AN EMPIRICAL STUDY ON CRITICAL SUCESSUFUL FACTORS OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) USAGE IN SUCCESSFUL PRIVATE ORGANIZATIONS IN KUCHING

By:

Moh Ung Kieng

A research Paper Submitted in Partial Fulfillment of the Requirement For the Degree of Corporate Master in Business Administration

FACULTY OF ECONOMICS AND BUSINESS
UNIVERSITI MALAYSIA SARAWAK
2003

TABLE OF CONTENTS

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a research paper for the degree of Corporate Master in Business Administration.

Name   : Asleena Helmi
Supervisor

This research paper was submitted to the Faculty of Economics and Business, UNIMAS and is accepted as partial fulfillment of the requirements for the degree of Corporate Master of Economics and Business.

Name   : Assoc Professor Dr. Shazali A. Mansur
Dean, FEB
UNIMAS

DECLARATION AND COPYRIGHT
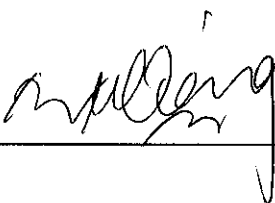
Name   : MOH UNG KIENG

Matrix Number   : 01-02-0621

I hereby declare that this research is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references and a bibliography is appended.

Signature   :

Date   : 15 MAY 2003

iv

ACKNOWLEDGEMENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study is to determine the CSFs that influence ICT usage among the successful private sectors across various industries in Kuching. Since government of Sarawak vigorously promotes ICT usage, it is interesting to investigate the salient factors that determine the extent usage of ICT among successful private organizations. Some organizations may be very successful without extensive ICT usage.

This paper shows firm level microanalysis of some critical successful factors on ICT usage in term of ICT budget expenditure. Evidences on ICT usage that is influenced by CSFs are provided, based on private successful firms level data of Kuching, Sarawak. It is found that in this study, there are four CSFs that have distinct implication on ICT usage of successful private firms in Kuching. The outcome shows that a private successful firm with business capability, greater and extensive exposure to ICT network especially e-commerce, higher employees' competence level and strong organizational support and favorable culture is likely to have more extensive or higher ICT usage in term of ICT expenditure budget.

The ICT sector includes the production of computers and peripheral equipment, software and programming services, communication services and electronics commerce of both Internet and many private and public sector Intranets (John A. Skip Laitner (1999); Henry et al. (1999) and OECD (1999)). The definition of ICT used throughout this report includes the use of Internet enabled devices such as PCs, printers, scanners, servers, mobile telephones, telephones and fax, leased lines, PDAs (personal digital assistants), modems and software applications.

The result of the findings may suggest policy of developing ICT industry in Sarawak as a whole.

Keywords: CSFs, ICT, and successful private organizations

1. INTRODUCTION

1.1 BACKGROUND STUDY

The emerging world is one of increasing electronic interactions in the economic, social and political spheres. The rise of the networked society at the global, regional, national and local levels is the outcome of the convergence of information and communication technology (ICT). With presumed benefits of ICT adoption, it is critical and timely to identify the CSFs that encourage ICT usage especially among the successful organizations in Kuching. Such defined factors will be very useful as a guide to other organizations and facilitate them to be successful in adopting extensive use of ICT in their organizations.

In addition, it is important to identify and overcome the barriers to the adoption and use of ICTs. Commonly identified barriers preventing the adoption and use of ICTs are low-income, low levels of education, unemployment and lack of technological or computing skills. All of these factors are correlated to, or are consequences of, socio-economic factors.

Sarawak government is continuously emphases the use of ICT in private sectors. In an environment characterized by rapid advance in ICT, Malaysia plans to leapfrog into the post-industrial age by leveraging ICT as a strategic lever for national development and global positioning. In 1996, Malaysia launched a program called "Vision 2020," which laid out a plan to build a fully developed, knowledge-rich Malaysian society by the year 2020 through the development of the ICT sector and the use of ICT to increase global competitiveness. The intent behind Malaysia's Multimedia Super Corridor (MSC) has been to create a high-tech environment and infrastructure that can attract national and international investors and create spillover effects in the rest of the Malaysian economy. The integration of ICT into overall national development strategies can help facilitate implementation, expand the scope and coverage, and increase the results for most of these factors. Moreover, development goals cannot be achieved by government efforts alone. The involvement of civil society and the private sector is crucial.

The production and distribution of Information and Communication Technologies (ICTs) has a large part to play in this process of digital revolution. As noted by Kotkin (2000), "the digital revolution is reshaping our communities in a manner not seen since the industrial revolution". The greatest impact of the ICT Revolution will be felt where people live and work. ICT fundamentally has the capacity to increase the quality of people's lives by enhancing the effectiveness of learning, the productivity and competitiveness of industry, and the well being of the nations. ICT will dramatically offer alternate modes of delivery of services and goods. None can deny that dramatic technological progress is observed in ICT. The millennium ushers with it a world of greater inter-connectivity, accelerating flow of data, and shrinking time and national boundaries. The force fueling this rapid transformation of isolated islands to inter-connected superhighways is Information and Communication Technology (ICT).

ICT promises to be a powerful and important tool for economic and social development, because of its inherent characteristics, like increasing the effectiveness and reach of development interventions, enhancing good governance and lowering the costs of service delivery and speeding the advent of globalization. Many of the most prosperous and prospective economies recognise the importance of this sector and are focusing their attention on further developing their skills and access to ICTs.

Rapidly falling costs of communications and computing and the extraordinary penetration and accessibility of World Wide Web is turning the world into a global village. In a way, ICT also provides a perfect bridge for matching demand and supply of information. It helps a recipient in locating strategic information and at the same time, creates potential users for particular information.

1.2 OBJECTIVE OF STUDY
As Kuching is progressing rapidly in the direction of becoming a cyber city, an important step amongst others, is to determine the critical successful factors for ICT usage and to take stock of the extent of ICT usage in the successful business community. This research synthesizes key statistics of ICT penetration and usage,

and provides a critical literature review of the CSFs of ICT usage in successful private firms in Kuching.

The key objectives of this research are to:

1) Gather information and obtain statistics to determine CSFs on take-up of ICT by successful firms in Kuching and may compare the statistics internationally, nationally, regionally and locally.

2) Explore the use of ICT by successful private firms that add values to them and its relationship to some critical success factors. Consequently, the study will assist to
- Address how economy sectors affect the level of ICT usage
- Assess the capability of the organizations that influence the level of ICT usage
- Relate the human resource on ICT competency to its positive effect on level of ICT usage
- Relate how organizational support and culture will influence ICT usage in a successful organization.

3) Review ICT evolution and use by successful private firms.

4) Identify some potential guidelines for policy implications arising from the research.

5) Provide a rationale for future research.

All these information gathered thereby can provide useful input for the elaboration of ICT policies, notably with the regard to areas such as ICT professionals, ICT culture promotion, development and adoption of new ICT trends such as E-commerce. This will also help to update Kuching current ICT statistics, which is useful to stakeholders in the ICT sector as well.

1.3 RATIONALE OF STUDY

Since ICT is such important that drives the new digital economy, it is important to analyze micro level evidences of ICT usage. ICT causes significant impact on business operation system, and our work places has changed dramatically with e-mail system and Internet. However, little research has been carried out into

the influencing factors on ICT usage for successful private firms in developing countries like Malaysia. Previous research and literature have highlighted the definitional problems of ICT usage for government bodies and private firms in other developed countries like UK, US. In fact there is currently no empirical research on the usage of ICT on successful private firms in Kuching.

Moreover, much research that has been carried out has taken a too 'deterministic' approach view of ICT. This has been predicated on the assumption that ICT must be a `good thing' for successful private firms. The presumption that adoption of ICT is beneficial, without any real attempt to understand the relationship between influencing critical success factors and ICT usage, is an inherent feature of much literature.

Firms differ in size, maturity, nature of business, location and turnover, and so a single stick or carrot policy is unlikely to be applicable to all firms. Thus it is favorable to argue that further research need to be undertaken in the private sector that recognises the diversity of firm and culture so that policy can more accurately be tailored to fit the successful private sector's requirements. Moreover, research has often failed to examine the role of capability, age, sector experience of ICT and management support within single, integrated studies. There has also been a failure to move outside the realms of normative or descriptive research in many instances.

This report presents the information that we may have been able to find and concludes with recommendations for research to overcome deficiencies.

Though there are only some 500 private successful enterprises in the Kuching, they are employing most of the workforce. The employment generating potential of this sector has been widely acknowledged as a key contributor to the regeneration of the Kuching economy. This sector is properly recognised as the main engine of growth for both business development and trading infrastructure locally in Kuching.

Though ICT is viewed to have tremendous contribution to economic competitiveness, ICT's penetration into Malaysia is

still considered ineffectual. For instance, despite the increased use of computer and mobile phones in business, e-commerce is still weak in Malaysia. To ensure the success in implementing ICT program, it requires large general support from ICT users, timely planning and constructing ICT infrastructure and then effective utilization of ICT. The forecast of ICT usage should be as accurate and timely as possible. To estimate the accurate ICT usage, it is first and of ultimate important to know the salient factors that will enable extensive ICT usage. Without preparing these entrepreneurs aligning to the transformation age of ICT, very soon they will definitely and slowly are out of place in e-market spaces. Consequently, the state's economy will be badly affected by not adopting to the ICT age of transformation.

Besides establishing fact of CSFs, it is believed that the information results from this study would enable stakeholders in the ICT industry and policy makers in general to make assessment on the following:
- The extent businesses use computer and related technologies
- How businesses use ICT for communication, marketing, and transaction purposes
- The overall impact of ICT on businesses
- The opinions of businesses on these technologies and
- Barriers for businesses to further develop their capabilities in this area

1.4 LIMITATION
It should be noted that the study is a snapshot or cross-section in time and, to that extent, the data and statistics will be subject to rapid change. We should also caution against treating increase in ICT expenditure as evidence of use. For example, much of the increased expenditure in 1999 in most organizations was due to Y2K. As the empirical work has tended to be cross-sectional in nature, making time-series comparison much more difficult. Given the focus of successful private organizations on ICT usage to this study, there is a research vacuum on ICT adoption of other organizations.

The next section provides literature review on ICT usage and its CSFs, which is followed by data description and regression analysis parts. This paper concludes with some findings and future research agenda.

2. LITERATURE REVIEW

2.1 ICT USAGE

In this context, the level of adoption and usage of ICT in an organization is indicated by the amount of expenditure on telephone traffic charge, Internet access charge, fax, leased lines, Intranet and extranet, consultation, training, hardware and software investment. The penetration rate of employees with access to computers, Internet and log on duration to the computers and Internet by the employees may also need to be included if possible for assessing the level of ICT usage.

Brock (op.cit) suggests that ICT use in enterprises varies according to:

- Size of firm the smaller the internal resource base, the less likely it is to use ICT;
- Age of firm younger firms may be more likely to use ICT and Enterprises with younger employees may be more likely to use ICT;
- Industry sector of firm wholesaling and retailing may be more likely to use ICT than other sectors;
- Firm's experience of ICT, including top manager role and end user ICT experience is important;
- Role of external support informal and formal sources are very important; and,
- Usage pattern of ICT. For example, SMEs use ICT mainly for operational and administrative support rather than for strategic decision-making.

Currently, only 40 per cent of the Small and Medium enterprises in Malaysia are using the Internet while 70 per cent use e-mail facilities. In Canada, Internet usage, an ICT product, increases as the price of Internet access and computers fall. 57 % of the households used their PC for Internet access. Accessing Internet is third most popular application after words and playing games (Survey reports by A.C. Nelson Canada, Markham Ontario, 1999).

Malaysia needs to start creating technology and increasing Internet penetration to ensure future economic success. As the world's economy continues to expand, fuelled by the Internet and digital technology, success in this new environment requires

Malaysia to further develop its ability to create and use technology (Datuk Dr. Craig Barrett, 2002).

Since 1992, Malaysia has fixed line telephony service penetration has grown from just over 11% to 19.8 % today and forecast to reach 24% by 2007 (ovum, 2002). The number of Internet users in Malaysia increased from 1.5 million in 1998 to 7.5 million in 2002, a growth of 400% over a period of 5 years (PIKOM Market Information Report, 2003). It will be more than 8.9 million by 2007 (Ovum 2002).

Table 1: Estimated Statistics for PCs and Internet in Malaysia

	1995	1996	1997	1998	1999	2000	2001	2002
PC's – Active Installed (units)	610K	760K	1.03M	1.6M	1.8M	2.2M	3.0M	3.6M
Number of Internet Subscribers	18K	90K	200K	400K	700K	1.4M	2.0M	2.6M
Number of Internet Users	30K	180K	500K	1.5M	2.8M	4.0M	6.5M	7.5M

Source: PIKOM

With a population of 22.2 million in Malaysia and estimated Internet population of 7.5 million in year 2002, a large portion of the people is still not wired. The typical Malaysia cyber buyer uses e-mail, does research for work and education purposes, and downloads software. Fifty percent (50%) of the cyber buyers search for information on web site via search engines. Majority of the Malaysian Internet users who have shopped online are because of convenience, followed by unique merchandise, competitive price and promotion offers (PIKOM and Technowledge Asia, 2000).

Although the PC penetration rate in homes is low in Japan, at around 20%, cellular phones and Internet access through cellular phones is diffusing at an astonishing rate, so we may say that the ICT revolution is picking up momentum through different media (Kumiko Miyazaki, 2001).

Analysis for all UK adult users found that the most common online activities for these groups were: searching for information about goods and services (74 per cent), using email (73 per cent), purchase of goods and services (42 per cent) and purchase and

7

use of financial services online (28 per cent) (ONS, 2002). As per capita, South Korea has the highest usage of the Internet and mobile phones in Asia Pacific (Vanessa Harvey, Ian Swan & Andrew McDougall, 2001). Policy that aims to increase spending in research and development in ICTs strengthen national competitiveness as well as improve the quality of life in Korea to ensure a skilled workforce can be retained.

