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OBSERVING THE RELEVANCE OF AN INFORMATION SYSTEMS SUCCESS MODEL

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Abstract

This paper contributes to the rigor vs. relevance debate in the Information Systems (IS) discipline. Using an Action Research methodology, this study evaluates the relevance of a rigorously validated IS evaluation model in practice. The study captures observations of operational end-users employing a market leading Enterprise System application for procurement and order fulfillment in an organization. The analysis of the observations demonstrates the broad relevance of the measurement instrument. More importantly, the study identifies several improvements and possible confusions in applying the instrument in practice.

Key words: Action research, Enterprise systems, IS Success.

1. INTRODUCTION

Research on assessing the success of Information Systems (IS) has been ongoing for nearly three decades (e.g. King and Rodriguez, 1978; Martin, 1979; Rolefson, 1978; Myers, Kappelman, and Prybutok, 1997; Delone and McLean 1992; 2003; Gable Sedera and Chan 2008). Such approaches of systems evaluations have moved beyond employing traditional financial measures (Schwarz and Chin, 2007) to observing subjective and behavioral measures. The academic contributions and the general rigor in development of such models have been categorically valuable. However, even the prominent success evaluation methods struggle to gain prominence in practice. Varity of interrelated variables that are complex in nature makes it difficult for practitioners selecting a single best approach. Evaluating IS success may require varying measures depending on the **stakeholders** and **systems** been employed (Seddon et al., 1998), which could be one of many reasons for the divide between research and practice. Increased complexity and uncertainties associated with assessing costs and benefits in IS has led researchers to propose evaluation methods continuously over the past few decades (Irani, 2008). Thus, a need for improved evaluation methods continues to exist.

In an attempt to bridge the gap between the research and practice in the systems evaluations domain, this research investigates the relevance of the success dimensions and measures of the

IS-impacts measurement model of Gable Sedera and Chan (2008)[1]. Employing an Action Research (Lewin, 1946; Baskerville and Myer, 2004) methodology, this study observes and informs how end-users treat particular success measures, whilst interacting with the referent system and their social environment. The study employs the '37 pool of measures' of the IS-impacts model and survey instrument. During the observation period, the end-users record their renditions and specific examples in relation to the 37 item pool in the instrument, using their daily requirements in the procurement and order fulfillment business process. Leclercq (2007) supports the aforementioned arguments of understanding the feelings and perceptions of the users as an important attribute towards developing appropriate IS measures. Herein we argue that, to the extent that each measure is populated with relevant examples of the business process attest to the relevance of the instrument.

The remainder of the report consists of five sections. Following the above introduction which details the motivations and objectives for the study, the next section discusses the theoretical background to this study, in particular the key measurement notions of the IS-Impact model. Third, the action research strategy is discussed. The next section of the document explores learning's from the IS evaluation measures from an end-user perspective and the article concludes with the key findings and study limitations.

2. THE IS-IMPACT MODEL

This section of the paper introduces the foci of the analysis in this study- the IS-Impact measurement model (Gable et al., 2008) and its pool of measures. Gable et al. (2008, p. 381) defines IS-Impact of an Information System (IS) as "*a measure at a point in time of the stream of net benefits from the IS, to date and anticipated, as perceived by all key user groups*." Gable and his colleagues argue that a holistic measure for evaluating an IS should consist of dimensions that together look both backward (**impacts**), and forward (**quality**). The IS-Impact Model is envisaged as a holistic formative index representing the stream of net benefits; the impact half measuring net benefits to date, the quality half being our best proxy measure of probable future impacts, and "impacts" being the common denominator (see figure 1). Using DeLone and McLean's (1992) IS success model as reference, the Gable et al. (2003; 2008) studies constitutes three completed survey rounds, serving both exploratory and confirmatory purposes: (1) identification- distill the salient set of systems success dimensions and measures; (2) specification- specify the dimensions and measures of system success derived from the identification survey and (3) confirmation- validate the system success dimensions and measures. The unit of analysis was enterprise systems implementation at a public sector organization and thus the model is widely referred to as the Enterprise Systems success model (Gable et al., 2003). The three survey rounds helped identified, specified and validated thirty-seven a-priori enterprise systems success measures arranged under four dimensions: individual impact, organizational impact, individual quality and system quality- to provide a single valid measure of overall IS success. When evaluating an IS, measures of these dimensions represent a 'snapshot' of the organization's experiences of the IS at a point in time. The IS-Impact model, dimensions and measures are designed to be economical and simple, yielding results from multiple user perspectives that are comparable across different systems and contexts.

