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A Proposed Revision to the DeLone and McLean's IS Success Model

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***Abstract*—This paper discusses the implications of adaptability to emergent technologies and changing users need to the success of information systems and thereby proposes an extension to the renowned IS success model introduced by DeLone and McLean.**

Keywords-Information Success Model, Adaptability

I. INTRODUCTION

Many studies have been conducted to determine the success of information systems. These research studies have identified dependent variables based on various factors. In 1992, DeLone and McLean synthesized various studies in their paper "Information Systems Success: The quest for the dependent variable" and provided a model to evaluate the success of information systems at an organizational level [2]. Between 1993 to 2002, more than 200 papers has referenced the DeLone and McLean model, henceforth stated as D&M, for the factors contributing to IS success in acclaimed journals. The D&M model has been reviewed periodically and updated by its own authors.

DeLone and McLean tried to combine a process and causal factors in their model [7]. The variables in D&M have broad definitions. For example, according to the model, technical success is measured by "systems quality". This raises the question on "technical success". Is it limited to hardware or software? What are the dependent and independent variables associated with "technical success"? What are the benchmarks in determining the dependent and independent variables? Should they be defined at the organizational or industry level? Will the variables change with technology and if so, what should be done? In addition, the success may vary based on user expectations.

The DeLone and McLean model did not factor the adaptability level of the information systems in their model. With constant changes in end-user needs and mergers between organizations, the success of the information systems depends on its ability to adapt to changes. The information systems should support seamless integration thus reducing organizational cost, operational cost and time-to-market. Since the technologies in the organizations are always in transition, the term "emergent" has been chosen over "emerging" [4].

II. TOWARDS A CONCEPTUAL FRAMEWORK

The original D&M model was proposed to measure the effectiveness of IS investment in organizations operating in a stable environment. The organizations in 1960's were subjected to high initial investment cost and low maintenance cost [4]. The IT managers of the organization took considerable time to determine the user needs and organizational goals. As a result, more time was spent on the analysis phase resulting in low maintenance cost over a period of time.

The success of an organization's information system is measured at three levels. They are technical level, semantic level and effectiveness level [8]. Technical level defines the efficiency and accuracy of the system to produce information. Success in conveying information to its intended audience is measured by the semantic level. The effectiveness of the system is measured by the impact of the information on its audience. Based on the above definition, and process and causal considerations, the D&M model identifies six parameters for the success of information systems in an organization. The original D&M model proposed in 1992 is depicted in Figure 1.

From figure 2 however, it can be inferred that DeLone and McLean have made several and considerable changes to their original model for over more than a decade to reflect the changes in technologies and user needs. They have merged the individual, organizational, industry and societal impacts in "net benefits". They have included a third characteristic, "service quality", to their original model. The factors that contribute to service quality are, reliability, responsiveness, assure and empathy. In the original model, "service quality" was part of system quality. However, it was separated based on the market changes and the emergence of IS organizations. The updated model resembles the process model introduced by Newman and Robey [6, 7] while still retaining the temporal and causal effects. Such has been validated by DeLone and McLean [3] by the following statement, "The updated D&M IS Success Model includes arrows to demonstrate proposed associations among success dimensions in a process sense, but does not show positive or negative signs for those associations in a causal sense".

Many existing businesses in many fields are challenged by the threats of new entrants [1]. The strategy for the entrants relies on low hardware cost, low software

maintenance enabled by the open source community and the ability to target profitable customers. The deregulation in many sectors has increased the competition. To be efficient and competitive, existing organizations are forced to constantly evaluate their existing information systems.

The constant need to change stresses that organizations have to adapt continuously to the changing environments influenced by the external forces [4,5]. The emphasis on long stable IT systems may inhibit the growth of an organization contradicting its goals as these systems will not be able to adapt to the ever-changing needs. Hence, the design of the IT system will be radically different for an organization operating under relatively stable environment and dynamically changing environment.

