

# Adoption of enterprise information system (EIS) in Malaysian small and medium enterprises (SMEs)

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**Abstract**—Enterprise information systems (EIS) are commonly adopted by large corporations rather than small ones because of the former's financial ability. However, in the Information Era, non-adoption is not an option for any firm size hence, the aim of this paper is to assess the adoption of EIS in small and medium enterprises (SMEs) in Malaysia. One thousand questionnaires were sent to the respondents that were identified through purposive sampling technique. Two hundred and twenty or 22% completed ones were returned. The findings revealed that 48.8% of the SME's in Malaysia have implemented the EIS platform between 2003-2005 and 28.8% have been utilizing the enterprise system before the year 2000. This implies that SMEs are early adopters of EIS and as such, should not have any problems with efficiency and productivity. Maintaining the organizational performance through information and communication technologies utilization would further enhance the SME's competitive advantage.

**Keywords**—enterprise information system; information management; innovation, SME; ICT; Malaysia

## I. INTRODUCTION

Driven by the Digital Economy and the global information-centric milieu, small and medium enterprises (SMEs) must acclimatize to these requirements in order to be on the competitive edge. Furthermore, the onslaught of information and communication technology (ICT) has revolutionized and positively affected the social and economic implications of SMEs to the nation's growth and sustenance. SMEs need to effectively process and integrate large volumes of data from diverse sources to enable effective decision making and knowledge generation. [1,2]. Retrieving data for accurate information has never been more crucial than now and this action has become one of the most significant challenges for SMEs in developing nations, for example, Malaysia.

Against the backdrop of ICT, managing knowledge comes in various spectra, one of which is enterprise information systems or EIS as it is commonly known. The beauty of EIS is that it supports the organization's business process rather than

act as a stand-alone system [3]. In other words, enterprise systems' processes can be performed by two or more departments, for example the Purchasing Department versus the Finance Department with their respective queries. The implementation of one system can efficiently and effectively support other departments under one roof of an organization, yet this opportunity has not been grabbed by SMEs in Malaysia.

With that regard, the government has consistently given full support to SMEs especially on financial matters. For instance, in his 2012 Budget Speech, the Prime Minister allocated the following for SMEs: (1) "A RM100mil SME Revitalization Fund offering loans up to a maximum of RM1mil for entrepreneurs will be available from Jan 2012, and (2) "To enable SMEs to commercialize research products a Commercialization Innovation Fund totaling RM500mil will be established" [5]. Other supports for SMEs are also included in Malaysia's Economic Transformation Program (ETP) with 12 National Key Economic Areas (NKEAs) and the New Economic Model with eight Strategic Reform Initiatives (SRIs) [5]. With all these in place, SMEs should out-perform companies that are bigger than them and this can be done through the strategic adoption of information systems. Therefore, this paper will provide insights on enterprise information system (EIS) adoption among small to medium-sized enterprises (SMEs) located in the Klang Valley of Selangor, Malaysia.

## II. BACKGROUND AND PROBLEM STATEMENT

Information and communication technologies (ICT) continue to play a crucial role in a firm's competitive advantage. ICT usage is more strategic in nature for most business firms as it can streamline business operations, improve business flexibility, integrate disparate functionalities and improve information flow across divisions [6]. Enterprise information systems (EIS) are one of the most recent advancement within the realm of ICT. EIS is defined as "*any kind of computing system that is of enterprise class, which*

*typically means offering of high quality of service, dealing with large volumes of data and capable of supporting work requirements of all employees*" [7]. Some of the common examples of EIS are Enterprise Resource Planning (ERP), Customer Relationship Management, Knowledge Management System and Product Life Cycle Management.