[1] The selection of IS-impacts measurement model was based on: (1) its research rigor, (2) claims of multi-stakeholder view point, (3) development in the context of Enterprise Systems, and (4) its potential for practical applications. Ifinedo (2008) considers this as the most comprehensive IS evaluation model. See more details in Gable Sedera and Chan (2008).

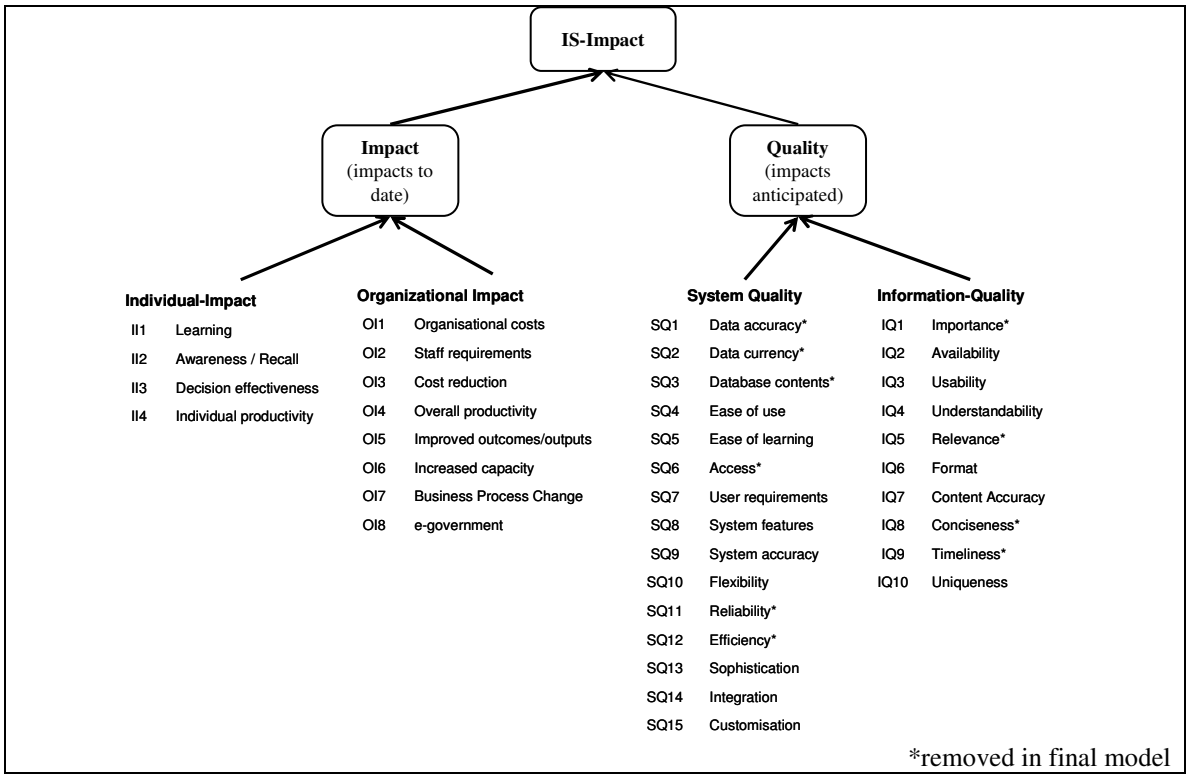


Figure 1. The 37 item a-priori IS-Impact Measurement Model

3. AN ACTION RESEARCH METHODOLOGY

For the purposes of investigating how key user(s) treat and relate their work routine to each IS-Impact success measure, the authors find an action research methodology (Lewin, 1946; Baskerville, 1999) most appropriate. Action research is used in the social and medical sciences as an established research method since 1940's, and has spread over to different areas such as information systems towards the end of the 1990s. As the name depicts, the method focuses on practical action of the study subjects and strives for highly relevant, new and richer research results (McNiff & Whitehead, 2006). One of the main reasons for action research is its popularity as a technique "*that is characterized by intervention experiments that operate on problems/questions perceived by practitioners within a particular context*" (Baskerville, 1999, p. 9). Action research is used in this study to (1) build on existing and generate new knowledge of IS success measurement, (2) link practitioners action to theoretical expositions in IS success measurement, (3) create an avenue for learning, improvement and lively discussion on the topic.