To gain market share and innovation, many organizations acquire businesses of small or equivalent size. As a result, each business will have their own process mechanism for their internal and external users of information systems. The difference in user perspective will cause confusion and may inhibit an organization's future growth.

III. A Proposed Revision To The Model

The success of IS depends on its ability to adapt to the changes in the environment. By including adaptability in the model, the independent variables are transformed to dependent variables. The original D&M model envisioned integration as part of System Quality. With the emergence of the Internet and e-commerce, the definition of integration is no longer limited to system quality. The need for adaptability is further enhanced by the growth of knowledge corporations. To grow, many organizations are forced to adapt to external needs. For example, emergence of Java, AJAX has improved the usability and user feeling. The organizations that have not migrated to these new technologies may loose customers to its competitors or may not be able to derive benefits from its suppliers. Due to adaptability, the information quality also changes. For example, ERP solutions like SAP provide rich information based on existing data. The adaptability also improves the service quality of the IS. For example, outsourcing and virtual teams has helped organizations to lower costs on their mundane tasks and allocate resources to technologies that help to achieve future growth. By being more open IS will be able to provide quality service and improve the efficiency and bottom-line of the organization.

By modifying adaptability, the efficiency of an organization can be increased or decreased. For an organization to be successful in a dynamic environment, its information systems should be agile and should be able to adapt to organization changes thus contributing to factors that influence the net benefits.

IV. Direction For Future Research

The proposed revised model (see figure 3) assumes that all industries are susceptible to emergent technologies. The proposed revised model should be validated with sound empirical studies. The impacts of adaptability on other independent variables may also provide new research directions. The term adaptability has a broad meaning. Proper classification should also be done to determine the factors that confirms to the taxonomy.

V. Conclusion

Adapting information systems to emergent technologies and customer needs will play an important role in future. Information systems acquired from various organizations and implemented by different IS managers will cater to different needs of the users. One has to carefully evaluate the adaptability of the existing system to future technologies to avoid surprises due to cost over-runs and integration delays. Inability of the information systems to adapt may affect the competitive edge of an organization.

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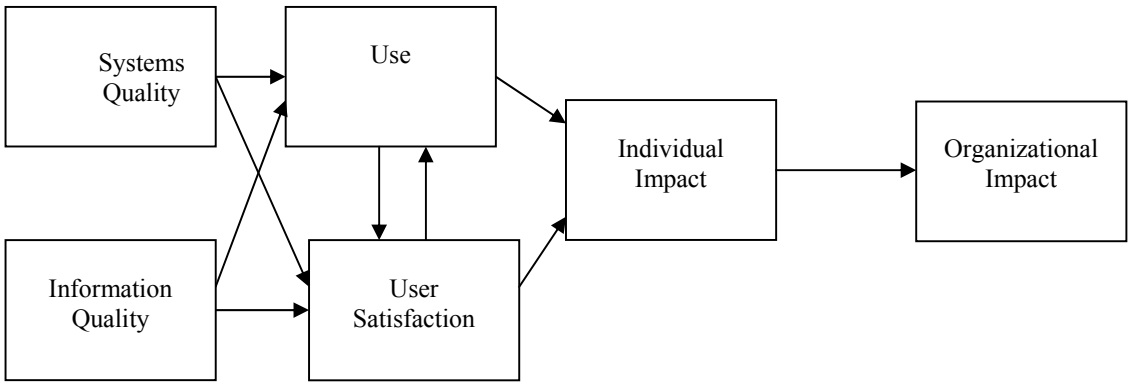
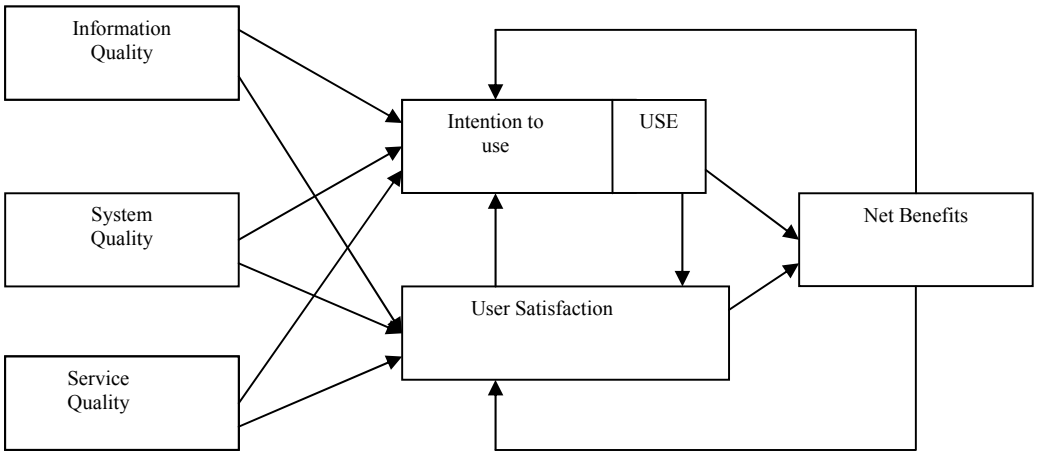


