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## **Cultural Influences on Information Technology (IT) Usage Amongst Industrial Workers in Malaysia**

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### **Abstract**

*This paper examines the cultural influences on IT usage amongst industrial workers in Malaysia. It explores the relationship between the workers' cultural attributes and IT usage. It also examines the factors that influence IT usage, their innovativeness and barriers that hinder IT application. This study reveals that the workers' capability in IT is partly nurtured by cultural attributes such as their love for knowledge, perception towards IT and their willingness to take risks; and external factors such as management's support and government's encouragement. Competition is one factor which is found to influence workers' innovativeness. The inability to own a computer, low English proficiency and the difficulty in understanding knowledge in IT are the major barriers in IT usage. Finally, we observe that a large majority of industrial workers use low capacity network services, mainly the e-mail, electronic newspaper and electronic classified advertisements*

### **Keywords**

Culture, Information Technology (IT), Computer Literacy, Competitiveness.

### **INTRODUCTION**

As a driving force of change in the Information Age, Information Technology (IT) is an important medium in empowering people with quick access to information and knowledge and enables them to network with others globally at a faster and cheaper rate. IT has also been identified as the strategic enabling tool that supports the growth of the Malaysian economy and its widespread usage would enhance the living standard of the population. Human intelligence augmented by IT will replace physical capital as the leading input of production in the development of Malaysia's knowledge based economy. The ability of firms and workers to assimilate and utilise IT skills is an indicator of competitiveness in the business environment. The enhancement of IT culture facilitates continuous learning and upgrading of knowledge and skills to enable them to compete successfully in the global workplace.

The development of IT infrastructure in Malaysia was boosted by the gazetted Multi Media Super Corridor (MSC) in 1996 with the main purpose to create a perfect environment for companies to create, distribute and employ multimedia products and services (Ghosh, 1998: 162). The MSC has since grown into a thriving dynamic ICT hub, hosting more than 900 multinationals, foreign-owned and home-grown Malaysian companies focused on multi media, communications products, solutions, services and; research and development. The MSC is geared to become a global test bed for ICT applications and a hub for regional operations in Asia. Many innovative applications have been developed in the MSC such as Smart Schools, Telehealth, e Business, smart card technology, electronic government and technopreneurship.

The importance of IT literacy and application in the Information Age among Malaysians was highlighted by the establishment of The National Information Technology Council (NITC) in 1994 with the vision of creating an information-rich society by enhancing the development and utilization of IT as a strategic technology for national development in Malaysia (INFOSOC Malaysia 2000). The National Information Technology Agenda

(NITA) was formulated in 1996 to provide a comprehensive framework for development in the Information Age. In essence the NITA:-

- (a) aims to transform the nation into a value-based knowledge society in line with Vision 2020;
- (b) focuses on comprehensive human development;
- (c) leverages on tri-sectoral partnership between the public, private and community interest sectors; and
- (d) uses top-down and bottom-up approaches for planning and implementation (INFOSOC Malaysia 2000).

The fundamental challenge for Malaysia is to develop the mindset to appreciate, understand and operate effectively in the E-World. The possession of a distinct mind set is characterized by :-

- (a) an abiding sense of National Identity and integrity based on unique Malaysian values ala Vision 2020.
- (b) the ability to compete and respond effectively in a complex and rapidly changing environment;
- (c) willingness to learn, develop and continuously improve knowledge and skills; and
- (d) capacity to promote and sustain innovation and entrepreneurship (INFOSOC Malaysia 2000) (NITC Papers, 1999).

Although the Government has tried to encourage the use of IT, the acculturation process is somewhat lacklustre. IT culture is less developed in Malaysia and still suffers from lack of appreciation and awareness in IT application. A.S Jaafar (2002) found that the level of ICT utilization in the country is still low compared to selected countries and there exists wide disparities among states in Malaysia in terms of accessibility to IT (Journal of ICT, 2002: 45). Since the first Internet inception in 1992 by Jaring, MIMOS Berhad, only about 6% of the population in Malaysia were using Internet at the end of the year 2000. The main reason behind the slow growth in Internet usage is due to the sceptical attitude towards Internet by most Malaysians as a result of the limited understanding and command over computer and Internet applications (Abdulai, 2001).