In general, EIS implementation is perceived as a complex and daunting process [8] as it involves wide-spread resources (e.g. employees, money, time, and infrastructure) exhaustion. Some recent studies have demonstrated unsuccessful implementation of EIS [9, 10]. Such findings instigated various studies to identify the factors that influence successful implementation of EIS, as well as the benefits gained from using the systems. Research on the success factors pointed to various issues such as top management support [11, 12, 13, 14] and effective project management [15, 16, 17, 18, 19]. Research on the benefits demonstrated the existence of both tangible and intangible benefits [20, 21, 22, 23].

While the success factors are abundant in literature, very few studies have examined the influence of socio-psychological factors to successful EIS usage. Examination in this context is important since most EIS uptake involves significant changes to legacy business processes that need to fit to the structure of the technological systems. Major changes are also common in employees work norms. In other words, EIS implementation requires compatibilities between various issues [24], absence which could lead to serious implementation problem. Although standard success factors such as top management support and project management are vital to successful implementation, socio-psychological factors, especially on matters associated with employees perceptions, attitude and beliefs on technological system adoption also have equal or more weightage on successful EIS usage [25].

Past studies showed positive effect of socio-psychological factors on technology implementation success [26, 27]. Research on socio-psychological factors has its root with the Triandis's [28] social psychological theoretical framework. The theory proposes that human behavior is influenced by six key social and psychological factors such as human habit of performing tasks and intention. The Triandis model was initially used within the sociology research subject, but over time, this model received support from other research disciplines, including information system research discipline. A review of literature on studies that have examined the association between socio- psychological factors and technology reveal that while the antecedents and technology usage process dimensions have been clearly demonstrated, there is limited focus on the dynamic relationships between socio-psychological factors, technology usage and the benefits gained from using such technology. This study aims to address this research gap.

### III. LITERATURE REVIEW

It is important to note that although the focus of this paper is enterprise information systems (EIS), the elaboration on knowledge management (KM) as the main element is important as EIS is a subset of that element. While both systems are about managing knowledge and information, delineation of both concepts require demystification. As it is, general literature on organizational studies related to the role of information and communication technology (ICT) and knowledge management are in abundance, particularly on ICT investments. There is a danger that organizations could spend large amounts of time, money and other resources on inappropriate technology in support of their Knowledge Management efforts. Key questions from various studies have provided clarification on how ICT has emerged as a main enabler for KM including the KM characteristics most suited to the system and users' needs [1, 29, 30, 31, 32, 33, 34, 35, 36]. Overall, critiques on the current literature in this field have been on the key classifications of knowledge management technology tools under the headings of collaboration, content management and business intelligence but the main concern is on EIS.

There have been articles on various types of firm growth theories elucidated over the past years. Theories such as neoclassical microeconomic theory and industrial organization theory argued on the power of capital investment and optimization of costs as the primary contributor to competitive advantage [37, 38, 39, 40, 41]. Since the mid-1990s, there has a significant shift toward knowledge as the paramount enabler of competitive advantage for firms [42, 43, 44]. The literature divides a firm's knowledge into explicit and tacit knowledge [43, 45]. Advocates of knowledge such as Lei [46] argued that tacit knowledge plays far more important role in competitiveness than explicit knowledge. This is because explicit knowledge can be imitated by competitors [47]. Explicit knowledge in this sense would only enable temporary competitive advantage phenomenon [43]. Tacit knowledge relates to a person's personal knowledge gained from years of experience [48]. Tacit knowledge is rather difficult to bring into a structure and imitate as it embodied in a person's skills and practical knowledge of the individual [48].

In the context of a firm, knowledge is occupied in both its' business processes and with its employees. Strategic management of knowledge resource is crucial especially in the case of firms that deal extensively with human interaction such as knowledge intensive business service firms [49, 50, 51]. Thus, the establishment of an appropriate knowledge management system (KMS) or in this case, the enterprise information system is undeniably important for this purpose.