Further, the researchers perform an important collaborative role with practitioners in this study. This according to (Baskerville, 1999, p.11) depicts an *"ideal social setting in the domain of action research*. In this case, the researchers bring his knowledge of IS theory (IS-Impact model and measures) and the client (user) bring situated, practical theory into the action research process. This **participatory** form of action research methodology is thus appropriate as it is (i) not only grounded in practical action, producing relevant results but (ii) researchers and study subjects both observe and participate, increasing knowledge and competencies of both and iii) knowledge can be applied directly to the study and users' evaluation of advanced (enterprise) systems.

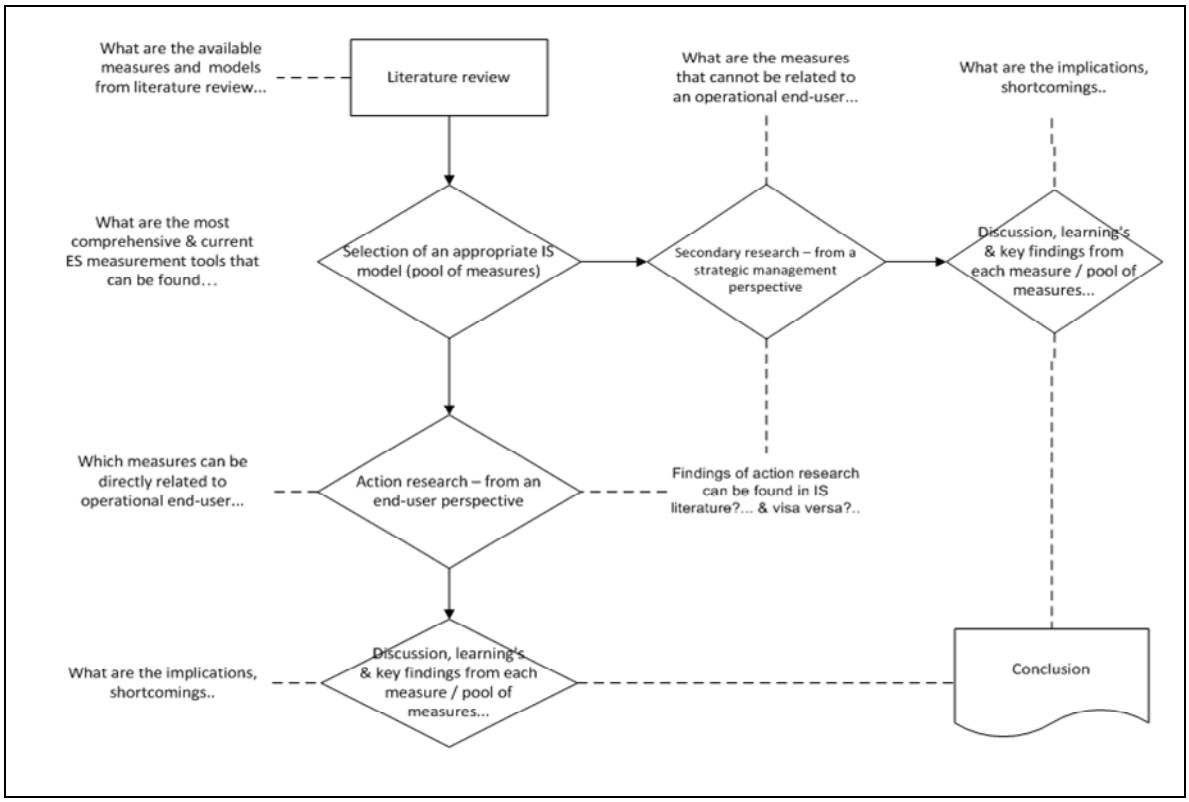
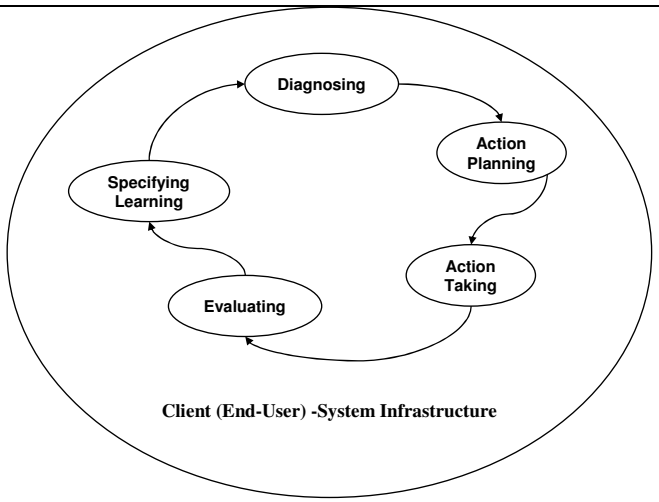


