Measuring the Performance of Information Systems In Developing Small Mediums Enterprise Business Function

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Abstract—Information systems (IS) function gives strength to all individuals or group in an organisation daily responsible for information systems related activities in the organisation. This paper exposes about the development of measuring models the IS function's performance based on scorecard and DMSM models that uses some criteria in the areas of IS success. Several criteria developed based on the frame work of IS function within small and medium enterprises with limitations. This study highlights the importance of IT/IS-Business partnership to increase the performance of the IS function, especially related to the capability of IS function to perform a good quality planning, effective system adaptation and good operational support. Keywords—the criteria, measuring performance, small medium enterprise, business function, DMSM and scocard model.

1. Introduction

Business environment is prone to changes and makes business planning very complex. Some factors such as the market forces, technological changes, complex diversity of business and competition have a significant impact on any business prospects. Management Information Systems (MIS) is designed to assess and monitor these factors. The MIS design is supposed to provide some insight into these factors enabling the management to evolve some strategy to deal with them. Since these factors are a part of the environment, MIS design is required to keep a watch on environment factors and provide information to the management for a strategy formulation. [2]

Unlike large business, small business is unique, with its own set of industry-specific practices and its own strategies for success. It is critical in today's competitive business environment for small and medium business to take timely decisions for growth. Robust yet flexible MIS is the first-step for Small and Medium Business(SMB) in this conquest for growth. MIS challenges faced by SMBs are: * Limited manpower & IT resources, * Limited IT Budgets Disparate data sources, * Current business climate pressure & competition, * Ever changing Reporting needs with changing Business conditions, * Dynamic Government Regulations & Compliance Reporting [2]. Contemporary information sytem (IS) researchers have increasingly directed interest and attention towards the link between information systems investment and organisational performance as many information systems research have focused on the relationship between information systems sophistication (diversity and complexity in the use of IS) and organizational performance and found that information systems sophistication have positive impact on organizational performance (Salleh, Jusoh and Isa, 2010). [1] A number of studies have been done into the performance of IS function (e.g. Chang and King 2005, DeLone and McLean 2003, Myers et al. 1997, and Saunders and Jones 1992). Most of these previously published work use constructs that were generally used to measure IS success. [1]. The success of organisations in benefiting from IS cannot be separated from the success of IS function in performing their tasks. Therefore it is necessary for organisations to regularly assess the performance of their IS function. This leads to a need for knowledge on how comprehensively evaluate IS function's performance. [3]

2. Research In Sophisticated Strategic Information

According to Hemmaftar et al., (2010) the key features of strategic information systems are:

1. To develop a strategic approach in aligning Information Systems or Information Technology with thebusiness strategies.
2. To integrate the business process to meet the enterprise objectives for the optimization of the enterprise resources.
3. To make use the database systems with the data mining capabilities to provide corporate information for marketing, production, promotion and innovation.
4. To maintain a rapid-response and the quality indicators as the real time information systems.[1]

According to Narnjo (2009) and Choe (2004) Sophisticated strategic information system refers to an information system which offers a range of information available for managers, which is percieved being useful that provides information which is broad-scope, high coordinated, high reporting frequency and integrated among different organizational functions [1]. A study on the relationship between information systems sophistication and performance measurement systems (Salleh et al., 2010), indicate that information systems sophistication is a determinant of performance measures. The results also indicate that different dimensions of information systems sophistication affect different dimensions of performance measures usage [1]. The strategic role of IT has no direct influence on IT usage sophistication; however it does have an indirect effect through IT management sophistication. This means that that once information technologies are properly deployed, it is possible for users to enhance their strategic role. Users should then be able to learn and appropriate themselves of the various functional applications implemented by the firm, and to assess the quality of information output by these applications in order to make better decisions. [4]
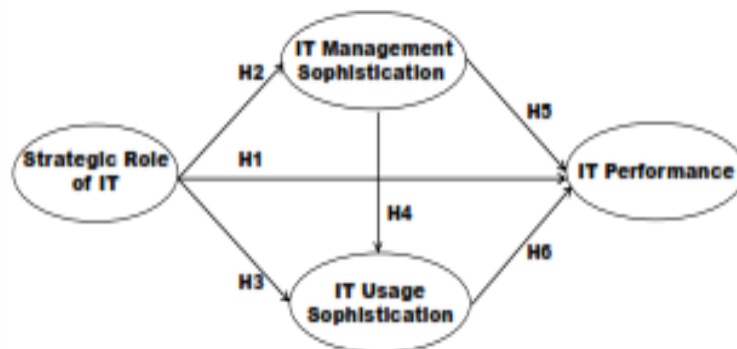
Figure 1. The Research Model of Strategic Role of I.T. In SMEs Information Performance [4]