In term of ICT expenditure, a greater proportion of the budget has been spent on three main items namely, software, consultancy and hardware. In Malaysia, as shown in table 2, the revenue generated from IT industry has been increased from RM3,800 millions in 1995 to RM7,151 millions in 2002, with an annual growth rate ranging from 8% to 30% except for the year 1998 which was due to financial crisis in ASEAN countries (PIKOM Market Information report 2003).

Table 2: Estimated Malaysia's IT Industry Billings

	1995	1996	1997	1998	1999	2000	2001	2002
Revenue (RM mil)	3,800	4,940	5,380	4,840	5,230	5,910	6,501	7,151
Growth rate (%)	26	30	9	(10)	8	13	10	10

Source: PIKOM

Moreover, use of other technologies other than PC's, such as WAP, GPRS, and third generation mobile phones and digital television are growing at a fast rate throughout the world (Millar (2002); Enders Analysis (2001)).

2.2 CAPABILITY

2.2.1 SIZE OF THE ORGANIZATION
Firm size has a large effect on network adoption, i.e., the larger the firm is the more likely it introduces information networks (Dunne (1994); Baldwin et. al (1995)). Organizational factors: Business size is a factor that affects adoption of FEDI (Financial Electronics Data Interchange) (Lee, 1998). Larger capitalized organizations have been found to have positive relationship with technology adoption (Kimberly and Ermiska, 1980). The survey of AMT (Advanced Manufacturing Technology) in the U.S. shows that the largest obstacle for introducing AMT is "cost associated with investments" (U.S. Bureau of the Census

8

(1993)). Another difficulty, can be seen in other developed countries, is "lack of expertise" (Northcott and Vickery (1993)). Both of reasons comply with the size effect of technology adoption rate.

Auger and Gallagher (1997) suggest that "SME's are more vulnerable because of their lack of financial and human resources as well as infrastructure resources that are needed to sufficiently understand and master the organisation and its environment".

Financial support is identified as one of the major obstacles for companies to invest network infrastructure like Internet. The cost forms a barrier to ICT usage. A study shows that 84% of companies in Malaysia have Internet access. About 60% of these companies use dialup accounts as it is less costly; while 18% use leased lines which are more popular with larger firms especially those from IT related Industries. Unaffordable access is probably the single most important reason for low use of ICT including Internet in developing countries (UNDP programs, UN millennium Summit report 2000). Recent reductions in access prices may make these more affordable for domestic customers in socially excluded areas (Local Futures Groups, 2001). Non-users alongside training, regard reduction of costs, such as access and use costs as the major incentive to increase ICT adoption and use (Tech Europe, 2001).

Low-income earners are lack of affordable routine access to ICTs (Cullen, 2001). This literature also applied to private firms in the same manner.

A large proportion of Internet users reside in Kuala Lumpur, Johor, Selangor, Penang, Sarawak and Sabah (PIKOM/Technowledge Asia, 2000). It may be because of the higher income per capital in these states.

Establishment would try to modernize and increase their efficiency by using ICT as their turnover grows (Report on ICT survey 2001, National Computer Board, Maritius Island). A possible explanation to this relationship could be that well-established enterprises may be in better position to afford to ICT adoption than those recently incorporated.

2.2.2 ICT INFRASTRUCTURE

The capacity of organizations to function effectively in the E-World needs to be developed and strengthened. We need to develop and strengthen the capacity of our organizations and institutions to function efficiently and effectively in the emerging networked global society. Lack of robust telecommunication infrastructure (Cullen (2001); Revenaugh (2001)) in the suburbs do not benefit from the potential offered from the capacity that ICT should offer.

The upgrading of the infrastructure for ICT is considered one of the most dominant emphases of development in recent years. The ICT infrastructure comprises the mechanism/media for the transfer of information. These include newspaper, radio television, telephone, mobile phone, facsimile machine, Internet, Local Area network (LAN), wide area network (WAN), security structure etc. More recently, the usage of Internet has been on the rise and facilitates greater distribution of information and communication. Today entrepreneurs have begun to utilize the ICT infrastructure for their customer relationship management to increase their competitiveness in the global market (Economic Briefing To Penang State Government, Volume 2, Issue 7, July 2000).

ICT infrastructure like PC, telecommunication facility should be available in the first place to provide ICTs access. To ensure extensive use among all employees, sufficient access should be available in the organization. Even though providing access to ICTs is a precondition for its use, this does not mean that access in itself will ensure the use of ICTs. What our literature review suggests is that related to lack of access there are additional barriers that constrain ICT use and that there is a need to develop and implement policies that go beyond widening access and instead focus on encouraging use.

Some research studies were found that supported a positive relation between the provision of access and increased use and some literature reviews highlighted that there are additional reasons that account for low levels of use even when free ICT access is provided in the organizations. Main areas where action may be undertaken to enhance ICT access are education, provision of ICT training and skills, enhance interest and

relevant content and provide access at a location required by users.

2.3 EXPERIENCE AND EXPOSURE TO ICT NETWORK

2.3.1 E-COMMERCE THROUGH WEBSITE
Electronic commerce is expected to double annually over the next five years. As such, there is a huge demand for ICTs (Vanessa Harvey, Ian Swan & Andrew McDougall, 2001). The world is concurrently moving rapidly into E-Business and E-Commerce activities. It is estimated these activities would amount to US$ 1 trillion in the year 2003. Website is considered to be an essential tool and facility for e-commerce and e-business activities. Sixty percent (60%) of companies in Malaysia do not have a website, while 40% have set up website. Despite the infancy of e-commerce, 8% of the companies have an e-commerce program or are in the process of implementing one. A more encouraging 11 % of the corporate have actually purchased online. The top purchases were software and hardware (Technowledge Asia's Malaysia Corporate Study, 1999).

Malaysia needs to take cognizance of these trends and act fast in order to be an active participant in the fast emerging E-World. With the establishment of the Multimedia Commission and the gazetting of the Digital Signature Act on 1 April 1999, the nation is poised to actively participate in E-Commerce (NITC, 1999). Thus e-commerce and e-business somehow is increasingly important for new digital economy and successful private firms should take the lead to venture this e-commerce and then induce ICT usage tremendously. Electronic commerce is already, and will increasingly be, the driving force behind ICT investment in world, and a key factor in the development of the competitiveness of the ICT industry. Electronic commerce fuels purchases of ICT products and services. More importantly, it drives even more rapid growth in investments in software and business services. Finally, electronic commerce has a crucial role to play in enhancing the global single market objectives.

Through e-commerce, the companies are able to reach global audiences for the product without having to establish a physical presence. E-commerce network is emerging as the largest, richest, borderless and diverse markets of goods and services and

ideas that the world has ever seen (Telekom Malaysia executive director, Datuk Dr. Abdul Rahim Hj Daud, Computimes 2000). The significant structural change may be driven by recent development in ICT, especially from the economic activity support be electronics commerce (Romm (1999); Koomey (1999); Romm, Rosenfeld, and Hermann (1999)). The immediate impact through e-commerce is that delivery of integrated public services online (London Connects, 2001). Such delivery service not only saves time but also ensures just-in-time delivery. This efficiency will brings values to both buyers and sellers and subsequently promote increase ICT usage.

Exposure to e-commerce begins with awareness campaigns of website or web page. Campaigns aimed at raising awareness of the technology and it potential benefits, increasing acceptance levels of ICTs, enhance use of ICTs, increase understanding of ICTs and help build positive attitudes towards ICT (PAT 15, 1999).

2.3.2 OUTSOURCING
One of the factors that address the adoption of Financial Electronics Data Interchange (FEDI) is external factor: competitive intensity, information intensity, intermediaries and trading partners, other industrial partners (Lee 1998). Such partners include outsourcing partners.

ICT may affect inter-firm organizations, for example the strategic outsourcing of its production activities builds up the relationship with suppliers and customers. Theoretically, a firm's decision on outsourcing depends on whether outside resources show technological superiority or higher productivity compared to the firm itself.

Market competitiveness (Kmmathue, Ahmed, and Charles, 1996) and pressure from other trading partners (Grova, 1993) have impact on ICT utilization. Because today's market place is increasingly competitive for many industries, firms are willing to explore the adoption of innovations in attempt to gain a competitive advantage (Porter, 1990). Through outsourcing, the company can be more focus on its core business and achieve the competitive advantages.

Plenty of competitors' information is available at their websites and Internet database. In Penang, one of the states in Malaysia with most **Internet** users, on average a typical CEO (chief operating officer) logs on to the Internet for 10.3 hours per week of various reasons. These include news update (29%), competitors' information (18%), internal company information (18%), personal finance purposes (1 1%), personal entertainment (10%) and other 14% (Economic Briefing To Penang State Government, Volume 2, Issue 7 July 2000). So obtaining competitors knowledge through Internet and websites ranks as one the most popular reasons for CEO to log on to Internet.

In addition, transaction costs associated with outsourcing, due to imperfect contracts, need for monitoring, etc, should be taken into account. Brynjolfsson et al. (1994) have argued "the advancement of ICT makes outsourcing activities more cost efficient, because ICT lessens coordination cost". By using ICT, a firm can shift its resources to supporting functions of the value chain such as business planning and R&D department, by improving efficiency in direct value creation departments, such as production, logistics and sales (Porter, 1985). Many non-ICT organizations will normally outsourcing of ICT activity like developing website. It is natural to assume that a firm with larger sales is likely to outsource its production (Kazayuki Motohashi, 2001).

2.4 EMPLOYEES' LITERACY AND ICT COMPETENCY

The factors that took priority in the past were cost, efficiency and performance, but more recent research studies suggest that alongside cost, access to skills and expertise are deemed essential factors for the adoption and appropriate use of ICTs. It has also been recognised that access to skills can be viewed as an inhibitory or driving factor (Roisin Mullins and Yanging Duan, 2000). It is obvious, but has occasionally been forgotten at some access initiatives, that users need basic computing and ICT skills before they can make use of access initiatives. Individuals with low or no ICT skills will be unable to use the technology even if it is available to them.

The knowledge and skills bases of private firms are important to consider as well as age of firm, size and maturity or exposure of ICT usage. We need to focus on building the capabilities

(Knowledge and skills) of our people, individual Malaysians (NITC. Mar 1999). Handling ICT, hosting of information and retrieving useful information from the net does require a fair amount of technical skills and net-literacy. An introduction of ICT system changes work at the organization in such a way that manipulating the system may need higher skills. This skill biased technical progress is supported by empirical studies for ICT investment. For example, computer investments lead to a greater share of white-collar workers with higher educational achievement, (Berndt and Morrison (1990); Berndt et. al. (1992)).

Literature indicates that individuals with low-levels of education and low-income levels had little awareness of ICTs and little knowledge of ICTs and the way in which it could enhance their quality of life. For instance, four out of ten non-users lack an understanding of how ICT may improve the quality of their life (Tech Europe, 2001). Low level of education affects the individual self-confidence. Lack of confidence and self-esteem are a barrier to ICT adoption (Katz and Aspeden, 1997). Only 12 per cent of people that had low educational achievement had ICT skills (Tech Europe, 2001).

Digital literacy has become a basic condition for getting and keeping a job (Tech Europe, 2001). Manual workers and low skilled workers have little or no access to ICTs in the work place (Local Futures (2001); Cullen (2001)). Moreover, content is commonly over-dependant on literacy and published mostly in English hence it makes it difficult to comprehend for poorly educated people or those who do not speak English (Katz and Aspden, (1997)).

Training is one the most practical and fast pace to acquire skill and knowledge. Training is targeted toward the acquisition of ICT skills, and knowledge of the capabilities of ICTs (Kibirige (2001); Conhaim (2001); Bickler (2001); Revenaugh (2000)). For non-users training is regarded as the most important measure towards encouraging ICT adoption and use (Tech Europe (2001)). Lack of free training available for individuals with low or no technological skills who cannot afford paid training (Katz and Aspden (1997)). Only four per cent of low-income earners have received computer training paid for by their employer and

only 12 per cent of low educated individuals have had any kind of ICT training (Tech Europe (2001)). This explains the inter-relationship between the education level, skill level and income level. It can generally deduce that a employee with the higher the level of education, the more training he will receive and the higher will be his income level.

In India, there is a large labour pool of highly skilled, low cost Labour because Computer education and training emerged in the 1970s and continues to be a major focus for the region. In the three years to 1999, ICTs earned revenues of some $12.2 billion, and the sectors showed increases of some 40.5%. This is twice the growth of many developed countries (Ian Swan, Director and Andrew McDougall, 2001). In terms of fostering high level ICTs, India is one of the most successful examples in the Asia Pacific region.

ICT literacy is defined as using digital technology, communication tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society (Digital transformation: Educational Testing Service's center for Global Assessment.). It is the basic skill and ability to use ICT products and services such as fax, phone, computer, and Internet etcetera to accomplish a practical task. ICT literacy enables individuals to maximize the capabilities of technology. (Telegraph, 31 October 2001).

Basic literacy is of crucial important for development to enable people to become ICT literate and will assist in decreasing the existing gaps currently defined as digital divide. ICT literacy can best be achieved through experiences that integrate cognitive and technical learning (Kelvin Gonzalez, May 7 2002). By 2006, nearly half of the US labor force will be employed by industries that are either major producers or intensive users of information technology and services (OECD, 1999).

2.5 ORGANIZATIONAL SUPPORT AND CULTURE

2.5.1 ORGANIZATIONAL SUPPORT
Blackburn and McClure (1998), found that "owner managers were a key influence in determining use, based on attitudes to ICT, level of ICT skills, and management orientation (i.e. IT-

focused or operation/administration-focused)". Research indicates that securing top management support is a good predictor of the level of success of new information technology (Ives and Olson, 1984). Strong support of top managers is vital to innovation adoption (Ettlie, Bridges and O'Okeefe, 1984) and thus also applies to adopting ICT usage. It goes beyond general approval for technology acquisition and includes strong commitment from top management to support the technology at all levels of organizations (Lederer and Mendelow, 1988). 39 per cent of non-users claim nothing could encourage them to use the Internet (Tech Europe, 2001). Thus management involvement in motivating and rewarding programs may drive these non-users to take up ICT application.