Figure 2. Research Design

Figure 2 illustrates the overall research design and how action research plays a central role in achieving the outcomes, and answering the research questions of each core phase. We discuss the conduct of action research, in light of the overall design next. The action research approach first requires the establishment of a client-system infrastructure or the research environment. Thereafter, a five phase, cyclical action research process purported by (Baskerville 1999) is adopted. The action research cycle and the descriptions of each phase are depicted in figure 3.

3.1 The Client (End-User) - System Infrastructure

Two end-users were consulted and participated in this study. The first is a senior travel consultant with over nine years of experience in the travel industry. In his multiple roles, the end-user has used different IS such as global distribution systems, accounting systems and enterprise systems. The second is a sessional academic in a tertiary education institution. The second end-user has three years relevant teaching experience in enterprise systems related subjects and has previously worked in the engineering field. In this study, end-users are tasked to complete a set of procurement and order fulfillment processes using a pre-configured SAP system. The steps and processes completed by the end-user forms the observable tasks in action research and are illustrated in figure 4.



Phases	Definition and Corresponding Description
1. Diagnosing	Identification and self-interpretation of primary problem and working hypothesis
	= Researchers' notion of IS-Impact measures align (or not) with end-user renditions
2. Action planning	Specify organizational actions for researchers and practitioners to collaborate and relieve or improve problem
	= Setup researcher and end-user tasks and environment. Consolidate survey instrument
3. Action taking	Implement the planned action. Researchers and practitioners collaborate in active intervention, causing changes to be made
	= Researcher directs and interacts with user to complete survey instrument
4. Evaluating	Evaluating the outcome, determining whether theoretical effects of the action were realized.
	= Probe and determine if survey captures sufficient and complete body of knowledge from users' experiences. If not, consider supplementary sources of literature.
5. Specifying learning	Directing the knowledge gained to client's organization, future interventions and research community
	= Discuss and relate findings to working hypothesis and theory (IS-Impact model)

Figure 3. The Action Research Cycle

3.2 Diagnosing

Building from an appreciation of IS success measurement, the end-user (synonyms with study subject and practitioner in this study) of a type of information system is briefed on the pool of IS success measures. With this background, the end-user is then directed to complete a set of simulated work tasks, designed by the researchers and containing a set of milestones. In the duration of the tasks, the end-user is encouraged to document any relevant and crucial information he needs in order to complete the milestones. Lasting over a month, the researchers also engage the practitioner in focus meetings at regular intervals throughout the duration of the study, to discuss relevant aspects of the measurement questions and the tasks completed. Although we prescribe mainly to results and knowledge arising from action research, the authors recognize the limitations of the method. When justifying which elements is most relevant to the study context, not all of these thirty seven questions/ measures could be action researched. In such cases, a combination of IS< marketing and management literature is consulted to supplement the findings. The tasks that the end-user completes in the system are discussed next. This naturally constitutes the actions planned and implemented.