The descriptive results indicate that for all SMEs, the benefits of IT mainly come from accounting/finance/HRM, and logistics/production/ distribution applications. Then come benefits accruing from marketing/sales/customer service applications, and to a lesser extent e-business, Internet and Web applications. This descending order of benefits is consistent with the increasing complexity of the strategic role of IT. Most manufacturing SMEs do not use IT for purposes of internal and external integration of business processes, which is the most strategic role. The IT applications easiest to implement are often the first deployed, and therefore are the first to provide benefits. [4]
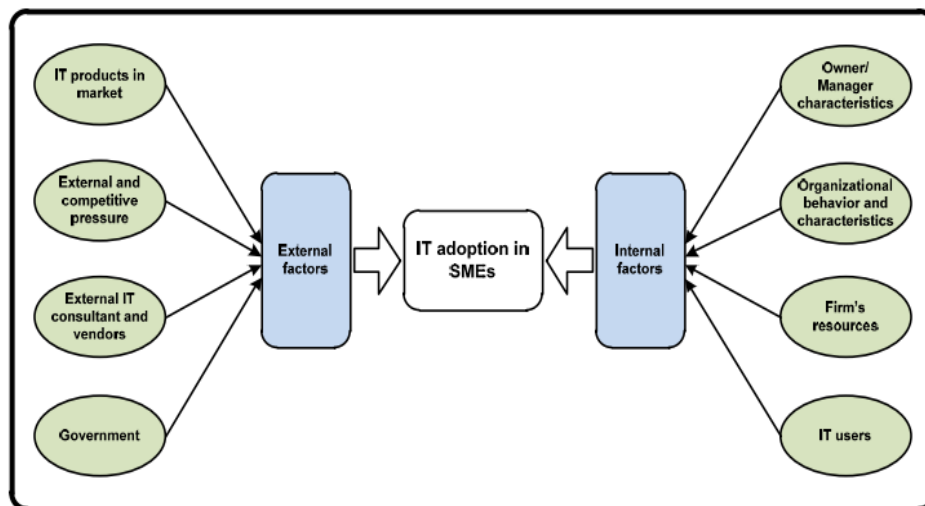
3. Business Function In Small Medium Enterprise

3.1 IT Solution (Computer Application)

The process of IT adoption within SMEs also depends on characteristics of marketed IS/IT itself which consist of a cluster of factors including type, process compatibility, user friendliness and popularity of implemented IS/IT, quality of software available in market and the costs of IT. For adoption of enterprise application software, easy-to-understand and relatively long-experienced enterprise applications are more effective in SMEs as compared to hard-to-understand and brand-new applications [6].

3.2. Organizational Characteristics

Prior research on IS/IT within SMEs have revealed a number of organizational characteristics as potential determinants of the adoption process which include SME strategies, business size, type of industry, information intensity, organizational culture and technological maturity. Strategically, IT tools are employed within SMEs in order to achieve pre-determined business strategy. Therefore, SMEs' investments in IT are strongly affected by their strategic context, such as cost reduction versus value added strategies [6].

**Figure 2.** Proposed Framework of IT Adoption For SMEs [6]

4. Conceptual Framework Is For Small Medium Enterprise

The ISS framework adapts Walsham's (1993) themes for IS strategy. There are three perspectives. First, the business context provides the understanding of the business environment within which the SME operates. This focuses particularly on the market and relationships with customers and suppliers. The owner's strategy for the business is elicited to aid identification of critical success factors (CSFs). These provide the basis for strategic information requirements. The second perspective is business process [7].
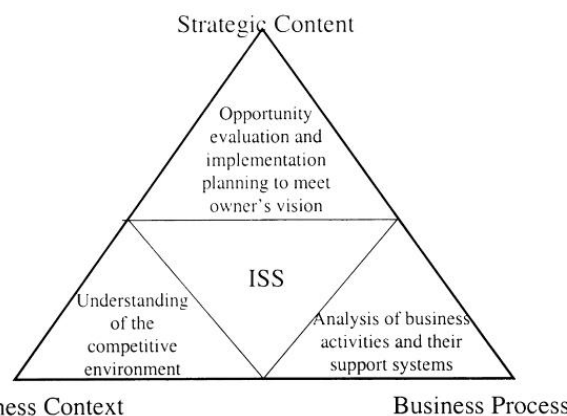
Figure 3. The Information Systems Strategy For SMEs [7]