### IV. METHODOLOGY

As the aim of this paper is to assess the adoption of enterprise new information system (EIS) among SME's

located in the Klang Valley of Selangor, Malaysia, the design of the research is cross-sectional with dual-staged sampling technique to pinpoint the units of analysis. The approach is also based on a wide literature review, focused on the identification of a taxonomy of information and communication technologies (ICTs), business and organizational factors influencing EIS adoption. The deriving Triandis research model was incorporated in the questionnaire that was preliminarily tested for reliability and validity. The instrument was mailed to the 1000 SMEs located in the Klang Valley. The SME list was determined through purposive sample with four criteria that was relayed to SME Corporation Malaysia for unique identification in their databases. The questionnaires were then collected by a dedicated research assistant for promptness and assurance of completion. Input data was then executed using parametric and non-parametric analyses as deemed appropriate according to the research objectives using SPSS version 20.

### V. FINDINGS

From the one thousand questionnaires sent to the SMEs, 305 forms were returned of which 220 were deemed useful and complete. For this paper, the results of the descriptive and frequency analyses are shown in Tables I-VIII. For Table I, the general managers accounted for the highest percentage at 45.5%, followed by managing directors at 34.1%.

TABLE I. RESPONDENTS' ROLE IN THE COMPANY

Role	Frequency	Percent
Managing director	75	34.1
General manager	100	45.5
Project manager	26	11.8
IT manager	5	2.3
Other senior executive	14	6.4
Total	220	100.0

For the service years, 54.1% have been with the respective SMEs for less than three years, followed by 24.1% who have been working between three to five years (see Table II).

TABLE II. YEARS WORKING IN THE COMPANY

Service years	Frequency	Percent
Less than 3 years	119	54.1
Between 3 to 5 years	53	24.1
Between 6 to 8 years	42	19.1
Between 9 to 11 years	1	.5
12 and more years	5	2.3
Total	220	100.0

As shown in Figure 1, 84 SMEs employ between 100-149 personnel followed by 75 with 50-99 staff and 61 companies with 20-49 workers. For industry involvement, 77 SMEs are into ICT, 70 are in retail trade and 59 are in production or manufacturing (see Table III).

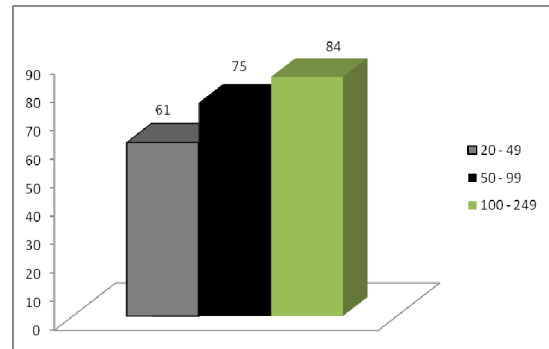


Figure 1. Number of Employees in SMEs

TABLE III. THE INDUSTRY SME'S ARE INVOLVED IN

Industry	Frequency	Percent
Retail trade	70	31.8
Real estate property	6	2.7
Mining	1	.5
Hotel	1	.5
Production	59	26.8
ICT	77	35.0
Insurance	1	.5
Others	5	2.3

Meanwhile, 99% of the SMEs earned revenues of less than 10 million ringgit per year (Figure 2). In terms of operation length, 61.8% of the SMEs have been in operation between six to eight years (Table IV). Table V shows the EIS implementation length with 100 SMEs having used EIS between 2003 to 2005, followed by 28.6% who adopted EIS before the year 2000.