## MODELS

The main focus of this study is on the usage of Information Technology (IT) which refers to a set of sophisticated tools which combines computing and communications. It consists of hardware, software, telecommunication network, work station, robots and smart chips. IT is basically concerned with gathering, processing and disseminating information. IT equips workers with capabilities to achieve a higher degree of competitiveness, productivity, innovativeness and capability in managing the technology and information driven phase of industrialization. Although the literacy rate in Malaysia has already gone up to 93 %, the number of scientist and technologies is only merely 400 per million which is very low compared to international standards (Rugayah and Noordin, 2002). Lack of adequate skilled manpower is also responsible for the poor assimilation of new technology, and stands in the way of technological innovation and diffusion for the economy as a whole (Ghosh, 1998). A sufficient number of people involved who are capable of understanding and using IT are needed to enhance competitiveness among industries.

One of the important aspects in the acculturation process relates to technology usage and construction done by man and society that is influenced by individual perceptions and attitudes as well as by social influences.

Nelson and Clark (1994) describe technology as a “culturally embedded, value-laden activity”, suggesting that technology use has a strong cultural component which refers to “the way man handles and construct technology to achieve their goals and human desire” (Norhani and Rugayah, 2001). The same applies to the Information Communication Technology (ICT), IT culture equips people with the appropriate values, beliefs, scientific thinking, effort, skills and creativity in order to compete at the international level, particularly in ICT application. Deans et al (1991) and Palvia Sarawat (1992) emphasized the importance of a country specific factors such as culture in determining the effectiveness of information systems (Anandarajan, M., Igbaria, M. and Anakwe, U.P (2000).

This study focuses on the cultural influences on IT usage amongst 500 respondents from 30 technology-based industries such as electronics, Information Communication Technology (ICT) instrumentation, automation, transport, servicing, pharmacy products, energy source, appliances and oleo chemical. This industry was selected because of its extensive use of high technology. Although it only represent at present, only about one fifth of total OECD trade, high technology industries such as manufacturing of computers, electronic equipment and pharmaceuticals are the most dynamic manufacturing industries that play an increasing role in international trade of manufactured goods (OECD, 1999). The sample consists of workers from various occupations including managers, executives, supervisors, production operators, clerks, typist, store keepers, drivers and security guards. The survey was carried out at several industrial areas in states of Johor, Melaka, Perak, Penang, Kedah, Selangor and Kuala Lumpur. Primary data were collected from all 35 technology-based firms in Malaysia that are listed in Malaysian Technology Development Corporation (MTDC) Capital Index and the

Malaysian Exchange of Securities Dealing and Automated Quotation (MESDAQ) that are proven excellence in their performance and has achieved standard quality of ISO 9002.

Each variable's reliability is verified by conducting a reliability test based on the results of the Factor Analysis. Cronbach's alpha results are found to be greater than 0.60 which met Nunnally's criteria (1967:226). The Mean score for each cultural attribute in this study were analyzed to identify the patterns of cultural attributes among workers. Various characteristics of cultural attributes were then clustered into six key factors by using Factor Analysis. To examine factors which influence IT usage amongst the workers, multiple regression were conducted to analyze the cultural attributes and factors that influence IT usage. Workers' actual usage of computers is also examined by adopting a modified research model based on The Technology Acceptance Model by Davis (1989).

## FINDINGS

### The patterns of workers' cultural attributes towards IT usage

Table 1 shows the Mean score for each item in cultural attributes towards IT usage. Most respondents do have the positive values, attitudes and perceptions needed in the development of IT and to compete with other developed countries. Workers are found to be willing to work hard, they believe that hard work will eventually pay and they are confident in their own skills and abilities. However, the difficulty in understanding new ideas and knowledge, the unwillingness to take risk and the dislike in solving difficult and complex problems would hinder advanced learning in IT application.