This focuses on understanding the work processes in the SME to appreciate whether information inhibit business activities, and also to identify changes that might be made as a result of the introduction of IS. Additionally, information available to the SME is identified. Finally, the strategic content embodies the vision for change from the owner and the practicality of its introduction given organisational circumstances [7].
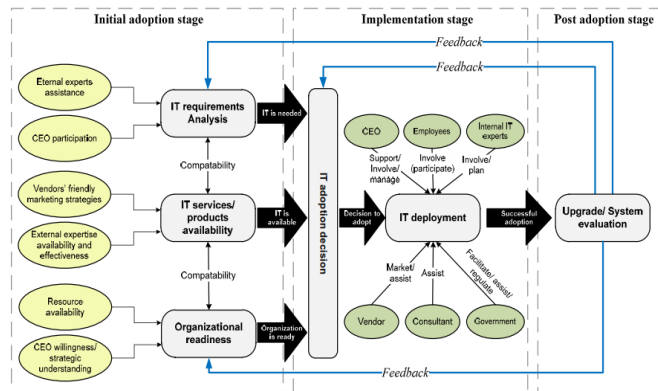
Figure 4. Conceptual model of effective IT adoption process within SMEs. [6]

Based on suggested categorization and reviewed influencing factors, and to come up with more systematic guidelines for effective IT adoption by SMEs, the authors put forward a conceptual model that is believed to assist successful IT institutionalization in this context. This model has been conceptualized based on extant perspectives and theories, and uses the technological innovation literature as a reference discipline. As suggested by prior literature, initial IT adoption, IT implementation and post-implementation of IT are three different stages in the technology innovation cycle. Initial IT adoption refers to a stage in which decisions are made about whether to adopt a new IS/IT. If the decision is to go ahead with adoption, the IT implementation stage involves implementing the IT infrastructures (including hardware and software) in the organization. Once the IT has been implemented successfully, the IT post-implementation stage is concerned with how much organizational learning takes place within the business so as to facilitate further IT adoption [6]. Accordingly, the model of the IT adoption process addresses all the three different stages and definitions of IT adoption in providing guidelines for successful IT adoption in SMEs. It is believed that the presented categorization of IT adoption issues and factors through the developed conceptual framework and conceptual model of effective IT adoption process can help governments, organizations, managers and IT consultants to achieve a clearer understanding of the IT adoption process. It may also increase the knowledge and literature bases by providing a clearer understanding of the reasons and methods that SMEs adopt IT, and establish the determinants that contribute to the success of the IT adoption process in these businesses [6].

5. Model Criterion For Development

5.1. DMSM Model

Models specifically for evaluating IS in general One of the most cited models for measuring information systems success is the DeLone and McLean Information Systems Success Model (DeLone W, McLean E, 2003) (DeLone W, McLean E, 1992), from now on referred to as DMSM. The DMSM has a basic model consisting of six categories of IS success: • Systems quality, • Information quality, • Use, • User satisfaction, • Individual impact, • Organizational impact [5] The model has later been extended by several researchers, for example by Seddon (1997) who concluded, among other things, that the meaning of "use" in DMSM needed to be better defined. Further, the validity of the DMSM (and of Seddon's extension) has been empirically studied (Rai A, Lang S, Welker R, 2002), and it was found that both DMSM and Seddon's extension were supported. The criteria presented is to be said as a model of information systems success. They do however differ in the definition of what constitutes an information system, and in their goal: the explicit measurability. [5]
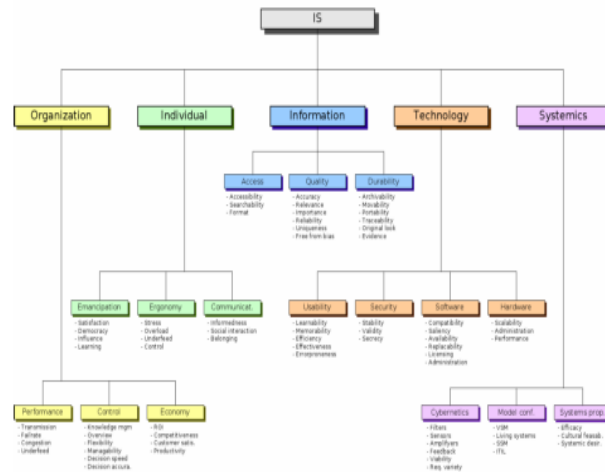
Figure 5. DeLone and McLean Information Systems Success (DMSM) Model Criteria [5]

1. Organization : The organization criteria are the criteria that will be found to be interesting from the point of view of the management and the sales department.
2. Individual : The individual criteria relate to the performance and satisfaction of individuals within the information system.
3. Information : The information category of criteria relate to the quality and access of information.
4. Technology
   The technology criteria are all those criteria that relate to tangible artifacts that participate in distributing and managing information.
5. Systemics
   The systemics criteria are related to a systems' point of view of the IS. These criteria study how well the IS conform to what can be said to be a good general system. [5]