Management support is critical to establish compelling mission and vision to drive for ICT usage. As ICT is increasingly hailed as a vital facilitator in the involvement of business activity, education, medical and many others, such involvement and commitment from top management such as resource allocation is crucial for sustaining competitive advantages.

2.5.2 ORGANIZATIONAL CULTURE

Having money to spend on ICT is problematical for certain non-users groups, but even if resources are available it is possible they will not have the motivation, desire or skills to use it. Socio-personal barriers encompass attitudinal and behavioural factors. These include issues such as levels of interest, awareness, understanding and acceptance of ICTs. Nonusers generally have negative attitudes or no interest and resistance towards the adoption and use of ICT (PAT 15 (2000); London Connects (2001); Local Futures (2001); Enders Analysis (2001); Tech Europe (2001)). There is a correlation between the attitudes towards ICTs from different socio-economic groupings. Lower socio-economic groups appear to be more negative in their attitudes; higher socio-economic groups have more positive attitudes towards ICTs (Social inclusion and the information poor, 2000).

Acceptance is closely related to attitudes. Negative attitudes towards ICTs are a barrier to adoption (Cullen, 2001). If positive attitudes are developed acceptance levels are more likely to increase. The reason for this is that if an individual has a positive

attitude they will have the motivation and desire to use ICTs. If an individual is aware of ICT, it does not necessarily mean that they have a positive attitude towards it. Levels of awareness can be raised relatively easily, but it is important in any promotional campaign that ICT technology should also be associated with having a positive impact on an individual's social or work life.

In the circumstances, firms with lack of ICT personnel and small capability, it takes vision and strong leadership from managers for the creation of an environment where attitudes towards understanding and adoption of ICT's into the business plan are viewed in a positive way. Therefore the need to train personnel in appropriate skills and provide an understanding of the benefits of ICT's is a major factor. (Roisin Mullins and Yanging Duan, 2000).

In short, ICT culture and positive mindset of each employee together with the top management commitment and support are the enablers to increase ICT usage within the organizations.

2.6 ORGANIZATIONAL ICT STRATEGY

2.6.1 IMPACT ON ORGANIZATIONAL PERFORMANCE
It has been found that "high performance work systems" leads to high performance for firms (Ichiniowski et. Al (1996)). Brynjolffson and Hitt (1996) show that "innovative work practices work well with information system in a sense that improvement of communication efficiency by IT stimulates a workers motivation in a decentralized decision-making and incentive system". Innovation adoption research indicates that an organization will only choose to adopt an innovation if it perceives that doing so will provide significantly greater benefits than existing technologies and processes (Rogers (1983)).

Hammer and Champy (1993) stresses "the importance of ICT for business process re-engineering". An advance in ICT enables a firm to change its activities flexibly and organizational and human resource strategy (Brynjolfsson and Hitt (1996)). ICT is one of the most important enablers for the reengineering of the business processes, which, in turn, represents a source of company and process higher performance (Kallio et al. (1999); Davenport (1993)).

Some researchers assert a positive impact of ICT use on business performance (Barua et al. (1995)); Stratopoulos and Dehning (2000)), or report examples of benefits, in terms of added value and competitive advantage, achieved through ICT use (Andersen (2001); Dutta and Evrard (1999); Guimares (2000)). Others consider it scarcely significant (Strassman (1990); Yosri (1992)) or even assume a negative impact (Brynjolfsson and Hitt (1995); Holland and Lockett (1997); Setzekorn et al. (1998)). In any case, it is still not clear which factors influence or determine this contribution (Weill (1992); Mukhopadhyay et al. (1995); Broadbent et al. (1996)). Many studies on ICT and productivity are conducted by means of production function to estimate the rate of return of IT investment. Lichtenberg (1993) and Brynjolfsson and Hitt (1995), based on firm level micro-data, show that the marginal return of IT capital is significantly higher than that of other capital inputs. Firm level investigation into IT and productivity relationship picks up difference between `good firm' and `bad firm' in a sense of IT management.

2.6.2 ICT MANNING LEVEL

In the new economy, human capital is the single most important asset. Computer investments create more and better paid jobs (Kruege (1993); Doms et. al. (1997)) as there is still great demand of ICT workforce. This leads to the shortage of ICT labour and is critical for firms to decide minimum sufficient manning level of ICT staff. IDC's updated forecast shows that despite the economic downturn that started affecting European countries in 2001, European organizations continue to face a significant shortage of skilled ICT staff. Indeed, as shown in Table 3, IDC predicts that the shortage will increase from more than 1.1 million professionals in 2001 to almost 1.7 million ICT professionals by 2005, representing a shortage of 12%.

Table 3: Shortage and % of shortage in the countries Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

	2000	2001	2002	2003	2004	2005
Demand	10,368,851	10,957,538	11,837,533	12,874,484	13,614,357	14,302,430
Supply	9,216,104	9,821,918	10,580,954	11,288,395	11,974,980	12,634,371
Shortage	1,152,747	1,135,620	1,256,579	1,586,089	1,639,377	1,668,058
%	11	10	11	12	12	12

Source: IDC US

Workplace is a factor for employees to access ICT world. Strategic plans, such as providing free ICT access to email and Internet facilities for employees within the workplace, will tend to increase the penetration of ICT usage among the employees. These plans have to be integrated and interrelated to the individual culture change agenda.

2.7 BUSINESS NATURE: ACTIVITY AND BUSINESS MODEL

The level of computerization is compounded by the extent of computer usage in the various economic sub sectors. In Malaysia, Manufacturing and Banking/Finance sectors attributed the highest percentage of 18% and 11% respectively whereas healthcare sector attributed 1% in ICT expenditure in year 2002 (PIKOM Market Information report 2003).

Table 4: ICT Expenditure By Sectors in Malaysia 2002

Economic Sector	Percentage %
Manufacturing	18
Banking and Finance	14
Distribution	11
Government	11
Telecommunication	8
Home	8
Oil and Gas	5
Utilities	4
Professional services	4
Education and Research	4
Transport	3
Healthcare	1
Others	9

Source: PIKOM

There are reports show the use of computers varies greatly across the industry sectors, with lowest usage in the agriculture sector and highest in the banking and insurance industry.

Figure 1: The Value of Information and ICT spending in the US by economic
Sector

High

Government

Finance Services

Manufacturing   Communications

Business/   Retail/Wholesale trade
Legal services
Engineering

Healthcare

Utilities   Pharmatical

Construction
Transportation

Agriculture

Low

Low   High

Volume of Information Exchange/Value of information
Source: Accenture analysis 2001
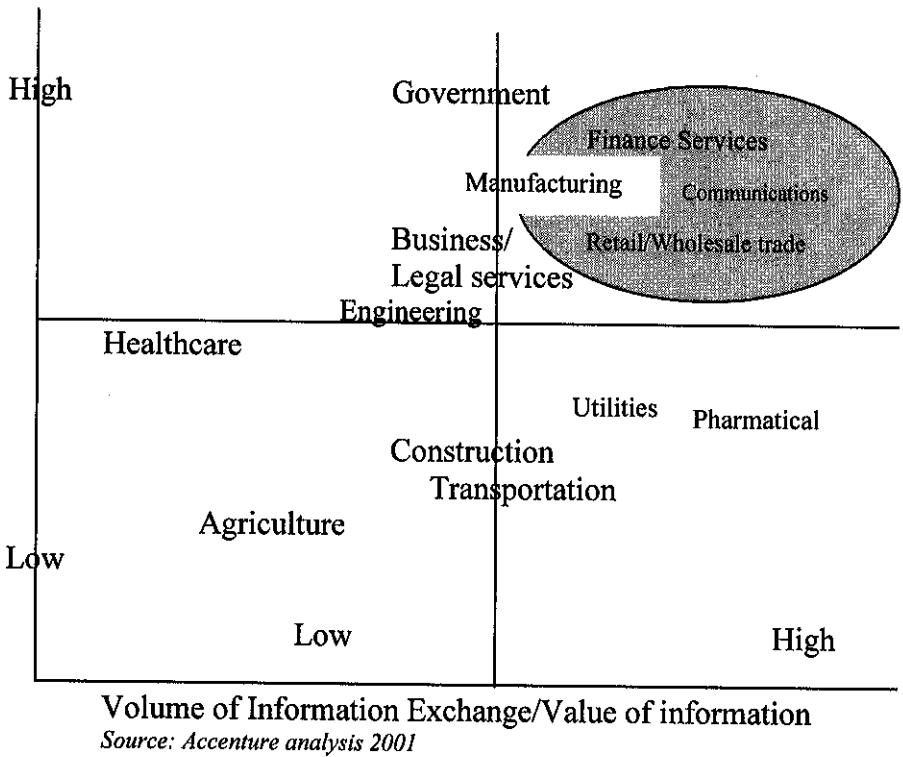
However, it is reported that use of Internet are mostly found in
the competitive sectors, such as Transport and Communication,
Banking/Finance/Insurance, whereby assess to information
enables quick delivery and hence provide an edge in business
activity (Report on ICT survey (2001), National Computer
Board, Maritius Island).

A report also indicated that 24% of Malaysian Internet users
have transacted on line for business related purchase (B-to-B).
This number will increase as economy improves as well as when
more companies set up and promote their e-commerce site in the
future and overcoming the top three purchasing inhibitors, that
is, lack of security, lack of physical contact and uncertainty about
Merchandise Quality (Technowledge Asia's Internet Consumer
Study, 1999).

3. METHODOLOGY

The research design for this study is exploratory in nature. Exploratory research is designed to provide a summary of some aspects of the environment when the hypotheses were tentative and speculative in nature (Aaker and Day, 1990).

3.1 THEORETICAL FRAMEWORK

A theoretical framework was developed to study the relationship between independent variables and dependent variable. Dependent variable is the ICT usage among the successful private organizations in Kuching, focusing on the extend use of ICTs such as computers, email, Internet and e-commerce. It can be measured in term of their expenditure in telephone, Internet, fax, leased lines, and intranet and extranet investment in hardware and software, ICT training and consultation. The independent variables in the study were derived from various reviews. Several variables or items were grouped into seven factors. The independent variables that influence the ICT usage in Kuching are: Capability of organization, Exposure to e-commerce, Level of employees' competency and literacy, Organizational strategy, Organizational culture, Organizational support, Business activity and nature

Figure 2: Theoretical framework

Independent Variables

Capabilities

Exposure to e-commerce

Organization Support

Organization Culture

Employees' Competency

Organization Strategy

Business nature & activity

ICT usage among successful private sector in Kuching

Dependent variable
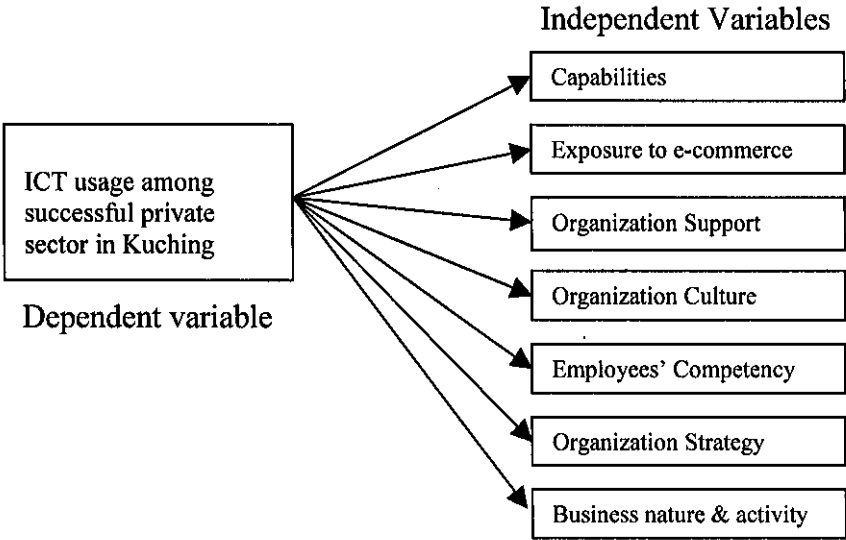
3.2 QUESTIONNAIRE

Based on our framework, the method adopted of this study is through survey. The survey distinguishes usage across the key economy activities in Kuching. A series of research questions to be addressed in a survey was developed. The data would be secured by distributing questionnaire to perceived successful private companies of various industries in Kuching. Kuching is chosen because, as the capital of Sarawak as well as the biggest city in Sarawak, most of the successful private organizations are located and operated with Head office in Kuching.

The model questionnaire was developed according to a two-fold structure:

First, to establish the generality of our observations, we had some simple descriptive questions regarding the background of the firms, their nature of business and their uses of ICT. For example: the nature of activity and business model adopted by the firms.

Second, we had questions about the relationships between these constructs. We asked about perceived effects or assessed the correlation between constructs.

Items for each construct in the questionnaire were based on the literature. The questionnaire consists of 37 statements covering all the possible elements related to each CSF contributing to the ICT usage. As the questionnaire would be developed as a survey tool for non-mandatory surveys, the burden on the respondents need to be judged to be an issue of major importance. Thus, in order to get best response from the survey, most questions were closed-ended (using five-point Likert scales, ranging from very low, to very high and the extended use of tick mark boxes), although there were several opened-end questions asking for perceptions about the general research questions. This is to ensure simplicity and ease to understand yet is able to achieve comprehensive covered survey. The issues on the use of ICT in general, together with the Internet, computer and e-commerce in particular comprise the core of the questionnaire. The questionnaire was pre-tested (Dillman, 1978), and then modified three times before distribution.

