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## Classifying Domains for Criteria and Factors of Successful Integrated Information System

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### Abstract

Assessment of Integrated Information System (IIS) is part of feedback loop that provide information on the status of IIS effectiveness to the organisation. The content of the assessment instrument is usually based on the success criteria for IIS. To ensure having a comprehensive assessment approach, IIS critical success factors are proposed to be included into the instrument. Further, the comprehensiveness of the approach should cover the three main domains of Information System integration namely organisation, technical and strategic. This paper discusses on the importance of comprehensive IIS assessment, the process of identifying IIS critical success factors and success criteria, and classifying them into these domains. These classified factors and criteria will be used as a basis for IIS assessment instrument that can comprehensively assess IIS in organisation. The process of classifying domains for IIS success criteria and factors will consist of identifying IIS success factors and criteria, classifying them into domains, putting measures into these factors and criteria, and validate the proposed criteria and factors through expert survey.

Keywords: Integrated Information System domains, Integrated Information System Success Criteria, Integrated Information System Critical Success Factor;

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### 1. Introduction

Information System (IS) integration is about integrating any two or more components of information system for the purpose of making them function as one system or perform as an

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integrated system which aimed to support organizational business processes within or between organizations effectively. Integrated Information System (IIS) is increasingly important to an organisation in order to maintain organisation's competitiveness in business, as well as servicing its customers and stakeholders (Perrey, et al., 2004; Markus & Cornelius, 2000; Mendoza et al., 2003). Few studies have been made on assessment of IIS like by using Critical Success Factors in Managing IS Integration (Mendoza et al., 2006), assessment of IS integration component (Wendt et al., 2005) and assessing success on packaged integrated software (Chien & Tsau, 2007). These efforts have contributes to better understanding on assessment issues for IIS, but fall short on looking the IIS assessment in a comprehensive perspective. The first step in the process of formulating a framework is to derive a set of criteria and factors as a measurement mechanism for IIS assessment.

This paper focus on discussing the process of deriving these factors and criteria, which involve justification on using criteria and factors as assessment tool, identifying criteria and factors, determining criteria and factors into domains, and using survey for getting expert opinion on how important these criteria and factors to the IS integration.

The rest of this paper is organized as follow. In Section 2, the paper will discuss on the state of IIS assessment followed by discussion on previous research in IIS assessment. The methodology of how to derive criteria and factors of IIS is the next section which covers on the process of identifying criteria and factors for assessing IIS, putting measures into IIS criteria and factors, until preparation of getting expert opinion on the importance level of the proposed criteria/factors to IIS. Discussion from the findings is made and the paper concludes with proposal of steps taken for further research.

## **2. Related Works**

### *2.1. State of IIS Assessment*

Assessment is an essential requirement of a feedback loop for continuous improvement of the IS function and such improvement relates directly to the overall performance of the organisation as measured by effectiveness (Myers, 2003). IIS assessment is not well established in the current literature and more research is needed on this area (Alaranta, 2005). IS integration views can be summed up into technical and non-technical domain. The most comprehensive view with regards to looking strategically on the whole issues in IS integration is by Wainwright & Waring (2004) that categorise IS integration into three main domains, namely technical (technical and systems), organisational and strategic domains.

### *2.2. Previous Research on IIS Assessment*

There are several literatures involved in discussing successful criteria to Information Systems (Myers, 2003, DeLone & McLean, 1992; Seddon, 1997; Sedera & Gable, 2004) as a basic premise to IS assessment; and to the extent proposing an IS Success Model (DeLone & McLean, 2003; Seddon, 1997) which attempt to reflect the interdependent and process nature of IS success. However, very few literatures discussed specifically on IIS assessment criteria (Mendoza et al., 2006; Wendt et al., 2005). Those that discusses on IIS assessment has either focus on certain domain in the IIS such as its technical domains (Wendt et al., 2005) or based on critical success factors (Mendoza et al., 2006). On assessing the state of IIS, the assessment can be associated with the success of the implementation or adopting the integrated system (such as ERP) in organisation. Ifinedo (2006) had found out that assessing the success of ERP in the adopting organisation is difficult where the system is complex which generates a wide range of benefits either tangible or intangible to different organisational users. Seddon et al (1999) found that different measures are necessary for measuring IS effectiveness

in different contexts, and that a "systematic combination" of six different types of measure as suggested by DeLone and McLean (1992) is not going to work

Mendoza et al. (2006) had produced 20 CSFs and 86 metrics based on review of material related to systems integration, EAI, integration levels, technology management literature, and referential documentation about CSF formulation. The focus of their study is more on assessing the organisation based on CSF.

Alaranta (2005) who did a study on post-merger IS integration, stated that some construct from the DeLone-McLean (2003) model need to be clarified when being used as measures in other IS integration scenarios. She also found out that the post-merger IS integration literature provides some further benefits that do not correspond to the DeLone & McLean model.

Chien & Tsau (2007) proposed a partial extension and specification of the DeLone and MacLean model of IS success to ERP systems. It has been operationalised at three high-tech firms in Taiwan and the result showed that quality in system, service and information are the most important factors in ERP success.