Table 1 : Workers' cultural attributes towards IT

CULTURAL ATTRIBUTES	MEAN	STD. DEV
Always enhancing own capabilities from time to time.	4.22	0.57
Able to imagine new ideas easily.	3.73	0.75
Loves to think about new ways in handling technology.	3.99	0.67
Appreciates IT very much.	4.14	0.64
Always interested in new ideas concerning IT.	4.09	0.64
Do not give up easily.	4.08	0.63
Loves to share ideas with others.	4.22	0.56
Understand new abstract ideas easily.	3.70	0.75
Knowledge in IT is easy to learn.	3.85	0.66
Belief strongly that hard work will eventually pay.	4.33	0.72
Readiness to accept challenging tasks.	4.09	0.65
Adapt easily to IT application.	3.91	0.65
Dares to take risk.	3.78	0.75
Open to changes in IT	4.11	0.62
Confidence in own ability.	4.20	0.62
Loves to solve complex problems.	3.77	0.73
Understands new knowledge easily.	3.76	0.73
Always enhancing knowledge from time to time.	4.20	0.61

Scale : 1.00 = Most Disagreeable, 2.00 = Disagreeable, 3.00 = Less Agreeable  
4.00 = Agreeable, 5.00 = Most Agreeable

### Cultural attributes and external factors that influence IT usage

Human resource development is of crucial importance in Malaysia to achieve a higher degree of competitiveness, productivity, innovativeness and capability in managing the technology and information driven phase of industrialization. Previous studies show that there is a great degree of complementary between IT artifacts and the people using them. Multiple Regression is used in analyzing the relationship between the workers' cultural attributes such as commitment, love for knowledge, perception towards IT and willingness to take risks and external factors which consist of management's support, government's encouragement and competition

$$IT = \alpha + \beta_1 CO + \beta_2 KN + \beta_3 PE + \beta_4 RI + \beta_5 MA + \beta_6 GO + \beta_7 CM$$

Where IT = IT usage

$\alpha$  = Constant  
 $\beta$  = Coefficient  
 CO = Commitment  
 KN = Love for knowledge  
 PE = Perception towards IT  
 RI = Willingness to take risks  
 MA = Management's support  
 GO = Government's encouragement  
 CM = Competition

Table 2 : Factors that influence IT usage

DEPENDENT VARIABLE	INDEPENDENT VARIABLES								R2
	Intercept	CO	KN	PE	RI	MA	GO	CM	
CL	0.000 (-.410)	0.026 (0.612)	0.092 (2.199)*	0.562 (13.025)*	0.163 (4.357)*	0.039 (-1.027)	0.049 (1.055)	0.064 (1.719)**	0.537

\* Significant at 5% level

\*\* Significant ant 10% level

Notes: Figures in parentheses are t-statistic

Regression analysis reveals that perception towards technology is an important determinant for IT usage because one's belief towards its compatibility and benefit will encourage their readiness to use computers. The love of knowledge also influences computer usage due to the vast field of information and knowledge that could be extracted from computers. Willingness to take risk is also significantly related to IT usage at 0.05 level. External factors such as management's support and encouragement given by the government seem to be not significantly related to IT usage. Competition and new discoveries in science and technology are found to be an important determinant. The ability in IT usage is mainly acquired by owns' initiatives and interest coupled by their positive perception towards the benefits and compatibility of IT usage.

### Cultural attributes and external factors that influence innovativeness

A culture of innovation stimulates the process of generating new ideas and applying them either internally or to the market, with the ultimate purpose of changing the markets and obtaining competitive benefits. An innovative mind could create new opportunities for learning and personal growth in IT application. At the individual level, a new tool often requires learners to master a new set of skills and develop new knowledge about their own abilities to think and solve problem (Xiodong Lin, 2003 : 4). Workers' innovativeness could enhance advanced knowledge and application in IT.

$$IN = \alpha + \beta_1 CO + \beta_2 KN + \beta_3 PE + \beta_4 RI + \beta_5 MA + \beta_6 GO + \beta_7 CM$$