3.3 SAMPLING POPULATION
The sample would cut across all economy sectors: primary sector (agriculture), secondary sector (manufacturing and construction) and tertiary sector (service).

As successful organizations, the establishments in the sample would have the following criteria:
1) Have more than 10 employees
2) Have minimum annual turnover of more than 0.5 million Ringgit in the last financial year
4) Have paid up capital 1 million Ringgit or listed in Kuala Lumpur Stock Exchange and
5) Have been incorporated for at least 1 year.

The population of such successful organizations is estimated to be 500 according to Kuching Chinese Commerce Chamber and Kuching Bumiputera Commerce Chamber. Due to the vast geographical area to be covered in Kuching and the number of successful private organizations in Kuching, the sample size of about 40 - 100 may be sufficient and is recommended. The sample would consist of respondents selected from each economic sector via simple random sampling.

3.4 DATA COLLECTION
Sufficient time was allocated for the respondents to search for some organization information and complete the questionnaire. To obtain best possible response, most of the questionnaires were delivered personally and few through email.

The eligible respondents for the questionnaire survey were senior executives or IT executives who were able both to evaluate the ICT contribution to activities and to estimate the value of the main company indicators. This will enable to capture information on specific ICT needs of establishments.

3.5 DATA ANALYSIS TECHNIQUE
Data analysis includes descriptive statistics, factor analyses (reduction of multiple items to scales for various constructs), correlations and/or regression and ANOVA (testing relationships between constructs) and reliability test (e.g. Cronbach' coefficient alpha). Statistical software tool SPSS is applied.

3.5.1   Descriptive statistics analyses company's background and business activities, reasons and barriers to ICT usage, descriptive analysis would be utilized to determine frequencies, measures of central tendencies (mean), measures of dispersion (range, variance, standard deviation).

3.5.2   Factor analysis would be used to assess dimensionality of each independent variable by examining the factor loadings with SPSS. In order to test the reliability of the conceptual approach, and the grouping of the variables, factor analyses and rotated component matrix were computed for ICT usage and critical successful factors. Only these items with heavy factor loading of 0.5 or greater are used for the constructs of the factors and represent the good fit to theoretical framework.

3.5.3   Constructs like ICT usage and influences of various CSFs were measured by asking the respondents to rate on a five-point Lickert-type scale (ranging from very low to very high.

3.5.4   Reliability has been defined as the "degree to which measures are free from error and therefore yield consistent results"(Peter (1981)). Cronbach's (1951) coefficient alpha has been widely used to assess the reliability of measurement scale.

3.5.4   Inferential statistics technique include Correlation, analysis of Variance (ANOVA), and multiple regression analysis would be applied to determine whether the data collected would show any significant relationship between the ICT usage and proposed CSFs for using ICT or support the hypotheses significantly or not.

The remainder of this report examines each of these together with a discussion of each CSF that enhances ICT use.

4. FINDINGS

The factor analysis result for these variables substantially validates the theoretical framework, high loading in each variable is found. Factor analysis for ICT usage suggests an aggregation of seven components as a whole. The constructs specified by the research model had been statistically tested through correlation and multiple regression analysis.

4. 1. RESPONDENT PROFILE AND CHARACTERISTICS

Out of eighty-eight questionnaires, distributed to private successful firms, fifty-two responded, which gives a response rate of 62.5 %. Eight questionnaires were sent out through e-mail and only two responded, resulting email response rate of only 25%. This partly reflects the attitude of respondents in Kuching. Table 5 provides the profiles and characteristics of the firms responded.

Table 5: Sample Profile and Characteristics

Demographic Variable	Category	Frequency	Valid percentage
Business Activity	Primary	2	2 %
	Secondary	20	40 %
	Tertiary	30	58 %
Computerization	Website	24	46 %
	Internet access	48	92%
	Computer	49	94%
Age of firms	1-10 years	13	25 %
	11-20 years	20	38%
	Above 21 years	19	37%
Employees	Less than 100	23	44 %
	100 - 300	13	25%
	Above 300	16	31%
Business model	B2C	27	51.9%
	B2B	18	34.6%
	B2G	7	7%
Average Level of education	No formal Education	1	1.9%
	Primary	9	17.3%
	Secondary	28	53.8%
	Diploma/Certificate	12	23.1 %
	Degree /post graduate	2	3.8%

1. Two percent (2%) of the respondents were in primary economy sectors, i.e. agriculture and pottery, 40% were in secondary sectors, i.e., manufacturing and construction and 58% were in tertiary sectors, i.e. in service sectors.

2. Organizations that responded with less than 100 employees made up 44%, between 101 to 200 employees made up 21%, between 201-300 employees made up 4%, between 301-400 employees made up 10 % and finally more than 400 employees made up 21%.

3. Twenty-five percent (25%) of the responded organizations have been in operation for 1 to 10 years, thirty-eight percent (38%) for 11 to 20 years, and thirty-seven percent (37%) for more than 21 years.

4. Security seems to be well taken by the successful firms as 90% of the respondents recognized the importance of security in ICT usage

5. More than ninety percent (92%) of the respondents have Internet access and almost all respondents have computers.

6. Reasons for having Internet access are: Information search (29%), meeting customers need and trends (18%), exploring new mode of business (15%) and maintain competitive position (14%).

7. For e-commerce adoption, 46% (24 out of 52) of the establishments have websites and Main reason for the organizations to host website are: Growing confidence in technology (15%); to strengthen customers and supplier relationship (13%); to implement new mode of business (12%); to achieve competitive advantage (9%).

8. Fifty-five percent of those who have website hosted their websites by outsourcing. This may be because the market competition drives the company to focus on their core business. Also now the vendors are seeking opportunities and work extremely hard with what resources they have to convince their customers to use improved technology

to improve their business performance and gain a competitive edge.

9. The three main reasons put forward by most of the organizations for not having website has been high cost (11%), small market (11%), no demand (11%) and customer not ready (9%).

10. Establishments merely use the internet for email (25%), for information search (24%), for advertise and undertake marketing activities (10%), to get access to database of the suppliers (8%) and 8 % of them conducting purchasing of goods and services while another 5% sell over the net.

4.2 ANALYSIS AND DISCUSSION

An exploratory factor analysis was used to help assess the unidemensionality of the multi item scales. A principle components factor analysis using a Varimax rotation was performed using twenty-eight (28) items proposed to measure the following seven (7) constructs: *Capability of organization, Organizational Exposure to ICT activity especially e-commerce, Employees' literacy and ICT competency, Organizational ICT strategy, Organizational support, Organizational culture, Organizational business nature.* The criteria used to determine the number of factors to extract was an eigenvalue that was greater than 1 (Zeller and Carmines 1980). The results showed that all seven factors had eigenvalues exceeding 1.00 (Table 6). See also figure 3 - Scree Plot.

Table 6: Eigenvalues of seven factors
Total Variance Explained

Component	Initial Eigenvalues Total	% of Variance	Cumulative %
1	10.524	37.586	37.586
2	2.645	9.445	47.031
3	1.878	6.706	53.737
4	1.852	6.615	60.353
5	1.611	5.753	66.105
6	1.471	5.253	71.359
7	1.090	3.892	75.251

Extraction Method: Principal Component Analysis

Figure 3: Scree Plot

Scree Plot
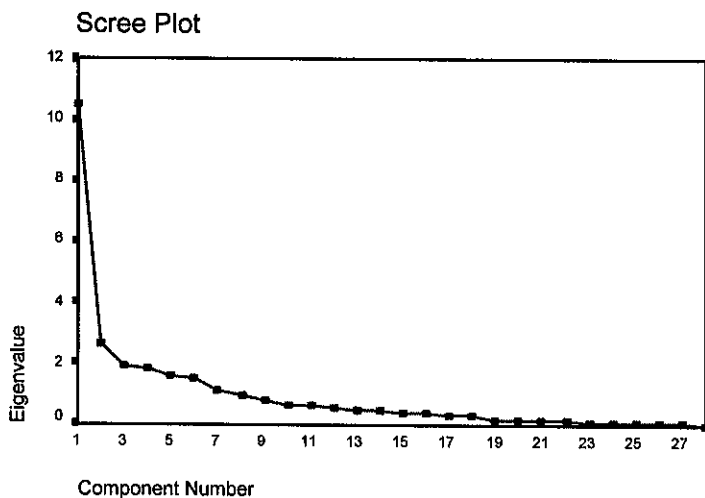
Dimensionally of each of the factor was assessed by examining the factors loadings. Items with the factor loadings of greater than 0.5 with which they are hypothesized to load were considered adequate indicators of the factor (Hair, et al., 1995) (see Table 2).

One aspect of reliability is internal consistency, which is an indicator of the level of homogeneity of a measuring scale (Cronbach, 1951). Here Cronbach's 1951 coefficient alpha is applied. Based on the reliability analysis result, three out of seven constructs had coefficient alpha more than 0.7 as Nunnally (1978) suggested that a set of items with a coefficient alpha greater than 0.7 is considered internally consistent. Because factors 4,5,6 and 7 had coefficient less than 0.7, its internally consistency were weak. Thus they were not used in subsequent analysis. However, factor 5* with reliability of 0.6937 was reexamined with related factor 6* elements to form additional factor, resulting four constructs to be considered internally consistent, with reliability coefficient of 0.734.

Table 7: Summarised of seven factors

Measurement Variables and Dimension	Factor Loading
Factor 1: Organizational Capability (Reliability X=0.9310)	
Capital of the organization	0.845
Annual business turnover	0.745
Total number of employees	0.669
Annual ICT budget expenditure	0.738
The network facility available	0.607
Communication facility	0.848
Computer and peripherals	0.816
Mode of Internet connection	0.666
Software application available	0.655
Factor 2: Organizational experience and exposure to e-commerce (Reliability X=0.9262)	
Availability of Website	0.888
Outsourcing of ICT activity including developing website	0.903
Frequency of updating website	0.795
Average monthly hits on organizational website	0.789
Factor 3: Employee literacy and ICT competency (Reliability X=0.7371)	
Education level of employee	0.648
Percentage of employees access to ICT	0.561
Percentage of employee undergone IT training	0.701
Factor 4: Organizational ICT Strategy (Reliability X=0.2492)	
Manning level of ICT in organization	0.747
Effect of computerization on organization performance	0.775
Percentage of employees having email account	0.514
Factor 5: Organizational support (Reliability X=0.6937)[1]	
Top management involvement	0.781
Satisfaction on ICT investment	0.828
Factor 6: Organizational culture (Reliability X=0.4425)[2]	
Organizational mission	0.582
Employee turnover rate in the organization	0.695
Factor 7: Organizational business nature (Reliability X=0.4995)	
Main activity of organization	0.767
Organization business model	0.733

[1] Item – Top management from Factor 5
[2] Item – Organizational mission from Factor 6
combined to form new factor 5*: Organizational support and Organizational culture

4.2.1 FACTOR 1: CAPABILITY OF THE ORGANIZATION

Its reliability coefficient of 0.9170 justifies for further analysis.

Table 8: Regression for factor 1

R	R Square	F	Sig. f
0.905	0.819	24.293	.000

Analysis shows that capability of an organization has strong relationship and ICT usage in term of ICT expenditure. The significant relationship between them at a confident level of more than 99.999% is also shown by the high Pearson Correlation value of more than 0.5 for any items under factor 1. The R-squared measures the proportion of the variation in the dependent variable (ICT budget) that was explained by the variations in the independent variables. Here the R-square indicates that 81.9% of the variance in ICT usage was accounted for by organizational capability.

It is generally acceptable that the larger the capital the organization has, the higher business turnover and larger number of employees, the larger will be the organization. If an organisation is large and supports integration between ICT and business functions then the skills required are already on board. However, for companies with few personnel equipped with necessary skills the practicalities associated with supporting ICT's and up- skilling the workforce become compounded and are viewed in a negative way (Roisin Mullins and Yanging Duan, 2000). Thus, generally the smaller the company the less likely it is to use ICT.

Larger capital and larger business turn over as a measure of larger organization may indicate the availability of financial resource for ICT investment and healthy cash flow condition. Profit is proportionally related to the business turnover. In general the higher business turnover brings more profit if the revenue generated from the turnover is more than the total operating cost. The retained profit becomes the capital or equity of the organization. Previous researchers indicated that larger organization tends to adopt new technology more quickly than smaller company as they have financial resource available to evaluate and adopt ICT technology. Larger capitalized

organizations have been found to have positive relationship with technology adoption (Kimberly and Ermiska, (1980)) because of their slack resources, economies of scale and competitive pressure needed to best utilize the technology.

Investment is always associated with cost and capital expenditure. Cost is the main barrier to adoption of ICT (UK annual survey (2001); US bureau census (1993)). Smaller or medium enterprises tend to have more limiting financial resources. Hence, initial high startup capital and maintenance costs may be viewed as an obstacle for embracing innovative technology to them.

The larger number of the employees in an organization, may directly imply the larger the organization is and thus, the more capability is the organization to adopt ICT utilization. This is because they have more capable human resource to adopt the new technology. This, however, this is inter-related to the skill and competency of the human resources that would be discussed in more details under employees competency. Smaller enterprises seem to lag larger enterprises because they: i) are often forced to accept market conditions as they find them, and are not able to shape conditions as easily as larger firms, ii) have limited resources for experimentation and cannot afford to make expensive mistakes, iii) often have small and clearly defined niche markets which are restricted to certain regions and certain parts of the value chain, iv) frequently have legacy systems which have become outdated, and which require further expenditure to replace.

It is natural that larger firms, with their larger capital and human resources to cope with successful investments, are likely to be an early adopter of new technology as compared to smaller ones are. Organizations with low-income earners are unable to afford equipment costs, access costs and telephone costs incurred in the access and use of ICTs (Katz and Aspden (1997); Hoffman and Novak (1999); Selwyn (2002); Brent Council (200 1)).

