as FMC/FMS, CIM, MRP I and MRP 2, and Materials Control category such as AS/RS and AMHS. Even for JIT, the most used high-tech product according to the survey indicates quite a significant proportion of respondents not using the product with 33.4% of the respondents. Even so, those who use JIT are largely not using a fully automated product with more than half of the respondents indicated having a manual or semi-automated JIT product. This clearly indicates that the use of fully automated high technology products in the SMIs is still very low.

Table 5 shows data on IT adoption among the sample firms. Based on 100% usage of e-mail it can be deduced that all the SME firms in the sample owned at least one PC. This may suggest that IT is now pervasive among the SMEs in Malaysia. However the adoption of the other IT products is still low with varying degree of usage. The most popular is Word Processing with 66.7% of the respondents indicated using the software fully. This is followed by Spreadsheet at 61.1%, Database at 44.4%, and to a lesser extent Accounting at 27.8%, Finance at 22.2%, Scheduling at 16.7%, Sales at 12.5%, Human Resource Management and Material Control at 11.1%, and Project Management at 5.6%. None of the firms however indicated computerizing the Purchasing system fully. Despite having PCs connected to the Internet by virtues of the 100% usage of e-mails, only 27.8% of the firms in the sample have their own websites. The data clearly indicates the level of IT adoption among the SME firms is still very low despite the many opportunities for increased IT sophistication.

Table 5. IT Adoption

IT Products/ Application	Usage (%)			
	Manual & Semi-Auto	Fully-Auto	Not Used	Plan to Acquire
E-Mail		100.0		
Word Processing	33.3	66.7		
Spreadsheet	38.9	61.1		
Database	56.6	44.4		
Accounting	72.3	27.8		
WWW (website)		27.8		72.2
Finance	77.8	22.2		
Scheduling	83.3	16.7		
Sales	87.6	12.5		
HR Management	61.1	11.1	27.8	
Material Control	89.9	11.1		
Project Mgt	61.1	5.6	33.3	
Purchasing	100.0	0.0		

An important characteristic of a K-Worker is the capability of the employees in adopting IT to perform their duties and responsibilities. Firms are also obligated to provide the necessary training in order to increase their employees' IT competency. Table 6 shows the distribution of the K-Worker IT skill, IT Training needs and IT Budget allocation on the sample SMEs.

Table 6. Acquisition of IT Skill, IT Training Needs and IT Budget Allocation

	% Acquired	% Not Acquired	% Plan to Acquire
Employees with IT skill (K-Worker)	33.3	66.7	
IT Training needs	50.0	27.8	22.2
IT Budget Allocation	77.8	22.2	

Table 6 above shows that only one-third (33.3%) of the sample SMEs have k-workers, that is employees with the necessary IT skills and using the IT products in carrying out their job functions. Despite the low percentage, half of the sample had acquired IT training. This suggests not all who went for IT training would eventually end up acquiring the IT skill. In terms of budget allocation for IT, majority of the firms (77.8%) do set aside budgets for IT expenditure. Though this is encouraging, the data suggests the actual impact of IT to the employees was not fully realized even though firms were supportive in terms of providing the financial and training support in order to promote IT.

DISCUSSION AND CONCLUSION

The development of human resource is to ensure contribution to sustainable productivity for continued economic growth. In line with that, this study makes an assessment of the development of human resource based on the application of information technology in the industrial sector, specifically the small-medium enterprises in Malaysia. Awareness by the industrial sector in adopting IT and other advanced technology is important in order to generate higher value-added economy.

This study has shown a large vacuum exists for well-educated skilled manpower in the areas of IT and other high technology in the industrial sector particularly the SMIs. This may not be favorable in today's era of k-economy where the need for progress in high technology development and IT is in high demand in order to facilitate globalization. The findings reveal a low level of IT manpower and a low technology adoption among the SMIs. The requirements for skilled human resource in IT and other technologies are still not adequate to meet the demands of the industry. One distinguishing feature that can be highlighted based on the facts presented in this study is the accessibility of e-mails by all the respondents in the sample. This seems to be the likely trend that is currently prevailing the world over. This also indicates that workers are familiar with computers and can use computers to access their e-mails. Motivating them further to use other tools and technology within similar computing environment should not be a difficult task compared to other past employees who had developed computer phobia.

In addition, it was suggested that the relevant training programmes should be given to the relevant employees and firms should also be encouraged to support re-training to address the issues of trainees not being adequately trained. In addition, firms should consider introducing incentives to encourage more IT literate employees and likewise, the government may consider giving subsidy in terms of tax incentives, etc. on training programmes to encourage SMIs to invest in training.

With the current capability of IT, further research and development works should be carried out to determine the best usage of the technology to help facilitate training, either through computer-assisted learning and instruction, e-learning and/or using virtual reality and other modeling and prototype development. An easy to use and user friendly software as a training aid will go a long way in getting more people into IT, hence producing more knowledge workers capable of utilizing the right tools and technology to carry out their work.

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