Where IN = Innovativeness

$\alpha$  = Constant  
 $\beta$  = Coefficient  
 CO = Commitment  
 KN = Love for knowledge  
 PE = Perception towards IT  
 RI = Willingness to take risks  
 MA = Management's support  
 GO = Government's encouragement  
 CM = Competition

Table 3: Factors that influence workers' innovativeness

DEPENDENT VARIABLE	INDEPENDENT VARIABLES								R2
	Intercept	CO	KN	PE	RI	MA	GO	CM	
IN	0.000 (0.746)	0.080 (1.636)	0.308 (6.350)*	0.013 (0.256)	0.252 (5.806)*	0.025 (0.581)	0.049 (0.922)	0.104 (2.410)**	0.377

\* Significant at 5% level

\*\* Significant ant 10% level

Notes: Figures in parentheses are t-statistic

Our findings show that the workers' love for knowledge and their willingness to take risks are important attributes which positively influence their innovativeness. It is found that support from management does not influence workers' capabilities. Our study suggests that competition influences workers' capabilities in innovation. The ability to innovate is found to be low among workers. Only 16.8% of them perform innovations and most of them are from the automation sector (35.5%) who are directly involve in research activities.

#### **Factors that influence the adoption of computers among industrial workers (Technology Acceptance Model (TAM) Revisited)**

The phenomenon of computer acceptance has been studied by many researchers in terms of user satisfaction of the technology as well as actual usage of the technology. The Technology Acceptance Model (TAM) suggests that attitudes towards use directly influence intentions to use computer and ultimately actual computer use (Davis, 1989). Davis demonstrates that an individual's initial attitudes regarding computer's ease of use and a computer's usefulness influence attitudes towards use. Actual usage of computers was selected as the indicator for adoption of computers for this study. It refers to the frequency of use of computers among the workers which provide a better indicator of the extensiveness of usage than measures of time spent. Frequency of use was measured a five point scale ranging from 1 (Never) to 5 (Every day). Perceived usefulness represents the first motivational factor influencing computer usage. It is defined as "the degree to which a person believes that using a particular system would enhance his or her job" (Davis, 1989). Compatibility refers to "the compatibility of computers with their type of occupation" while Social Pressure relates to the person's perception of the social pressures put on him or her to use computers". Perceived ease of use refers to "the degree to which a person believes that using computers would be free of effort". Davis (1989) identified ease of use as an important determinant of system usage through perceived usefulness. He suggests that perceived ease of use may actually be an antecedent to perceive usefulness.

We adopted and modified this model to examine the actual usage of computers among workers. Variables such as "perceived usefulness", "compatibility", "social pressure" and "perceived ease of use" are regressed against "Actual Use of Computers" to identify the relationship between them (See Figure 1).

$$AU = \alpha + \beta_1 PU + \beta_2 CO + \beta_3 SP + \beta_4 EU$$

Where AU = Actual Usage

$\alpha$  = Constant

$\beta$  = Coefficient

PU = Perceived Usefulness

CO = Compatibility

SP = Social Pressure

EU = Perceived Ease of Use

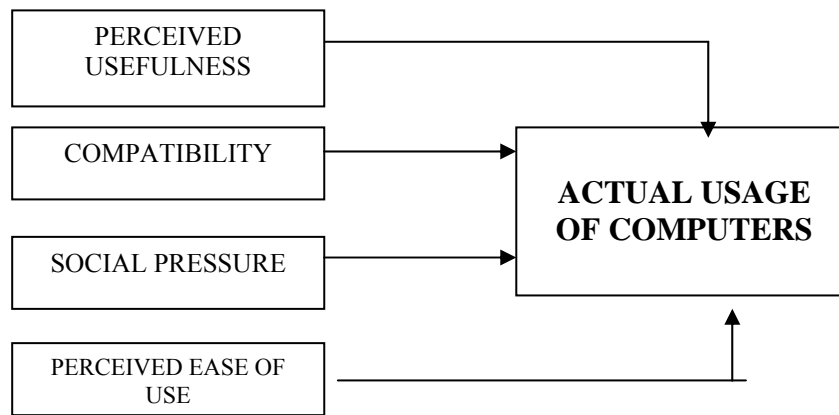


Figure 1 : The Research Model for IT Usage

The regression analysis shows that compatibility and perceived ease of use have strong direct effects on actual usage of computers. Our study indicates that these are the important factors affecting the adoption process of computers among industrial workers in Malaysia (Table 4). The Technology Acceptance Model (TAM) by Davis (1989) is found to be applicable to this study.