The essential network and ICT facility like computer and peripherals, communication equipment, Internet infrastructure, software applications are crucial to adopt ICT and promote ICT usage. All such facilities are referred as ICT infrastructure. Infrastructure forms the basic platform for ICT access. It is the

precondition for ICT adoption and use. ICT infrastructure for the access is inevitable initiatives for ICT use (Marilyn Leask & Alison Kingston, (2000). To equip with the ICT and network facilities, the organizations need to have the capability, in term of financial and human resources, to invest in these ICT infrastructure. It proved that the more capability of an establishment, the more sophicated ICT facilities would be available for ICT and thus subsequently increase the ICT usage as all the facilities are available anywhere and anytime without any constraints and limits. Graham/Marvin (1996) assume "the further promotion of the telecommunications infrastructure would be an important condition for a future oriented ICT-policy, especially seen in the light of globalisation, where importance shifts from the national to the global and local levels". Another way to increase ICT usage in organization is to provide organization public access points, especially for the low incomes group unable to afford access at home (Jones (2002); Tech Europe (2001)). Organizations are encouraged to set up ICT infrastructure for free access by employees.

Finally, widespread take-up of ICT by all categories of institutions, businesses and citizens requires the existence of an efficient infrastructure − e.g. high-speed communications - to allow the effective use of ICT services. In this respect, it is important to guarantee the availability of affordable services to users whose take-up of ICT is critical in expanding the usage of ICT.

In short, company characteristics, in term of size, turnover, etc affect the organization using innovative technologies include ICT (Spectrum, 1999).

4.2.2 FACTOR 2: ORGANIZATIONAL EXPERIENCE AND EXPOSURE TO E-COMMERCE

The Cronbach alpha of 0.9262 shows a high reliability or the consistency of the factor.

Table 9: Regression for factor 2

R	R Square	F	Sig. f
0.639	0.408	8.114	.000

Table 9 shows that there is significant relationship between this factor and ICT usage. The Pearson Correlation value for each item under this factor is in the range of 0.536 to 0.605. This factor also accounts for more than 40.8% variance of the total ICT usage. There may have several reasons to explain significant relationship between the ICT usage and this factor.

Website is a crucial means for e-commerce activity. The availability of organizational web site will encourage e-commerce that allows the purchase of products and services online (PAT 15, 2000). It overcomes geographical barriers by participating in meeting, creating new and maintaining existing social networks, shopping online (Kenyon, 2002).

The barriers to e-commerce can be overcome or reduced their effects through following methods: i) Establishments that frequently update website with latest information on organizational development will overcome lack of reliable information (Nath et al. (1998)), uncertainty over web (Sebev et al (1997); Ganasekaran (1998)), increase customer acceptance - suitability of product on web (Liang and Huang (1998)) and reduce concerns regarding unsuitable material or content (Livingstone (2001); Cullen (2001)). Such measures will subsequently increase the number of visiting hits of the company' website and thus increase ICT usage. ii) Legislation and legal and digital signatures (Satapathy, 1998) can improve apprehension towards conducting online payments due to security reasons (Cullen, 2001). It enables buyers and sellers to have secure Internet transactions (Sroka (1998); Nath et al. (1998)) and eliminate the concerns over confidential information (Cullen, 2001).

As a result, more ICT budget needs to be allocated for promoting e-commerce and also e-commerce is starting to take off well. Establishments are resorting more and more to electronic means of conducting business like having websites as they have confirmed that these are convenient ways to provide information about company information and they are growing confidence in modern technology in bole sting sales and access to global markets. [3]This survey shows that the main reasons for

---

[3]Refer to p.63, Appendix 4: Table 29, Figure 5

established organizations to have website are: Growing confidence in technology (15%); enhancing the trading process, use internet to access database of supplies like strengthen customers and supplier relationship (13%), to implement new mode of business (12%). [4]Moreover, 8% of them use the Internet for conducting purchasing of goods and services, 8% to get access to database of the suppliers and 10% of them to advertise and perform marketing. Auger and Gallagher (1997) suggest "drivers to ICT use through exploring the factors that motivate businesses to invest in e-commerce". The drivers are access to an affluent customer base; equal access for all – visually impaired (Rogers and Rajkumar, 1999); lower information dissemination costs; lower transaction costs; buyers and sellers cost reduced (Lee (1998); Segev et al (1997)); broader market reach; increased service; additional channel for customer feedback; consumer and market research. Informative, accurate and attractive website enables these drivers in practice and attracts customers and suppliers to gain information from the website.

Because today's market place is increasingly competitive for many industries, competitor and vendor influence the adoption of innovative technologies including websites (DosSantos and Peffers, 1998). In an environment where the firms perceives a high level of competitive intensity and rivalry, the firm is more likely to allocate funds for the adoption of innovations, e.g. e-commerce, websites, resulting in a greater level of overall innovation within the firms (Kimberly and Evanisko (1981); Reich and Benbasat (1990)). Often called 'web-shapers' or, "value creators or innovators" should be allowed to take the front-line in E-Economy activities to create new economic value and build organizational capabilities.

Outsourcing has impact on firm external relationship. There is substantial number of case studies related to the ICT's impact on firm's external relationship. Outsourcing to develop website is popular today and will affect the ICT usage positively. It is observed that ICT stimulates strategies outsourcing and allows a firm to concentrate on its core activities, because ICT improves communication efficiency with other firms. In addition, ICT can

---

[4]Refer to p.63, Appendix 4: Table 30, Figure 6

be used for effective management of suppliers and customer relationship in the concept of SCM (supply chain management) or CRM (customer relationship management) (Kazuyuki Motohashi, 2001). Contract theory suggests that ICT changes equilibrium of the decision to make or buy, and a firm with information systems tends to outsource its production (Brynjolfsson et. al. (1994)). Thus outsource can increase the ICT usage.

4.2.3 FACTOR 3: EMPLOYEES' LITERACY AND ICT COMPETENCY

"In the end, people are the business and the business with the best people wins the competitive battles". (Carly Fiorina, HP CEO (Feb 2000)).

With insufficient skills of the employees, the companies have little incentive to invest in ICT or the investments under way result in minor improvement of productivity (Oulu, 1999).

Table 10: Regression for factor 3

R	R Square	F	Sig. f
0.603	0.364	9.147	.000

The internal consistency is high with Cronbach alpha of 0.7371. There is significant relationship between the factor and the ICT usage with a confident level of more than 99.999% and of F-value = 9.147. A 36.4 % of variance in ICT usage is explained by the 3-predictor variables under factor 3. Pearson Correlation value for this factor ranges from 0.430 to 0.552.

Education serves as an enabler of ICT adoption and access in more than one way. Better levels of education should translate into more computer literate individuals. A beneficial cycle could be encouraged since the new opportunities for education and learning offered by the use of ICT should encourage the use and adoption of ICT. Thirty per cent of non-users are low educated individuals (Tech Europe, 200)). People with low educational levels are incapable of effectively using ICTs due to low levels of literacy (Selwyn (2002); Revenaugh (2001); Cullen (2001)). Less educated individuals demonstrate less interest in adopting and using ICTs (Oswald (2002); Tech Europe (2001); Hoffman and Novak (1999)). Moreover, ICT requires some basis language

for communication and application. Statistics point out that over 85% of the content on the net is in English, yet, fewer than one in 10 people worldwide speaks that language (Vikas Nath, 2000). Thus, the literary well-connected have an overpowering advantages and can increase the ICT usage. Establishment with high level of education and training are being able to overcome such language communication problem and will find themselves able to live and work in the E-World. South Korea has a long established educational sector to support the development of ICTs. Thus South Korea has the highest usage of the Internet and mobile phones in Asia Pacific, as per capita (Vanessa Harvey, Ian Swan & Andrew McDougall).

Increasing levels of general education and literacy might be a necessary precursor to the effective utilisation of ICT (Tech Europe, 2001). Again training will dismantle fear and build up confidence to use ICT. Studies indicated that training in ICT skills is relatively low, with only twelve per cent of low educated people having received any kind of ICT training and only four per cent of low-income earners receiving computer training paid by their employer (Tech Europe, 2001).

The greater proportion of employees who have access to ICT facilities, the higher would be the ICT usage. The percentage of employees using ICT will increase if each employee is given the equal right to access ICT facilities available in the organization. Research undertaken in Hounslow indicates that 48 percent of managerial and professional workers have access to the Internet at work, while only 5 percent of semi-skilled and unskilled workers did (Local Futures Group, 2001). ICT users believe that access is the most important initiative to encourage ICT adoption (Marilyn Leask & Alison Kingston, 2000). However, amongst non-users the most important factor to enhance ICT adoption was not access but training coupled with a reduction of access costs. These findings indicate that providing ICT skills training for all is just as important as providing access for all. Therefore training or support for non-users or new users should probably always be implemented alongside access initiatives. Access is a precondition for Internet use, but supporting activities such as raising an awareness and desire to use the Internet and the provision of training to develop basic levels of ICT skills are also important.

4.2.4 FACTOR 4: ORGANIZATIONAL ICT STARTEGY

The factor analysis results for the three variables support the theoretical framework with the factor loading of more than 0.5 as shown at table 7. But the reliability test gives a Cronbach alpha of 0.2492 (Table 17) reflecting the relevance of this factor in the sample hypotheses as the low reliability and no further analysis was carried out. The low reliability of this factor may be due to the difficulty and inconsistence in determining the impact of ICT on organizational performance and shortage of ICT staff nationwide.

Performance can be measured in many different ways (Steers (1977); Gupta and Govindarajan (1984); Venkatraman and Ramanujam (1986); Guimares and Armstrong (1998)). Some researchers have used single-item measures for company performance, such as company profitability (Snow and Hrebiniak, 1980). Much has been written about how ICT impacts on corporate performance, but the literature is not clear-cut and the work of Paul Strassmann in particular casts doubt on the evidence. The work of Paul Strassman (1997) has been particularly skeptical. He suggested, "There was no correlation between expenditure on ICT and any known measure of productivity". Strassmann suggested, "Spending more on ICT does not in itself boost economic performance". However, the number of different ways in which ICT may contribute to business performance, and the importance of content validity for such a significant measure, calls for multi-item measures. The items measured in this factor may not be sufficient or relevant and caused the inconsistency and low reliability.

A key issue is that whereas many of the costs of adoption are tangible and quantifiable, the benefits may be often speculative, intangible or difficult to quantify. The literature on business transformation highlights how difficult and perhaps inappropriate it would be to try to translate the benefits of ICT usage into quantifiable productivity measures of output (Brynjolfsson (1993); Brynjolfsson and Yang (1996)).

Numerous benefits have been proclaimed to result from the use of ICTs, but few studies are available that substantiate these claims. This variety of considerations highlights the fact that ICT benefits and impacts cannot be simply presented.

The manning level of ICT staff in these organizations surveyed does not reflect the actual demand of the ICT staff required. There is a large gap between the demand and supply for ICT manpower. Thus the measurement of the ICT staff level does not reflect the actual demand of the ICT staff and this leads to the unreliability of the construct measurement. IT-related jobs now represent an important and growing sector of activity. Demand for these professionals is expected to grow at an annual average rate of 8% in the coming years (European Information Technology Observatory (1999); EITO (1999); Data Corporation (1999)). One of the main of barriers to ICT usage, which can be identified from the relevant literature, is lack of staff to implement ICT.

The inconsistency and difficulty in determining the ICT impact on organizational performance together with no accurate figure reflecting the actual requirement of ICT manning level limit this factor from being taken into consideration as a CSF for ICT usage.

4.2.5 FACTOR 5*: ORGANIZATIONAL SUPPORT AND CULTURE

From Table 18 and 19, factor 5 shows a reliability of 0.6937 and factor 6 shows a reliability of 0.4425 respectively. Because coefficient alpha of factor 5 is close to the recommended level value of 0.7 (Nunally 1978), and from literatures, we strongly feel that organizational support and culture play dominant role in ICT usage. For example, organizational factors: *management support and vision* affects adoption of Financial Electronics Data Interchange (FEDI) (Lee 1998). Specific item of Management Involvement and the item of Organizational Mission yielded high reliability of 0.734. A new construct of Organizational support and culture (factor 5*) was analysed. This combined factor have a r-squared of 0.270 and shows significant relationship with ICT usage at a confident level of more than 99.999% with a f-value of 9.049. Pearson Correlation values are 0.425 and 0.490 for 2 variables under new factor 5*.

Table 11: Regression for factor 5*

R	R Square	F	Sig. f
0.519	0.270	9.049	.000

Strong support of the top managers is vital to innovation adoption (Bridges, Ettlie, and O'Okeefe (1984); Lederer and Mendelow, (1988); Zmud (1984)). Top management support goes beyond general approval for technology acquisition and include strong commitment from top management to support the technology at all levels of the organization (Lederer and Mendelow, 1988)). Research indicates that securing top management support is a good predictor of the levels of success of a new information technology (Ives and Olson, 1984). The participation, involvement and commitment of key trisectoral players are critical in making this transition happen. Trisectoral ownership of the comprehensive organizational planned culture change agenda is critical to the success of ICT adoption and usage (NITC, 1999). Martin and Matlay (2001) favor "a perspective that examines the reactive or proactive approach of managers to ICT, where perceptions and commitment are all-important".

Developing the organisational vision to address the ICT usage is probably the greatest challenge for present leader. This will require strategic direction from top management with clear goals and objectives focus. Clear leadership is required to draw initiatives and policies into a clear coherent whole. Strong organisational incentives and support is required to achieve joined-up delivery of initiatives and services. Moreover, there is a clear recognition of the importance of further developing the production of ICTs.