Source : DeLone and McLean, "Information Systems Success : The Quest for the dependent variable", Information Systems Research, 1992.

Fig 1.



Source : Updated D&M IS Success Model, 2003

Fig. 2

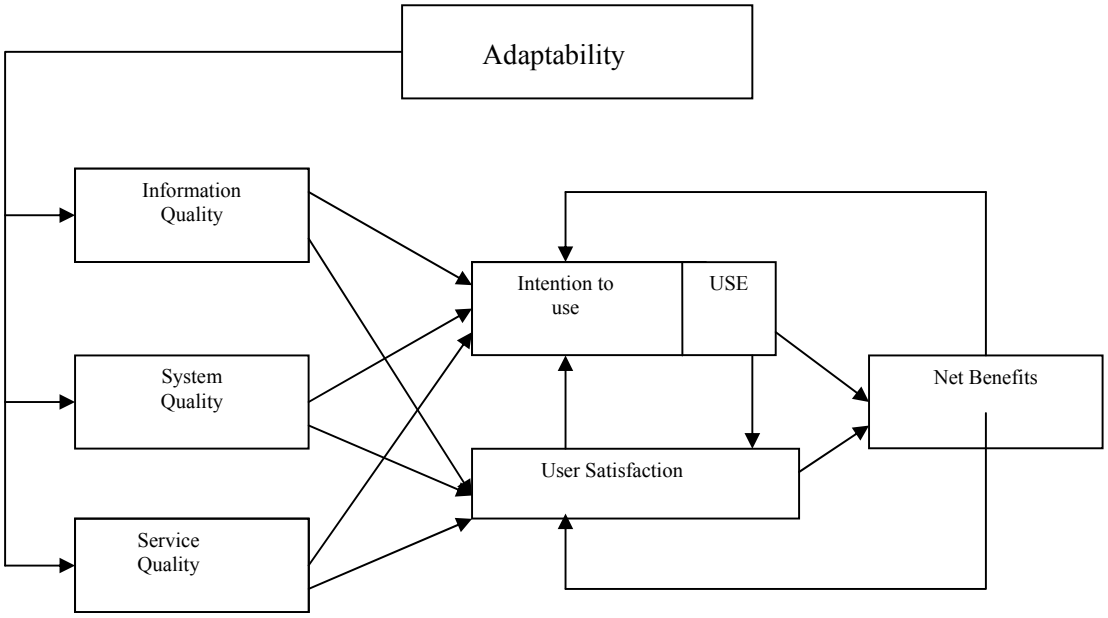


Fig. 3: The Proposed Revised Mode