Table 4 : Actual Usage of Computers Based On Technology Acceptance Model (TAM)

DEPENDENT VARIABLE	INDEPENDENT VARIABLES					R2
	Intercept	PU	CO	SP	EU	
AU	0.000 (6.970)	0.055 (1.580)	0.369 (8.838)*	0.065 (-1.863)	0.464 (11.655)*	0.573

\* Significant at 5% level

Notes: Figures in parentheses are t-statistic

### Computer Literacy

The level of understanding IT application and the actual usage of computers amongst workers measure computer literacy. This study reveals that basically, a large majority of the workers (82.6%) are able to use computers in their daily tasks. They frequently use the computers every day at their office. The usage of computers among respondents is clearly very closely related to their nature of work. Those who are capable in computer application are mostly from the administration department (30%). Only 8.0% of the respondents never use computers before due to lack of interest and knowledge.

### Barriers that Hinder IT Usage

Computers application should be clearly taught and encouraged to minimize the barriers in its acquisition. It is found that most respondents are quite familiar with the use of computers. However, there are still barriers that hinder their interest in advanced learning in the application of IT. The inability to own a computer (43.4%), low English proficiency (42.2%) and difficulty in understanding new knowledge in IT (42.2%) seem to be the main problem faced by many workers. This shows that major barriers are not to be found in negative attitudes but rather in understanding new ideas or lack of proficiency in English which could hinder advanced learning in the application of IT.

### The level of IT application

An important prerequisite for knowledge creation is information. Knowledge creation is made possible only by

the availability, diffusion and productive use of information most prominently in the form of Information Technology (IT). The development of industrial sector in Malaysia requires a huge amount of skilled manpower that is well versed in IT. The application of Information Technology is vital in achieving competitive advantage. This study reveals that a large majority of respondents are only able to use low capacity network services, mainly the e-mail (73.8%), electronic newspaper (43.8%) and electronic classified advertisement (42.0). Many of them are not aware about other services especially from the high capacity network. Most of the services are alien to those services because of limited exposure and ignorance among them.

## CONCLUSION

ICT is a major enabler of today's globalisation process. Cultural influences on IT usage amongst industrial workers would enhance their competitiveness in terms of skills and knowledge. Workers should be equipped with the appropriate values, beliefs and behavior in handling IT to facilitates the acquisition and exploitation of information in a more practical and profitable way. Computer literacy is an important asset that would facilitate the acculturation of IT in their everyday lives. Our study shows that workers' cultural attributes such as their love for knowledge, perception towards IT and willingness to take risk influence IT usage. The main problems that hinder IT application is the inability in to own a computer, low English proficiency and difficulty in understanding new knowledge. A large majority of them are only able to use low capacity networks services, mainly the e-mail, electronic newspaper and electronic classified advertisement. The workers' perception towards the ease of using computers and its compatibility with their kind of occupation are strong determinants for the actual usage of computers.

The acculturation of IT demands a shift in mindsets and attitudes towards IT. Workers should be exposed to IT application to enable them to explore the benefits, usefulness and easiness of using computers. Management plays an important role in providing their workers with adequate facilities and training to enable them to develop their skills and knowledge from IT application. They should be encouraged to be innovative, risk-averse and perceived IT as an enabler rather than a complicated difficult technology. These values and capabilities in IT should be acculturated among industrial workers to enhance their competitiveness and capabilities in the globalise world. Malaysians, particularly the industrial workers should be acculturated with IT capabilities in order to compete globally with others, in terms of knowledge and skills.

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