Readiness (culture, behavioral patterns or lifestyle) of individuals to adopt new technology, for instance, e-commerce, plays an important role in the process towards the information society. The fundamental challenge is to develop the Mindset to appreciate, understand and operate effectively in the E-World. The possession of a distinct mindset is imperative. 55 per cent of non-users show no interest in adopting and using ICTs (Local Futures, 2001). Thirty-nine per cent of non-users claim that nothing will encourage them to use the Internet (Tech Europe, 2001). These statistics clearly indicate that a considerable proportion of non-users will remain as non-users due to a lack of interest or negative attitudes toward ICTs. The program for developing new mindset of employees is essential. This is especially applicable to the groups who present higher levels of

resistance towards the adoption and use of new technologies and possess lower levels of awareness, interest and knowledge of ICT. Another effective way to change the mindset is to inform individuals of the benefits that can be derived from ICT use as it is exacerbated by the fact that four out of ten non-users lack an understanding of how ICT can improve their lives (Tech Europe, 2001).

To engender the requisite mindset at the individual, organizational or institutional levels, a mission to provide direction and goals of ICT usage together with a comprehensive and sustained organizational effort is required. A Culture Change Agenda needs to be formulated such as the Saemaul Undong Programme in Korea that was implemented in Korea in the 70's.

4.2.6 FACTOR 7: ORGANIZATION BUSINESS NATURE

The ICT adoption rate does not vary much across industries, which shows "general purpose nature" of information technology (Motohashi (1995); OECD (1997a)). It is also expected that these successful private firms are "early adopters" or "networked entrepreneurs" who are able to use the electronic network for maximum advantage. ICT is applicable to all type of business model. All models today use ICT extensively in order to facilitate the transactions.

The reliability test and ANOVA test shows that the factor is of low alpha Cronbach reliability of 0.4995 and of no significant relationship to the ICT usage. There may be several reasons to explain the insignificant relationship between the factor and the ICT usage.

Computer price index drops more than 10 % annually, and use of Internet has expanded explosively since 1995. These successful firms in all sectors are capable to computerize their operation and had already invested ICT infrastructure and facilities as the first movers to tap the competitive advantages. Moreover, ICT is presumed to be beneficial to all type of business activities. This can be proved from the survey that almost 100% of the firms have at least a computer.

One needs to distinguish the old economy from the new economy. In the old economy, it is costly to purchase PC and

lack of skill and expert. In the new economy, the product is often intangible. It might be consumed at the same time it is delivered, if one takes for example on-line music. While it might be costly to develop a product, once developed, the good can be reproduced at low marginal costs, for example software. Some important parts of the new economy are also characterised by the notion that the 'winner takes all'. These successful firms seem to take the full advantage of "winner takes all" as first mover to adopt ICT. Unlike in the old economy, where several brands usually fought one another for market share over many decades, in the new economy, when one brand becomes a dominant force, then it can become even more dominant through becoming an effective standard, for instance in computer operating systems. This partly explains the ICT usage has no significant relationship with the different business nature of the firms or economic sectors nowadays.

Because of emerging e-business and e-commerce, the costs of building organizational level ICT infrastructures may be high but there are no equally effective alternatives and the cost of not investing in such infrastructures may be even higher. Further, once the infrastructure has been laid, the low-cost of propagation technology will help organizations to leapfrog ahead through better access to market information, more cost efficient process, higher level of customer satisfaction and better governance. Thus almost all the successful private firms in all sectors are willing to invest for the initial ICT facilities and infrastructure. ICT infrastructure and facilities has been established in these firms. This can be proved from the survey finding that almost 100% of these firms are computerized.

The difficulty with such research is that samples are often self-selecting. In essence of the sample, these successful private firms have adopted ICT because they were aware in advance that their business would benefit in these ways. Also, as shown in Table 5 above, the sample has only 2 % respondents from agriculture sector as the number of successful agriculture firms is much less than those from services or construction and manufacturing sectors. This may cause some limits to quantify significant relationship between ICT use and the factor.

5. CONCLUSION AND RECOMMENDATIONS

The main objective of this study was to determine the CSFs that influence the ICT usage in the private successful firms through questionnaire survey of randomly selected private successful firms across all industry located in Kuching. Appropriate measures of control and precaution were taken during each step of study to obtain reliable and useful views and opinions. Factor analysis was used to group and minimized twenty variables to seven constructs for easier management. The correlation of the constructs was also analysed. As a result, three of the constructs were found to be not reliable: *Organizational ICT strategy, organizational culture and organizational business nature,* and were dropped from further analysis.

The empirical outcomes provide evidence about the existence of significant relationship between the ICT usage and four critical success factors, that is, organizational capability, organizational exposure to ICT network like e-commerce, employees' literacy and ICT competency and the organizational support. The reliability of the regression model does support such generalization and conclusion of the results from this sample that four CSFs have very strong and significant relationship with the ICT usage. In short, a private successful firm is likely to have allocated more ICT expenditure budget for ICT usage when it has greater business capability, more experience and exposure to ICT network especially e-commerce, higher employees' literacy and competence level, and stronger organizational support and favorable culture.

However, other factors at a micro and macro level which are not undertaken in this study will all play a part, and factors such as social-economic which can act as key drivers should not be overlooked in a policy context. For example, the measurement of ICT strategy in term of ICT impact on organizational performance and security need to be redesigned to improve its reliability and consistency. More precisely, results indicate that the main variables accounting for ICT usage are related to the four critical successful factors mentioned above. Further study aiming at providing useful information of the other CSFs influence on ICT usage is recommended in future. Further research is critical to enable deeper understanding of the impact of socio-personal factors as a barrier to ICT adoption and use.

The Malaysian market is developing, but needs to focus more on educational prospects, attracting increased levels of venture capital, diversifying the industrial base somewhat, and attempting to secure more firms dedicated to ICT adoption. Probably education can provide sufficient stimulus for the non-users to appreciate the benefits of ICT and enhance their desire to learn how to access ICT technologies. The private sector have a crucial role to play in creating a skilled, educated intellectual force with a strong penetration till the grass-root level of the employees throughout the organization. The ability to use knowledge, information and ideas to innovate new products and services and the entrepreneurial skills to market and sell will be critical for success in the digital economy. The challenging issue that remains is creating an enabling policy framework and vision statement supported by leader will and stimulant; and scaling up and design in this field.

BIBLIOGRAPHY

Aaker, D A and Day, G S (1990), Marketing Research, 4th ed, Singapore: John Wiley

Asian Technology Information Program (ATIP) (1997), Information Technology in Korea, available at www.atip.or.jp/public/atip.reports.97/atip97.060.html

Asian Technology Information Program (ATIP) (1998), Korean Government's Info Industry Strategy, available at www.atip.or.jp/public/atip.reports.98/atip98.023.html

Auger P. and Gallagher J.M. (1997), Factors affecting the adoption of an Internet-Based Sales Presence for Small Businesses. The Information Society 13:55-74

Baco and Brynjolfsson (1993), Information Technology, Incentives and the Optimal Number of Suppliers, Journal of Management Information Systems, Fall 1993

Berndt and Morrison (1995), High-tech Capital Formation and Economic Performance in U.S. Manufacturing Industries: An Explanatory Analysis, Journal of Econometrics, vol 65, 9-43

Berndt, Morrison and Rosenblum (1992), High-tech Capital, Economic and Labor Composition in U.S. Manufacturing Industries: An Explanatory Analysis, NBER Working Paper #4010

Brynjolfsson (1993), Productivity Paradox of Information Technology, Communications of ACM, December 1993, 66-77

Brynjolfsson and Hitt (1996), Information Technology, Organizational Architecture and Productivity: Firm Level Evidence, Mimeo

Brynjolfsson and Hitt (1995), Information Technology as a Factor of Production: The Role of Differences Among Firms, Economics of Innovation and New Technology, 1995 vol. 3, 183-199

Brynjolfsson, Malone, Gurbaxani and Kambil (1994), An Empirical Analysis of the Relationship Between Information Technology and Firm Size, MIT Sloan School CCS Working Paper #123

Computimes Series (1997-2002), New Strait Times Press, Kuala Lumpur

Cronbach, L J (1951), Coefficient Alpha and The Structure of Tests, Psychometrika.

Cyberjaya (2000): available at www.cyberjaya-msc.com

Cyberlaw Proposals in Malaysia (2000), available at www.apnic.net

Datuk Dr. Craig Barrett (2000), Knowledge Skills: Key to future economic success, New Straits Times, 28 August 2002.

David Canning (1999), Telecommunications Infrastructure and Internet use, Consulting Assistance on Economic Reform II (CAER), December 1999, available at www.hiid.harvard.edu.

Davidow & Malone (1993), The Virtual Corporation: Structuring and Revitalizing the Corporation for21st Century, Harper Business

Doms, Dunne and Troske (1995), Workers, Wages and Technology, paper presented at the Conference on the Effect of Technology and Innovation on Firm Performance and Employment, Washington DC,
1-2 May 1995

DosSantos B.L. and Peffers, K. (1998), Competitor and Vendor influence on the adoption of innovative applications in electronic commerce. Information and Management. Vol. 34, No. 3, 175-184

Economic Briefing To the Penang State Government, Vol 2 Issue 7, July 2000. "Information & Communication Technology: Implication Significance in Malaysia's Business Environment: A survey Report, available at www.seri.com.my

Gordon (2000), Does the "New Economy" Measuring up to the Great Inventions of the Past? Forthcoming in the Journal of Economic

Gunasekaran A. (1998), Agile manufacturing: enablers and an implementation framework. International Journal of Production Research. Vol 36, No. 5, 1223-1247

Hammer and Champy (1993), Reengineering the Corporation: A Manifesto for Business Revolution,Harper Collins

ITU Telecommunication Indicators Update (2000), ITU/EDT, Telecommunication Data and Statistics, available at www.itu.int

John A.Skip Laitner (2000), "The Information and Communication Technology Revolution: Can it be good for both the Economy and the Climate?" 2nd revision, EPA Office of Atmospheric Program Washington, DC, January 31 2000

Kazuyuki Motohashi, 2001, January: Economic Analysis of Information Network Use: Organizational and Productivity Impacts on Japanese Firms, Research and Statistics Department, METI, Tokyo, Japan

Kevin Gonzalez (2002), Defining, Assessing Information and communications Technology (ICT) Literacy, Princeton, N.J

Krueger (1993), How Computer Have Changed the Wage Structure? Evidence from Micro Data, Quarterly Journal of Economics, 33-60

Kumiko Miyazaki (2001), Technological Progress under the IT Revolution/ Enterprise Strategy and Technology Policy, 5th Annual Conference on Japan Association for Evolutionary Economics, Tokyo, Japan

Lee M.K.O. (1998), Internet-based financial EDI: towards a theory of its organizational adoption. Computer Networks and ISDN Systems. Vol. 30, No. 16-18, 1579-1588

Liang T.P. and Huang J.S. (1998), An Empirical study on consumer acceptance of products in electronic markets: a transaction cost model. Decision Support Systems. Vol. 24, No. 1, 29-43

Lichtenberg (1995), The Output Contributions of Computer Equipment and Personnel: A Firm Level Analysis, NBER Working Paper#4540

Loh L. and Ong Y. S. (1998), "The adoption of Internet-based stock trading: a conceptual framework and empirical results. Journal of information Technology. Vol. 13, No. 2, 81-94

Malaysia E-Commerce Landscape (2000), PIKOM/Technowledge Asia. www.pikom.org.my

Malaysian Internet Resources (MIR) (2001): National Recovery Plan: Information Technology and the Multimedia Super corridor, available at www.mir.com.my

Multimedia Development Corporation (MDC) (2000), available at www.mdc.com.my

Marshall K.P. (1999), Has technology introduced new ethical problems? Journal of Business Ethics. Vol. 19, No. 1, 8 1-90

Nath R. Akmanligil, M. Hjelm, K. Sakaguchi, T. and Schultz, M. (1998) Electronic Commerce and the Internet: Issues, Problems and Perspectives. International Journal of Information Management. Vol. 18, No. 2, 91-101

OECD (1997a), Information Technology Outlook, 1997, OECD, Paris

OECD (1997b), Technology and Industrial Performance, OECD, Paris

Oliner and Sichel (2000), The Resurgence of Growth in the Late 1990's: Is Information Technology the Story? Working paper, Federal Reserve Board, February 2000

Peter, J P (1981), Construct Validity: A Review of Basic and Recent Marketing Practices". Journal of Marketing Research.

Peter van Heusden, August (1996), A survey of Information Communication Technology in Sub-Saharan Africa, available at http://www.idrc.ca/acacia/studies/ir-heus.htm

PIKOM (2002), Online Retailing in Malaysia (2000), PIKOM/Technowledge Asia, available at www.pikom.org.my

PIKOM (2002), Overview of the Malaysia ICT Industry 2002/2003, available at www.pikom.org.my

PIKOM (2003), Market Information: Estimate Statistics for PCs and Internet, 2002, available at www.pikom.org.my

Porter, M E (1990), The competitive Advantage of Nations, New York: The Free Press

Porter (1985), Competitive Advantage: Creating and Sustaining Superior Performance, New York, Free Press

Porter, M.E. (1998) Clusters and The New Economics of Competition, Harvard Business Review, November-December

Roisin Mullins and Yanqing Duan (2000), Factors governing the use of Information and Communication Technologies, Proceedings of the Organisation Support Systems Conference, Ustron, October 2000 Poland, 359-366, University of Luton, UK

Stephen Graham and Simon Marvin (1996), " Telecommunications and the city. Electronic spaces, urban places", London and New York: Routledge.

Report on 2001 survey of ICT adoption of Businesses in Mauritius (2002), National Computer Board Maritius (NCB).

Report on Technowledge Asia's Malaysia Corporate Study (1999), Technowledge Asia Group, Singapore.

Report on Technowledge Asia's Internet Consumer Study (1999), Technowledge Asia Group, Singapore.