3.3 Action Planning and Taking

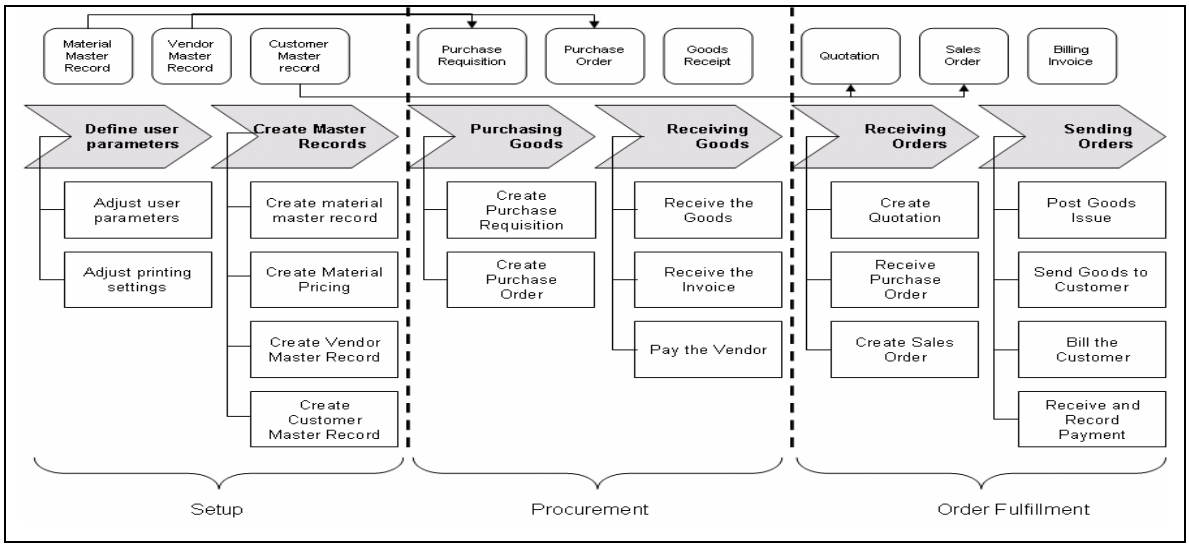


Figure 4. End-User Tasks (Adapted from Tan and Sedera 2008)

Setup: The end-user first prepares the SAP environment for execution. The process here commenced with the end-user entering their employee number, name, and contact information. This enabled the user to orient themselves to the business environment that they are now part of. Moreover, in order to initiate the two business processes, each user set user parameters and added master records for vendors, customers, and materials. More specifically the setup included six activities: (1) Adjust User Parameters, (2) Adjust Printer Settings, (3) Create Customer Master Record, (4) Create Material Master Record, (5) Create Material Pricing and (6) Create Vendor Master Record. The key deliverables of this phase include: (a) defining user parameters, (b) creating customer and vendor records, (c) creating all necessary materials and trading goods, and (d) establishing material pricing table for the list of materials created.

Procurement: Next, the end-user executes a procurement process which involved acquiring a range of products from vendors using a fictitious case scenario drawn from the case study. This processes uses setup information created in step 1 as well as new information based on the scenario. The procurement process employed here does not include complex business rules, but follows a simple straightforward execution. The key five steps of procurement include: (1) Create Purchase Requisition, (2) Create Purchase Order, (3) Receive the Goods, (4) Receive the Invoice (5) Pay the Vendor. The key deliverables for procurement process include: (a) creating purchase requisitions with all trading goods information, (b) creating appropriate purchase orders to replenish order stock, (c) creation of goods receipts and (d) making payments for the appropriate vendor invoices.

Order fulfillment: Next, users change their role from being the client organization to the role of being a vendor organization. Drawing from the case scenario, the vendor organization now responds to customer orders. The key activities of the order fulfillment process are summarized below. (1) Create Quotation, (2) Receive Purchase Order, (3) Create Sales Order, (4) Post Goods Issue, (5) Send Goods, (6) Billing the customer, (7) Receiving and Recording Customer Payment. The key deliverables of order fulfillment include: (a) creating and printing quotations, (b) creating an internal sales order, (c) creating an outbound delivery document, (d) creating and printing invoice and (f) completing customer payment.

3.4 Evaluating and Specifying Learning

As prescribed by the action research methodology adopted for this study, each end-user is observed in the duration of task completion and simultaneously, discussions with the end-users on each IS success measure is evoked. A conscious decision was made to remove the organizational impacts dimension and its related measures due to the control nature of the research. Moreover, in light of the operational staff view point and the suggested strong correlation between the Strategic Management and the Organizational Impacts identified by Gable et al. (2008) further support the exclusion of this dimension from our investigation. For each of the remaining measures in this study, key words were first identified. End-users are required to make their own interpretations of the keywords and associate them with examples from their completed tasks. In the interest of richer content, a laddering technique is also adopted. Originating from the repertory grid interview technique (Kelly, 1955), **laddering** allows researchers to elucidate in-depth cognitions from an interviewee on a specific term or phenomena of interest. For example, if the respondent suggests productivity improvement, laddering suggests that researchers ask "what do you mean by productive". A plausible response is "the system saves me time". The researcher should ask "what time do you mean?" A possible response could now be "reduction in payroll cycle or data entry time". The researcher will continue probing (laddering) till the simplest, lowest element is reached or that the respondent is unaware of new terms. These terms and keywords are then associated with the original term, for further in-depth analysis. An attempt to identify how and why end-users would respond to each measure is thus captured, and illustrated in the following tables.