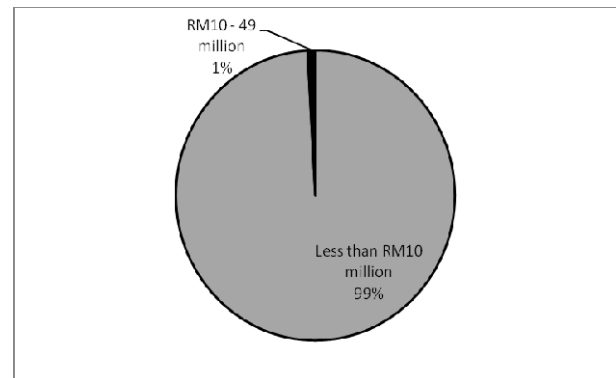


Figure 2. Revenue Earned Per Annum

TABLE IV. YEARS SME'S HAVE BEEN IN OPERATION

Years	Frequency	Percent
Less than 3 years	2	.9
Between 3 to 5 years	4	1.8
Between 6 to 8 years	136	61.8
Between 9 to 11 years	17	7.7
12 and more years	61	27.7
Total	220	100.0

TABLE V. YEAR EIS IMPLEMENTED

Year	Frequency	Percent
Before 2000	63	28.6
2000 - 2002	47	21.4
2003 - 2005	100	45.5
2006 - 2008	4	1.8
Do not have EIS	6	2.7
Total	220	100.0

TABLE VI. STATISTICS FOR EIS

	N	Mean	Std. Deviation	Std. Error Mean
EIS adoption	220	50.93	11.72	.790

Lastly, Table VI shows the statistics for 13 statements on EIS adoption where the mean value is 50.93 and the standard deviation is 11.72 (indicative of data points being close to the mean). This assures that 78% of the respondents have adopted EIS and finds the system useful. Further interpretation of the statistics will be elucidated in the next section.

## VI. LIMITATION AND IMPLICATION

The research path is based on the assumptions that business complexity, organizational change and externalities are the most relevant variables influencing EIS adoption among SMEs and such variables are explained through a subset of factors from literature reviewed. Besides this, the scope of the study is limited to SMEs in the Klang Valley of the state of Selangor, Malaysia but the fact remains that the concentration of small to medium-sized enterprises are located close to the capital city.

The practical implication resulting from the empirical study has shown the need for SMEs to seriously consider the adoption of an EIS system. At 78% of the 220 respondents, the empirical evidence is not sufficient to assume total usage among other SMEs in the Klang Valley. The findings can be incorporated into the development of other ICT strategies under the auspices of knowledge management, inclusive of ERP, MIS and other software houses.

## VII. DISCUSSION

As a continuance to the implications of this study, the findings also suggest other ICT options for SMEs to strategize their business goals and outcome towards a profitable-reported quantum. The other knowledge management alternative is Information Reuse and Integration (IRI). IRI seeks to “maximize the reuse of information by creating simple, rich, and reusable knowledge representations and consequently explores strategies for integrating this knowledge into systems and applications” [2]. In addition, IRI plays a “pivotal role in the capture, representation, maintenance, integration, validation, and extrapolation of information; and, applies both information and knowledge for enhancing decision-making in various application domains” [2]. Relating such technological advances to the results, the demographic profiling of the SMEs should further aid other non-EIS implementers. As evidenced from the response rate, the assumption by the

research team members is that 85 non-usable responses were not EIS adopters. Further research on this phenomena is possible because non-usage of ICT in this day and age speaks of internal organizational problems [54,55].

Subsequently, indicators of information system success as posited by Chuang et al [53] and Ghobakhloo et al [54] should provide the necessary information and best practices for SME administrators to heed when planning for automation to their various processes. By knowing that they have these innovative alternatives and success factors [52], SMEs will be able to sustain and be on the cutting edge of their niche business area.

## VIII. CONCLUSION

This study provides insights into the level of adoption of enterprise information system by SMEs in the Klang Valley, Selangor, Malaysia. The findings indicate that SME’s are not utilizing the full force of ICT although government intervention, encouragement and support have been given to them. As such, future research should delve into the reasons for non-adoption or limited adoption of ICT with particular emphasis on EIS. At the end of the day, the SMEs’ goals would consistently include the need to enhance their competitiveness, reduce costs, increase their focus on internal resources and core activities, and sustain competitive advantage.

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