Rogers M. and Rajkumar, T.M. (1999), Developing electronic commerce Web sites for the visually impaired. Information Systems management. Vol. 16, No. 1, 15-25

Satapathy C. (1998), Legal framework for E-commerce. Economic and Political Weekly. Vol. 33, No. 29-30, 1906-1907

Segev A. Porra J. Roldan M. (1997), Internet-based EDI strategy. Decision Support Systems. Vol. 21, 157-170

Spectrum. (1999), Moving into the Information Age: Information Society Initiatives, Spectrum and DTI Publications.

Sroka M. (1998), Commercial development of the Internet and WWW in Eastern Europe. On-Line and CD-ROM Review, Vol. 22, No. 6, 367-376

Sukesh K. Ghosh (1991), Econometrics Theory and Applications Prentice Hall, New Jersey

Survey reports by A.C. Nelson Canada, Markham Ontario (1999), available at www.GlobeTechnology.com

UNDP (2000), Driving Information and communications Technology for Development, October 2000, A UNDP Agenda for Action 2000-2001, available at www.undp.org

UNDP (2001), Final Report of the Digital Opportunity initiative: Creating a development Dynamic 2001. Accenture, Markle Foundation, United Nation Development Program, available at www.undp.org

University of America (2000), Information Technology in Korea, available at www.american.edu/carmel/SL3913A/

U.S. Bureau of Census (1993), The Survey of Manufacturing Technology: Factors Affecting Adoption; SMT/91-2, U.S. Government Printing Office, Washington DC, 1993

William H. Greene (1993), "Econometric Analysis", 2nd Edition, USA

Young D. Carr H.H. and Rainer, R.K. (1999), Strategic implications of electronic linkages. Information Systems Management Vol. 16, No. 1, 32- 39

APPENDIX 1: RESULTS OF FACTOR ANALYSIS

Table 12: Factor Analysis : Determination of Eigenvalues >1
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.524	37.586	37.586	10.524	37.586	37.586	5.876	20.984	20.984
2	2.645	9.445	47.031	2.645	9.445	47.031	4.445	15.876	36.861
3	1.878	6.706	53.737	1.878	6.706	53.737	2.664	9.515	46.376
4	1.852	6.615	60.353	1.852	6.615	60.353	2.527	9.026	55.401
5	1.611	5.753	66.105	1.611	5.753	66.105	2.369	8.462	63.863
6	1.471	5.253	71.359	1.471	5.253	71.359	1.616	5.770	69.634
7	1.090	3.892	75.251	1.090	3.892	75.251	1.573	5.618	75.251
8	.920	3.286	78.537						
9	.789	2.818	81.355						
10	.652	2.330	83.685						
11	.610	2.178	85.863						
12	.542	1.936	87.798						
13	.510	1.823	89.621						
14	.442	1.577	91.199						
15	.423	1.511	92.710						
16	.371	1.325	94.035						
17	.344	1.228	95.262						
18	.335	1.198	96.460						
19	.182	.649	97.109						
20	.166	.593	97.702						
21	.149	.531	98.233						
22	.136	.486	98.719						
23	.108	.384	99.104						
24	7.044E-02	.252	99.355						
25	6.422E-02	.229	99.585						
26	4.995E-02	.178	99.763						
27	4.059E-02	.145	99.908						
28	2.578E-02	9.206E-02	100.000						

Extraction Method: Principal Component Analysis.

51

Table 13: Factor Analysis: Rotated Component Matrix

Component	1	2	3	4	5	6	7
YROPER							
CAPITAL	.845						
BIZTOVR	.745						
NOEMPLOY	.669						
EDUEMPLO			.648				
PEREMUSE			.561				
TRAINING			.701				
CULTOVER						.695	
ICTSTAFF				.747			
ICTBUDGE	.738						
MISSION						.582	
MGTINVOL					.781		
SATISFAC					.828		
PERFOEFF				.775			
ICTFACIL	.607						
COMFACLI	.848						
COMPACCE	.816						
MODE	.666						
APPLI	.655						
SECURITY							
EMAILUSE				.514			
INTERUSE							
WEBSITE		.888					
OUTSOURC		.903					
FREUPDAT		.795					
HIT		.789					
ACTIVITY							.767
BIZTYPE							.733

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 10 iterations

APPENDIX 2: RESULTS OF RELIABILITY TEST-CRONBACH ALPHA COEFFICIENT

Table 14: Reliability (Factor 1)

✶✶✶✶✶✶ Method 2 (covariance matrix) will be used for this analysis ✶✶✶✶✶✶					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. CAPITAL	2.7500	1.4535	52.0		
2. BIZTOVER	2.9808	1.3931	52.0		
3. NOEMPLOY	2.4231	1.6251	52.0		
4. ICTFACIL	2.9423	1.3048	52.0		
5. COMFACLI	2.6538	1.1696	52.0		
6. COMPACCE	2.6731	1.2323	52.0		
7. MODE	1.9423	1.2744	52.0		
8. APPLI	2.2115	1.1086	52.0		
N of Cases = 52.0					
Item Means Mean Minimum Maximum Range Max/Min Variance					
2.5721 1.9423	2.9808		1.0385	1.5347	.1288
Reliability Coefficients 3 items					
Alpha = .9170		Standardized item alpha = .9224			

Table 15: Reliability (Factor 2)

✶✶✶✶✶✶ Method 2 (covariance matrix) will be used for this analysis ✶✶✶✶✶✶					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. WEBSITE	2.8462	2.0135	52.0		
2. OUTSOURC	2.7692	2.0060	52.0		
3. FREUPDAT	1.0385	1.5076	52.0		
4. HIT	.7500	1.0824	52.0		
N of Cases = 52.0					
Item Means Mean Minimum Maximum Range Max/Min Variance					
1.8510 .7500	2.8462		2.0962	3.7949	1.2353
Reliability Coefficients 4 items					
Alpha = .9262		Standardized item alpha = .9424			

53

Table 16: Reliability (Factor 3)

****** Method 2 (covariance matrix) will be used for this analysis ******					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. EDUEMPLO	3.0962	.7985	52.0		
2. PEREMUSE	3.5769	1.3481	52.0		
3. TRAINING	2.7115	1.3625	52.0		
N of Cases = 52.0					
Item Means Mean Minimum Maximum Range Max/Min Variance					
	3.1282	2.7115	3.5769	.8654 1.3191 .1880	
Reliability Coefficients 3 items					
Alpha = .7371			Standardized item alpha = .7467		

Table 17: Reliability (Factor 4)

****** Method 2 (covariance matrix) will be used for this analysis ******					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. .ICTSTAFF	2.1923	1.1209	52.0		
2. PERFOEFF	3.7692	5.6694	52.0		
3. EMAILUSE	2.4038	1.5625	52.0		
N of Cases = 52.0					
Item Means Mean Minimum Maximum Range Max/Min Variance					
	2.7885	2.1923	3.7692	1.5769 1.7193 .7326	
Reliability Coefficients 3 items					
Alpha = .2492 Standardized item alpha = .4439					

Table 18: Reliability(Factor 5)

****** Method 2 (covariance matrix) will be used for this analysis ******					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. MGTINVOL	4.2308	1.5918	52.0		
2. SATISFAC	3.5385	1.9449	52.0		
N of Cases = 52.0					
Item Means Mean Minimum Maximum Range Max/Min Variance					
	3.8846	3.5385	4.2308	.6923 1.1957 .2396	
Reliability Coefficients 2 items					
Alpha = .6937			Standardized item alpha = .7028		

Table 19: Reliability(Factor 6)

****** Method 2 (covariance matrix) will be used for this analysis ******					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. CULTOVER	3.7885	1.1086	52.0		
2. MISSION	3.9231	1.7916	52.0		
N of Cases =	52.0				
Item Means	Mean	Minimum	Maximum	Range	Max/Min
Variance					
	3.8558 3.7885	3.9231	.1346	1.0355	.0091
Reliability Coefficients	2 items				
Alpha = .4425		Standardized item alpha = .4819			

Table 20: Reliability (Factor 5*)

******Method 2 (covariance matrix) will be used for this analysis ******					
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)					
	Mean	Std Dev	Cases		
1. MISSION	3.9231	1.7916	52.0		
2. MGTINVOL	4.2308	1.5918	52.0		
N of Cases =	52.0				
Item Means	Mean	Minimum	Maximum	Range	Max/Min
Variance					
	4.0769 3.9231	4.2308	.3077	1.0784	.0473
Reliability Coefficients	2 items				
Alpha = .7340		Standardized item alpha = .7373			

Table 21: Reliability (Factor 7)

****** Method 2 (covariance matrix) will be used for this analysis ******						
R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)						
	Mean	Std Dev	Cases			
1. ACTIVITY	2.5577	.5392	52.0			
2. BIZTYPE	2.3846	.7182	52.0			
N of Cases =	52.0					
Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.4712	2.3846	2.5577	.1731	1.0726	.0150
Reliability Coefficients	2 items					
Alpha = .4995		Standardized item alpha = .5148				

APPENDIX 3: RESULTS OF REGRESSION ANALYSIS

Table 22: Regression (Factor 1)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
CAPITAL	2.75	1.454	52
BIZTOVER	2.98	1.393	52
NOEMPLOY	2.42	1.625	52
ICTFACIL	2.94	1.305	52
COMFACLI	2.65	1.170	52
COMPACCE	2.67	1.232	52
MODE	1.94	1.274	52
APPLI	2.21	1.109	52

Correlations

		ICTBUDGE	CAPITAL	BIZTOVER	NOEMPLOY	ICTFACIL	COMFACLI	COMPACCE	MODE	APPLI
Pearson Correlation	ICTBUDGE	1.000	.620	.701	.521	.776	.709	.814	.626	.713
	CAPITAL	.620	1.000	.666	.643	.489	.606	.665	.468	.545
	BIZTOVER	.701	.666	1.000	.558	.452	.513	.567	.364	.485
	NOEMPLOY	.521	.643	.558	1.000	.474	.543	.540	.457	.602
	ICTFACIL	.776	.489	.452	.474	1.000	.680	.756	.599	.605
	COMFACLI	.709	.606	.513	.543	.680	1.000	.831	.776	.678
	COMPACCE	.814	.665	.567	.540	.756	.831	1.000	.712	.741
	MODE	.626	.468	.364	.457	.599	.776	.712	1.000	.717
	APPLI	.713	.545	.485	.602	.605	.678	.741	.717	1.000
Sig. (1-tailed)	ICTBUDGE	.	.000	.000	.000	.000	.000	.000	.000	.000
	CAPITAL	.000	.	.000	.000	.000	.000	.000	.000	.000
	BIZTOVER	.000	.000	.	.000	.000	.000	.000	.004	.000
	NOEMPLOY	.000	.000	.000	.	.000	.000	.000	.000	.000
	ICTFACIL	.000	.000	.000	.000	.	.000	.000	.000	.000
	COMFACLI	.000	.000	.000	.000	.000	.	.000	.000	.000
	COMPACCE	.000	.000	.000	.000	.000	.000	.	.000	.000
	MODE	.000	.000	.004	.000	.000	.000	.000	.	.000
	APPLI	.000	.000	.000	.000	.000	.000	.000	.000	.
N	ICTBUDGE	52	52	52	52	52	52	52	52	52
	CAPITAL	52	52	52	52	52	52	52	52	52
	BIZTOVER	52	52	52	52	52	52	52	52	52
	NOEMPLOY	52	52	52	52	52	52	52	52	52
	ICTFACIL	52	52	52	52	52	52	52	52	52
	COMFACLI	52	52	52	52	52	52	52	52	52
	COMPACCE	52	52	52	52	52	52	52	52	52
	MODE	52	52	52	52	52	52	52	52	52
	APPLI	52	52	52	52	52	52	52	52	52

Table 22: Regression (Factor 1) (CONT.)

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	APPLI, BIZTOVER, ICTFACIL, NOEMPLOY, MODE, CAPITAL, COMFACLI, COMPACCE[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: ICTBUDGE

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.905[a]	.819	.785	.593	1.910

a. Predictors: (Constant), APPLI, BIZTOVER, ICTFACIL, NOEMPLOY, MODE, CAPITAL, COMFACLI, COMPACCE

b. Dependent Variable: ICTBUDGE

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.325	8	8.541	24.293	.000[a]
	Residual	15.118	43	.352		
	Total	83.442	51			

a. Predictors: (Constant), APPLI, BIZTOVER, ICTFACIL, NOEMPLOY, MODE, CAPITAL, COMFACLI, COMPACCE

b. Dependent Variable: ICTBUDGE

Table 23: Regression (Factor 2)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
WEBSITE	2.85	2.014	52
OUTSOURC	2.77	2.006	52
FREUPDAT	1.04	1.508	52
HIT	.75	1.082	52

Correlations

		ICTBUDGE	WEBSITE	OUTSOURC	FREUPDAT	HIT
Pearson Correlation	ICTBUDGE	1.000	.574	.536	.556	.605
	WEBSITE	.574	1.000	.962	.751	.756
	OUTSOURC	.536	.962	1.000	.755	.750
	FREUPDAT	.556	.751	.755	1.000	.847
	HIT	.605	.756	.750	.847	1.000
Sig. (1-tailed)	ICTBUDGE	.	.000	.000	.000	.000
	WEBSITE	.000	.	.000	.000	.000
	OUTSOURC	.000	.000	.	.000	.000
	FREUPDAT	.000	.000	.000	.	.000
	HIT	.000	.000	.000	.000	.
N	ICTBUDGE	52	52	52	52	52
	WEBSITE	52	52	52	52	52
	OUTSOURC	52	52	52	52	52
	FREUPDAT	52	52	52	52	52
	HIT	52	52	52	52	52

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	HIT, OUTSOURC, FREUPDAT, WEBSITE [a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: ICTBUDGE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639[a]	.408	.358	1.025

a. Predictors: (Constant), HIT, OUTSOURC, FREUPDAT, WEBSITE

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.084	4	8.521	8.114	.000[a]
	Residual	49.359	47	1.050		
	Total	83.442	51			

a. Predictors: (Constant), HIT, OUTSOURC, FREUPDAT, WEBSITE
b. Dependent Variable: ICTBUDGE