(a) Individual impact: how the ES has influenced the performance of the user.

Measurement item	What are the keywords?	What does it mean for end-users?
I have learnt much through the presence of (the IS).	**Learning** can be referred to as mastering new techniques, gaining knowledge, know- how and experiences	**Relationships** between the input and output (information, data on customer, pricing etc & their relationships.) **Integration** between information and data from different tasks/ modules **Steps** taken to complete tasks and different ways of completing the same task, discovering the best way to complete it
(the IS) enhances my awareness and recall of job related information	Enhancing awareness can be identified as users **understanding** and **additional knowledge** that is been **created by using the system**	**Enables multiple ways of completing tasks** and generating reports/ information from the system **Creating multiple reports more efficiently –** multiple invoices for the same customer can be obtained without having to enter the customer general data number of times
(the IS) enhances my effectiveness in the job	Most often effectiveness is used as a measure of success because it is about **outcomes, results, and consequences** (Gounaris et al., 2007). An IS that is capable of recalling job related information may also lead to increasing effectiveness of the end-user.	**Number of errors** made during an order fulfillment and procurement process are **minimal** Reports can be generated within a short time [such as vendor master record, vendor master record…] Ability to complete **multiple tasks** with a **minimum effort**: Being able to identify errors made and to rectify them with a minimum effort
(the IS) increases my productivity	Productivity refers to, **a relationship between an output and the input** that is required to generate the output (Schreyer & Pilat, 2001). Also productivity is a common indicator of performance and it is important to have the right variables to measure performance (Stensrud & Myrtveit, 2002).	Ability to generate **many numbers of reports** (reports such as invoicing, purchase order, etc) within a given time period… Able to complete **many number of processes** within a given time frame. i.e., time taken to complete procurement execution process.

Table 1. Individual Impact Items

(b) Information Quality: Users' perceptions on the goodness of the task outputs produced by the system.

Measurement Item	What are the keywords?	What does it mean for end-users?
Information needed from (the IS) is **always available**	SAP AG, (2005) defines availability as the *"degree to which everyone is able to **access and use** electronic and information technology"*.	**24/7 accessibility** to the system [front end services – SAPGUI as well as individual applications/ modules] – that's enables access to stocks, invoicing, purchase order… Capable of retrieving information/ data that's been already saved **at any given time** **Time taken** to access reports [i.e. purchase order] and/or check the status of the purchase orders are **minimum** The system offers **zero or less downtime** that would keep the user away from accessing the system
Information from (the IS) is in a form that is **readily usable**	The users understanding of the term "readily usable" can be identified as the degree to which the system is capable in **providing accurate and expected** results.	**System contains all the required fields to complete tasks/ processes** – such as creating a customer master record will require sales, distribution, delivery details etc. **System contains different modules** [and tasks for each module], in procurement different modules could be found for materials management, sales and distribution, production etc and each module will contain number of tasks **Facilitates data integration** – data entered in different tasks can be **viewed in one screen/** report which is the expected final output [often] **Provides real time information –** most current information…
Information from (the IS) is easy to understand	Understanding can be referred to as the ability to **think** about what the system is communicating and **make use** of it. Understanding of the system could vary from one user to another and is a **psychological process**.	**Lay out/ format is standardized** - Accounting data/information has a standard layout at each stage/step to be completed & avoids confusion… **Output contains only relevant information** - Only the information that is needed to do the job. Avoids irrelevant information that could hinder the effectiveness of meaningful data. Seamless flow of the system and its output - A logical flow of information (step by step) that enhances ease of use… **Language** of communication is user **friendly** - Includes **graphical interface, symbols** that are easy to understand and less complicated… Information provided is consistent - **Uniformity of screens** in different tasks...
Information from (the IS) appears readable, clear and well formatted	Readability, clearness and format of the system make reading and **completing tasks easier** for the user.	Contains optimum number of information fields (only the required fields) **Language** of communication – will depend on the customer/ vendor **Uncomplicated data structure** – combination of symbols, signs, letters, codes etc A clearly divided areas for different processes – such as sales & distribution (SD) manufacturing management (MM), production planning (PP), etc. Visibility of menu bar, buttons, tool bar at etc where to click for what and next step of the task (s)
Though data from (the IS) may be accurate, outputs sometimes are not	Accuracy is used more often as a comparative measure and refers to as **perfection** in many fields. Data/ Information accuracy of IS/ES is as important as any other feature/ advantage in the system.	Output contains **the same information as in the input** – customer, vendor, accounting and sales information Codes, currency, denominations etc are **exactly the same as expected**
Information from (the IS) is unavailable elsewhere	Information that is found in IS **may not be able to find anywhere else within the organization, department, database… as a single output**.	Information can be constantly updated therefore **better access to real-time** information i.e., timely sales information Integration between different tasks/ modules allows the user retrieve key information in to a single screen i.e., an invoice includes types of materials purchased, quantity, price, customer contact etc **in a single document**. Ability to access historical data/information i.e., customer transaction history