The criteria listed are formulated in a generic manner. In most cases it is not obvious how they will be measured in practice. In future work, it is my intention to operationalize each criterion. To fulfill this, each criterion must in the end fulfill these qualities: [5]

a. *Measurability*: The purpose with all the above is to be able to measure and compare information systems. Thus the criteria themselves will need to be measurable. The mode of the measurement is another discussion, but in the end it must be possible to assign a value to a criterion.
b. *Explicit definition*: In order to do so, the criteria must be defined and broken down into points of observation, where it is stated clearly what entity or phenomenon the observation points actually concern.
c. *Quantification*: While not strictly necessary, it is my belief that it is a good design goal to formulate the measurements of the points of observation in a quantitative manner.
d. *Possible to validate*: With the above three points, it should also be possible to evaluate how well a specific contribute to the overall quality of an information system. Criteria which can be shown to have no impact should be removed. It is likely that each criterion will be broken down into a number of points of measurement which together will serve as the operationalization for the criterion. [5].

5.2. Scorecard Model

Govindaraju and Usman (2011) presents the development of a model and scorecard to measure the IS function's performance based on a number of earlier models such as Pitt and Watson (1995), Seddon (1997), and Heo and Han (2003). [3]. The scorecard model developed consists of four main dimensions namely: Product Quality, Service Quality, Planning, Adaptation and Operational Support Capability, and Net Benefit. Through a validation survey and analysis, it was found that all the dimensions and factors are reliable. [3] The analysis tool used to validate the measurement instrument is exploratory factor analysis and confirmatory factor using structural equation modelling (SEM).

Generic model used to validate the performance measurement model/scorecards developed in the study is the resulted below [3]
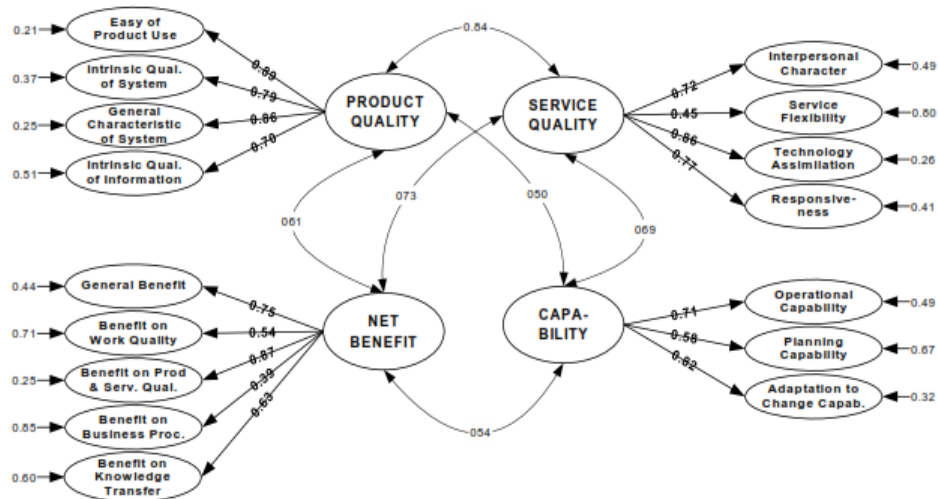
Figure 6. Structural Model of IS Function Performance Measurement Scorecard [3]

Analysing the IS function's performance from a user perspective, while previous works mainly focus on the product quality and service quality delivered, this research highlights the importance of capability of the IS function as one aspect of its performance. The capability dimension which includes operational capability, planning capability, and adaptation capability express that it is necessary for high performing IS functions to actively keep up with the changes in technology as well as business. Analyzing the performance measures within the *capability* dimension, it could be seen that it is very important for organizations to strengthen IT/ISBusiness partnership in order to be able to improve the performance of the IS function. IT/IS-Business partnership is an enabler for IS function to have a high operational, planning and adaptation capability. [3].

6. Conclusion

There are two models for evaluating the performance of information systems in small medium enterprises based on organizational characteristcs and IT capability in supporting management goal. IT has critically become an indispensable tool for the daily operations of organizations. SMEs now invest significant amounts of financial resources in IT to strengthen their competitive positions. Due to the large-scale application of IT among SMEs, they have been exposed to several associated risks within the adoption and development of IT solutions. By combining two models, it is possible to make a holistic criteria model that intended to focus on IS evaluations, but through minor reformulations they can be made to fit. Analyzing the performance measures within the *capability* dimension, it could be seen that it is very important for organizations to strengthen information businness partnership in order to be able to improve the performance of the IS function.

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