Table 24: Regression (Factor 3)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
EDUEMPLO	3.10	.799	52
PEREMUSE	3.58	1.348	52
TRAINING	2.71	1.362	52

Correlations

		ICTBUDGE	EDUEMPLO	PEREMUSE	TRAINING
Pearson Correlation	ICTBUDGE	1.000	.473	.430	.552
	EDUEMPLO	.473	1.000	.348	.513
	PEREMUSE	.430	.348	1.000	.626
	TRAINING	.552	.513	.626	1.000
Sig. (1-tailed)	ICTBUDGE	.	.000	.001	.000
	EDUEMPLO	.000	.	.006	.000
	PEREMUSE	.001	.006	.	.000
	TRAINING	.000	.000	.000	.
N	ICTBUDGE	52	52	52	52
	EDUEMPLO	52	52	52	52
	PEREMUSE	52	52	52	52
	TRAINING	52	52	52	52

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	TRAINING, EDUEMPLO, PEREMUSE [a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: ICTBUDGE

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.603[a]	.364	.324	1.052	1.795

a. Predictors: (Constant), TRAINING, EDUEMPLO, PEREMUSE

b. Dependent Variable: ICTBUDGE

ANOVA [b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.352	3	10.117	9.147	.000[a]
	Residual	53.090	48	1.106		
	Total	83.442	51			

a. Predictors: (Constant), TRAINING, EDUEMPLO, PEREMUSE

b. Dependent Variable: ICTBUDGE

Table 25: Regression (Factor 4)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
ICTSTAFF	2.19	1.121	52
PERFOEFF	3.77	5.669	52
EMAILUSE	2.40	1.563	52

Correlations

		ICTBUDGE	ICTSTAFF	PERFOEFF	EMAILUSE
Pearson Correlation	ICTBUDGE	1.000	.441	.130	.362
	ICTSTAFF	.441	1.000	.075	.257
	PERFOEFF	.130	.075	1.000	.298
	EMAILUSE	.362	.257	.298	1.000
Sig. (1-tailed)	ICTBUDGE	.	.001	.179	.004
	ICTSTAFF	.001	.	.299	.033
	PERFOEFF	.179	.299	.	.016
	EMAILUSE	.004	.033	.016	.
N	ICTBUDGE	52	52	52	52
	ICTSTAFF	52	52	52	52
	PERFOEFF	52	52	52	52
	EMAILUSE	52	52	52	52

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	EMAILUSE, ICTSTAFF, PERFOEFF[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: ICTBUDGE

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.511[a]	.261	.215	1.133

a. Predictors: (Constant), EMAILUSE, ICTSTAFF, PERFOEFF

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.803	3	7.268	5.660	.002[a]
	Residual	61.639	48	1.284		
	Total	83.442	51			

a. Predictors: (Constant), EMAILUSE, ICTSTAFF, PERFOEFF

b. Dependent Variable: ICTBUDGE

Table 26: Regression (Factor 5*)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
MISSION	3.92	1.792	52
MGTINVOL	4.23	1.592	52

Correlations

		ICTBUDGE	MISSION	MGTINVOL
Pearson Correlation	ICTBUDGE	1.000	.425	.490
	MISSION	.425	1.000	.584
	MGTINVOL	.490	.584	1.000
Sig. (1-tailed)	ICTBUDGE	.	.001	.000
	MISSION	.001	.	.000
	MGTINVOL	.000	.000	.
N	ICTBUDGE	52	52	52
	MISSION	52	52	52
	MGTINVOL	52	52	52

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	MGTINVOL, MISSION[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: ICTBUDGE

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.519[a]	.270	.240	1.115	1.756

a. Predictors: (Constant), MGTINVOL, MISSION

b. Dependent Variable: ICTBUDGE

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.507	2	11.254	9.049	.000[a]
	Residual	60.935	49	1.244		
	Total	83.442	51			

a. Predictors: (Constant), MGTINVOL, MISSION

b. Dependent Variable: ICTBUDGE

Table 27: Regression (Factor 7)

Descriptive Statistics

	Mean	Std. Deviation	N
ICTBUDGE	2.67	1.279	52
BIZTYPE	2.35	.738	52
ACTIVITY	2.56	.539	52

Correlations

		ICTBUDGE	BIZTYPE	ACTIVITY
Pearson Correlation	ICTBUDGE	1.000	.101	.127
	BIZTYPE	.101	1.000	.294
	ACTIVITY	.127	.294	1.000
Sig. (1-tailed)	ICTBUDGE	.	.237	.184
	BIZTYPE	.237	.	.017
	ACTIVITY	.184	.017	.
N	ICTBUDGE	52	52	52
	BIZTYPE	52	52	52
	ACTIVITY	52	52	52

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ACTIVITY, BIZTYPE[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: ICTBUDGE

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.144[a]	.021	-.019	1.291	1.772

a. Predictors: (Constant), ACTIVITY, BIZTYPE

b. Dependent Variable: ICTBUDGE

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.729	2	.864	.518	.599[a]
	Residual	81.714	49	1.668		
	Total	83.442	51			

a. Predictors: (Constant), ACTIVITY, BIZTYPE

b. Dependent Variable: ICTBUDGE

APPENDIX 4: SURVEY FINDINGS ON REASONS FOR HAVING WEBSITS, REASONS FOR NOT HAVING WEBSITES, REASONS FOR USING INTERNET AND PURPOSES FOR USING INTERNET

Table 28: Sample response of various reasons for not having website

High cost	Poor infra	Lack of equipment /software	Security Issue	Low priority	No Mgt Commitment	Uncertainty	Small Market	No Demand	Customer not Ready	Lack of staff	Complex	Other
6	4	1	1	4	4	1	6	6	5	4	3	10

Table 29: Sample response of various reasons for having website

Confidence in technology	Strengthen relationship	Improve Efficiency Distribution	New mode of doing business	To have e-business	Borderless market	Cost reduction	Pressure from Competitors	Gain Competitive Advantage	Meet customer need	Enco-uraged by Gov't Policy	Other
17	15	5	14	7	10	7	7	11	15	6	1

Table 30: Sample response of various purposes of Internet

Information Search	e-mail	Access Supplier data	Education & training	Advertisement & marketing	Purchasing	Selling	Electronic File Transfer	Cycle time reduction/automation	Other
45	47	15	18	19	15	9	9	5	3

Table 31: Sample response of various reasons for using Internet

Pressure from competitor	Pressure from partners	Competitive position	new mode of doing business	Information access	Customers need	Encouraged by Gov't policy
12	16	21	22	44	27	14

Figure 4: Reasons for not having websites

Reasons for not having websites

■	1
■	2
□	3
□	4
■	5
■	6
■	7
□	8
■	9
■	10
■	11
■	12
■	13

others
13
19%

complex
12
6%

11
7%
lack of
knowledge

10
9%
customer not
ready

9
11%
no demand

8
11%
small
market

7
2%
uncertainity of
ICT

6
7%
no magt committment

5
6%
less priority

4
2%

3
2%
security issue

2
7%
lack of equipment & software

1
11%
high cost

poor
infrastructure
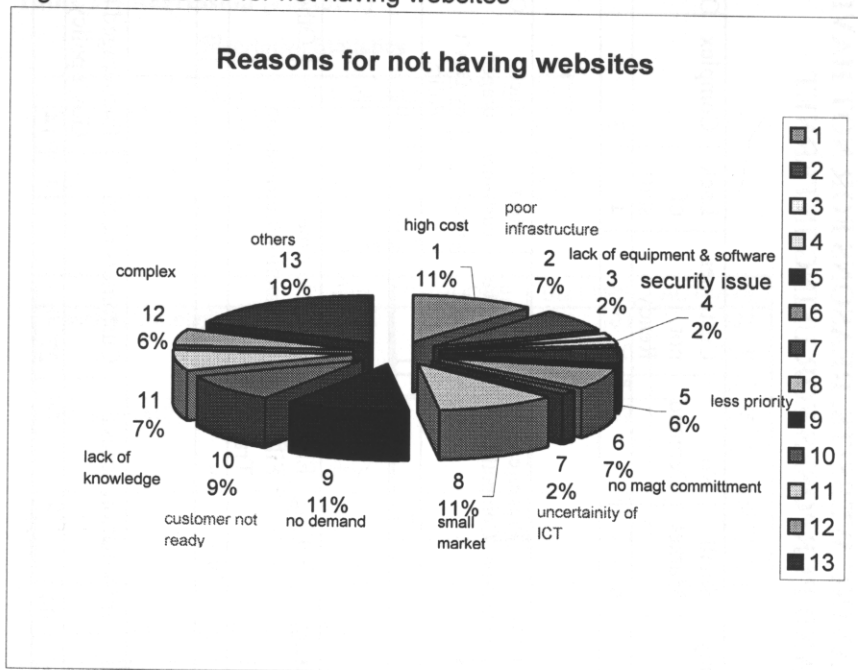
Figure 5: Reasons for setting website

reasons for setting website

■	1
■	2
□	3
□	4
■	5
■	6
■	7
□	8
■	9
■	10
□	11
■	12

customer needs
10
13%

gov't policy
11
5%

others
12
1%

confidence in technology
1
15%

strengthen customer &
supplier relationship
2
13%

3
4%

4
12%
Improve
distribution
new mode
business

5
6%
e-business

6
9%
borderless
business

7
6%
cost reduction

8
6%
competition
pressure

9
10%
competitive
advantage

64
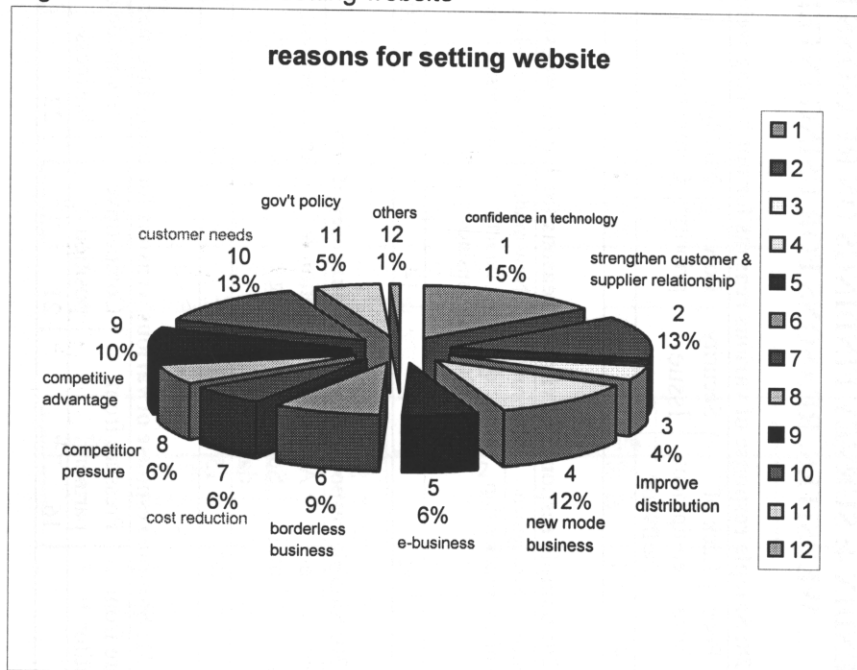
Figure 6: Purposes of using Internet

Purposes of using Internet

automation & cycle
time reduction

selling
purpose   EFT
7   8   9   10 others   information search
purchasing   6   5%   5%   3% 2%   1
purpose   8%   24%
8%

advertising &
marketing
5
10%
4   2 email
10%   3   25%
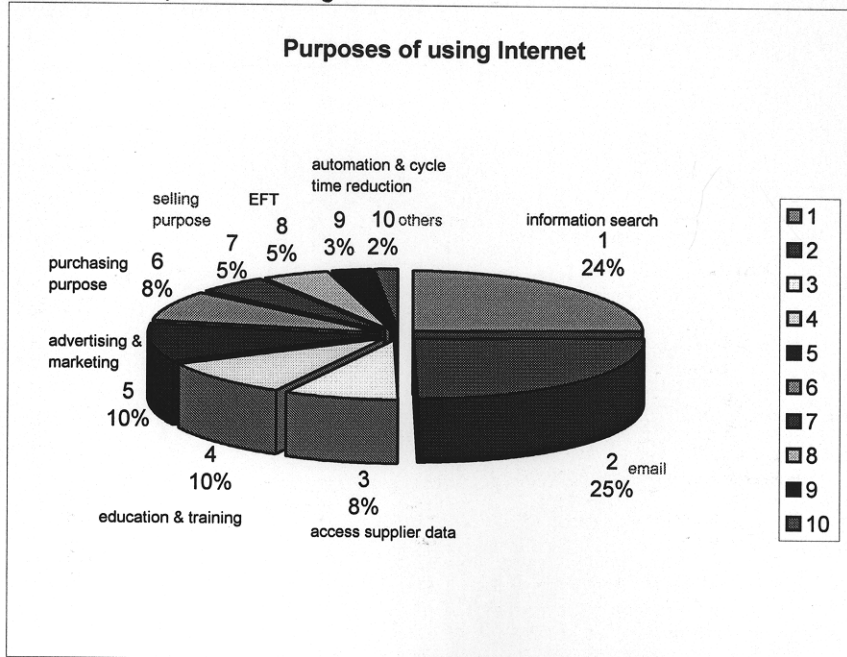education & training   8%
access supplier data

1
2
3
4
5
6
7
8
9
10

Figure 7: Reasons for using Internet

Reasons for using Internet

pressure from competitors

govt policy   pressure from patners
to meet customer   7   1
needs   6   9%   8%   2
18%   7%   3
14%
to maintain competitive
position
5   4   try new mode of
29%   information access   15%   business

1
2
3
4
5
6
7

65