Table 2. Information Quality Items

(c) System Quality: Users' perceptions on how well the system performs from a design and technical perspective

Measurement Item	What are the keywords?	What does it mean for end-users?
(the IS) easy to use	"the extent to which a computer system enables users, in a given context of use, to **achieve specified goals effectively and efficiently** while promoting feelings of satisfaction" (ISO9241; Lee et. al, 2006)	It is a **stepwise process** that has a logical flow It indicates missing data in un-completed tasks There is only limited number of steps to complete a particular task (only a few clicks…) Information found can be extracted at any given time to be used for another task **Navigation** between different screens **take less time** (system response time)
(the IS) is easy to learn	Learning enhances understanding through **acquiring new skills, knowledge, values and techniques**.	Design/ and Structure of the system - easy to understand because of its **simple structure and the design** System is **user friendly** (layout/ interfaces) Number of modules in the system. This refers to the optimum number of modules in completing the process. Number of tasks per module – the optimum number of tasks per module Is based on a **simple methodology** that is easy to understand. Steps such as creating a quotation, receiving purchase requisition
(the IS) meets (the Unit's) requirements	A units requirements may vary depending on its **objectives, goals** etc. Therefore requirements can be stated as characteristics or attributes that are necessary to achieve these goals.	Improve **operational efficiency** through standardized, transparent compliance processes Enhancing reliability of business processes **Effective risk management** by proactively tracking and detecting key data **Virtualized and shared resources** that enhances integration (DaRold & Ridder, 2008)
(the IS) includes necessary features and functions	Features and functions of systems are most often used to guide decisions, especially when it comes to selecting an IS (Kyte, 2007). Features and functions are used to **perform tasks** in IS.	The system consists of signs, symbols, colours of the screen that **enhances ease of use** Error handling [edit information, correct inaccurate data] is made easier, faster and effective
(the IS) always does what it should	IS proves to be functioning **as expected**	The system [SAP/R3] **generates the next screen instantly** Information contained in the output **is 100% accurate compared to the input** Ability to access data/reports completed in the previous steps **Ability to save incomplete data and complete it at a later stage** Denial of access to the next step unless the existing step is fully completed Informs the user about incomplete/un-saved data highlighting the error/reason for it. Saves data and retrieves the saved data instantly, in order to complete the next task.
The (the IS) user interface can be easily adapted to one's personal approach	User interface is a component of usability of the product (Lee et al. 2006)	**Personal preferences** such as colour of the screen, format etc can be adapted Familiarity with the system and its effect on completing a task in less time **Setting priorities** in completing tasks - It is possible to complete tasks in any order
(the IS) requires only the minimum number of fields and screens to achieve a task	Minimum number is still **optimal** for completion of tasks	**Access information quickly** - access vendor master data, purchase order history, and generate budget reports Provides an option of accessing pages through the use of codes i.e**., use of transactions codes** to list all the vendors.
All data within (the IS) is fully integrated and consistent	Integration in IS can be described as bringing together smaller components of the system such as software, applications, processes through different communication networks (Bhatt, 2000)	SAP/R3 provides a **logical flow of information**, starting from general information to more complicated information [such as pricing, material types, quality etc…] Each time user access the system to complete the similar tasks, **the user interface and contents provided by the system is exactly the same** Data entered in different tasks can be viewed at a later stage – because the system is integrated it is possible to access the whole history of a purchase order. For example who created, dates, vendor details, payment details and payment dates, etc

(the IS) can be easily modified, corrected or improved.	Modifications, corrections to information/ data that can be found in the system. These changes may be necessary in **rectifying errors, changing information** etc.	**Time taken to modify** information in IS – time that could consume in changing customer details in a customer master record Can be modified with a **minimum number of steps** – number of steps required to modify a customer master record in SAP/R3 Does not need to take prior approvals, authorization etc – The user may require prior approval from higher authorities before changing any data in SAP/R3 End user is in a position to correct data him/her self – an end-user may **only have limited access** to SAP/R3 thus preventing him/her from making changes to any data

Table 3. System Quality Items

4. KEY FINDINGS AND DISCUSSION

This section of the paper would summarize the key findings and discussions for each dimension and their measures.