### **3. Process of Classifying Domains for Success Criteria and Critical Factors**

#### *3.1 Identifying Criteria and Factors for Assessing IIS*

Assessing IIS should encompass not only on the success criteria of the integration, but should also include the critical factors that lead to successful IIS implementation. Previous works on success criteria (Chien & Tsau, 2007; DeLone & McLean, 2003; Saarinen, 1996; Davenport, 1998; Al-Mashari et al., 2003; Kumar et al., 2002) provide only success criteria, while Nah et al. (2001) provides strategic factors to ensure success to IIS. Combining both criteria and factors in doing the assessment to IIS and grouping the assessment criteria and success factors into 3 main domains will provide the organisation with a comprehensive approach to IIS assessment. Final findings shows that DeLone & McLean's Success measures still identified as the backbone of the criteria and factors which mostly categorised in technical and organisational domains. Nah et al (2001)'s criteria and factors are predominantly covers the strategic domain.

After finding all these variables, the next task is to determine which domains the variable closely affiliate to. Thus the definition of domain has to be clear to assist in determining which criteria/factors belong to which domain. Definition of domains has been established based on Wainwright & Waring IS Integration Model, and these definitions are utilised in the exercise. In the process of determining which domain does each selected criteria/factors should belongs to, there are finding that some criteria/factors have issues which belongs to more than one domain. In order to minimise complexity in categorisation at the early stage of research, these criteria/factors have to be grouped into either one of the domains. Thus, the determining factor is based on weighting which issues are the most influencing the criteria/factors, and then identifying what domain this issue belongs to.

The analysis of criteria/factors has to be done to all selected criteria/factors. Table 1 shows the results which list all the possible factors and criteria based from literature search and grouped into proposed domains.

Table 1. List of IIS Assessment criteria and factors

Domains	Assessment Criteria/Factors	Authors
Technical	Systems Quality	DeLone & McLean (1992, 2003)
	Information Quality	DeLone & McLean (1992, 2003)
	<i>Satisfaction with development process</i>	Saarinen, 1996
	Integrated Systems	Kumar et al., (2002)
	Integrated Business Process	Kumar et al., (2002)
Strategic	Teamwork and composition	Nah et al. (2001)
	Change management program and culture	Nah et al. (2001)
	Top management support	Nah et al. (2001)
	Supporting business plan and vision	Nah et al. (2001)
	Business process reengineering with minimum customization	Nah et al. (2001)
	Project management	Nah et al. (2001)
	Effective communication	Nah et al. (2001)
	Software development, testing and troubleshooting	Nah et al. (2001)
	Project champion	Nah et al. (2001)
Organisational	Service Quality	DeLone & McLean (2003)
	Individual Impact	DeLone & McLean (1992)
	<i>Organisational Impact</i>	DeLone & McLean (1992, 2003)
	Use / Intention to use	DeLone & McLean (1992)
	User satisfaction	DeLone & McLean (1992, 2003)
	Net benefits	DeLone & McLean (2003)
	<i>Perceived usefulness</i>	Seddon (1997)
<i>Organisational Performance</i>	Al-Mashari et al. (2003)	

### 3.2. Putting measures into IIS Criteria and Factors

The next process after having a proposed IIS criteria and factors which has been grouped into domains is to breakdown further into meaningful measure of success criteria and factors. Using the literature once again, the detailed measures associated with these criteria/factors are collected and analysed which produced a proposed list of detail criteria/factors for IIS assessment.

### 3.3. Using Survey for Getting Expert Opinion

The result from the breakdown of the proposed criteria will be validated by getting expert opinion from experienced practitioners in organisation. Thus, a survey is chosen to be an instrument to gather opinions from the targeted experts. The measures from general factors and criteria are then used to develop the main theme of the survey, which is to determine the followings:

- Identifying the important criteria and factors to the success of Information Systems integration.
- Identifying the appropriate domain (area) in organisation for these criteria and factors.

The list of finalised criteria and factors of Information System integration will be used in the survey questionnaires which consist of 60 criteria/factors. The affiliation of each criteria/factors to a domain is based on where its main criteria/factor belongs to. Thus, for example criteria/factors B1 through B6 has been categorised in Technical domain since all these criteria/factors are based on main criteria/factors of Systems Quality, which belongs to Technical domain.

### 3.4 Discussion

The findings from the survey will give better perspective on whether the proposed criteria/factors is important to the IIS. There will be further analysis and formulation based on findings from the survey to choose relevant and most appropriate criteria/factors that can be used as measurement instrument for IIS assessment.

## 4. Conclusion and Future Work

In this paper, the process of deriving criteria/factors to IIS as a preamble for formulating an IIS assessment tool has been presented. The process involved has been discussed but can be improved by detailing the process of determining every criteria/factors selected. Nevertheless, the main processes have been detailed out, which started from analysis of previous works on IIS success factors as well as failure factors, IIS success criteria and as Information System, its success, and criteria/factors associated with IIS. The difficult task is to determine which domains do these criteria/factors should belong to, and by all means the effort does not produce perfect solution. The assistance from expert opinions based on the proposed survey is seen to be an instrument that provides validation to the proposed criteria/factors, but it can also turn the other way round.

The empirical survey is not the end of the research, but it provides the researcher a clearer picture on proposed criteria/factors for IIS. The next step after analysing the result from the survey is to formulate a framework of assessment for IIS based on the selected criteria/factors from the survey. Once the relevant criteria/factors have been selected, a measurement detail has to be formulated. Furthermore, the assessment approach, detail instrument and tools need to be constructed in order the proposed framework can be tested via case study.

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