Individual Impact (see table 1): First, some **potential overlaps** were reported for the measures of effectiveness and productivity, reported by the end-user, raising the concern of mutual exclusivity. The end-user suggests that completing more numbers of reports in a specific time is a measure of effectiveness where it is really a measure of productivity. The authors suggest making clearer that where effectiveness probes the outcomes, results and consequences (Gounaris et al., 2007), productivity in this case query the number of outputs as opposed to number of inputs. Second, the authors suggest that a reword of the learning measure to "I have learnt more through the presence of (the IS)" be more appropriate to emphasize new techniques and knowledge obtained as a result of using the IS. It could also be argued that **order** of the measurement items would play a key role in obtaining accurate survey results more efficiently encouraging the user who is taking part in such a survey to share his/ her knowledge. Therefore use of an open ended question (as stated above) at a later stage of the measurement tool could be more appropriate.

Information Quality (see table 2): First, the content accuracy measure draws confusion over the wording, causing skewed responses. Content accuracy should be used as a comparative measure of **what was** against **what is**. In the interest of parsimony, the measure could be reworded to "Outputs from (the IS) is accurate." Second, the format, understandability and usability of the information draw some similarities. They are easily attributed to the characteristics and logic of the enterprise system itself. The same information produced by a system may be of more significant value to one employment cohort than another. Thirdly, to the operational user understanding of the information could be a direct result of its readability, clearness and the format. End-user is probed about the measurement item about readability, clearness and format only after answering the question "information (from IS) is easy to understand", this may look as a good strategy in obtaining more information about two measures that are closely related to each other, but could be argued as duplication of measurement results relating to the same measurement item (which is evident from the research findings – table 2).

System Quality (see table 3): Research suggests that this variable is closely related to **operational** stakeholders, users who predominently spends the most time with the systems. Generally, the authors found most measures such as ease of use, learning, response time of the system etc are highly relevant to the end-users. Except for one measure that tries to evaluate whether "IS meets units requirements", end-users both agree that this measure is more suited as a measure in the organizational impact dimension.

Concluding our research findings it could be stated that most measures found in this study that attempts evaluate information quality and system quality are highly relevant and are capable of proving better results. We strongly believe that end-user is playing a major role towards the success of IS and more focus on individual impact is of high importance in a survey instrument.

However, from this study it is evident that individual impact measures do not cover a wide range of aspects or are not sufficient enough and measurement items could be further improved, new items can be introduced to capture IS impact on individuals who use the system.

5. CONCLUSIONS AND LIMITATIONS

There exists a multitude of measures used to evaluate the impacts, benefits or success of systems. However, the question of what are the end-users be thinking about when they are responding to these measures have been modestly addressed. This paper attempts to capture an end-user's renditions of a pool of IS evaluation measures of one such IS evaluation model, Gable et al.'s (2008) IS-Impact model. Leclercq (2007) amongst others, reel the importance of feelings and perceptions of the users (as an input) towards the development of IS measures are considered as important as any other input. Adopting an action-research approach, the research attempts to observe and discover how practitioner or end-users treat a particular success measure, whilst interacting with an enterprise system and his social environment for the completion of a set of procurement and order fulfillment tasks. The study uncovers a range of important aspects in the design and selection of evaluation measures. In-depth analysis of respondent data suggests that certain measures could be combined, changed, and better/ differently worded. Measures that are similar in content could also lead to confusion and make the practitioners responses complicated/ difficult. Results also prompt a further development of success measures targeting multiple employment cohorts. The authors hoped that this study would encourage discussion amongst the community in finding the right balance of measures, which is important in getting useful feedback in a survey.

The limitations to the following study are listed and acknowledged. As the study draws from a single measurement model, the list of measures is not merely an exhaustive one. Other models and measures should be included for further consideration. Multiple employment stakeholders were not canvassed for this study, as the foci were on practitioner end-users. Strategic stakeholders with more holistic view of an organization's operations would draw different responses to the same set of measures. It is thus useful extension to compare findings in this study to those canvassing other stakeholders. Last, drawing from a larger number of respondents would naturally convey reliability to the findings and create the avenue for further comparisons.

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