
S. Damayanthing Edirisngh
(Senior Lecturer, University of Kelaniya, Sri Lanka)

Abstract: Enterprise Resource Planning (ERP) considered as one of the major Information Technology (IT) innovations in this decade which is available in on-premises, cloud and hybrid deployment models with its dynamic technological advancement. Currently technology has become more powerful with new innovations such as cloud computing, digital technology and cognitive computing, more and more capabilities embedded and will have amazing capability to create new forms of value, new ways of delivering capabilities, new revenue streams and lot more. Impact of Information and communication technology (ICT) investment, for the user satisfaction, which resulted the business performance. It has been a major research subject for a long time. The purpose of this research paper is to present the synthesized theoretical and empirical literature to help the development of propositions and suggestions of a research agenda on the end user satisfaction on ERP systems. The proposition and the research agenda provided an adequate explanation of the user satisfaction on ERP systems, and perceived performance of organizations. Accordingly six hypothesis were developed and identified five independent variables to study the enterprise resource planning systems on end user satisfaction.

Keywords: Information Technology, ERP, User Satisfaction, Organizational Discipline, Software Industry

I. INTRODUCTION

This research provides useful framework to organizations to achieve business benefits from Enterprise Resource Planning (ERP) adoptions. And understand barriers to successful ERP implementations and further mistreatments of sub systems and sponsors to assure successful ERP adaptation by mitigating the risk of investment. United Leadership, Organizational Discipline, Communication & Stakeholder Management and Organization Culture improve organizational readiness for ERP system adaptation. Finally, it has revealed actual benefit and performance growth that the ERP system provided to the organization, and critical role of the end user computing satisfaction with end users.

Enterprise Resource Planning (ERP) systems are comprised with highly sophisticated integration capability. In the history of information and communication technology, ERP is having the most top places. In software industry it considers as the most advanced development. Any organization who has adopted ERP solution, considers it as the information backbone to the core business processors (Amoako et al,2004, Alkhaffat et al,2016).

The organizational decision on ERP adaptation is to gain some advantage, cost savings, improve efficiency and performance or support to operational and strategic decision making. It is a well-known fact that the ERP systems give many benefits and it is very much important those benefits outweigh the cost of the investment. That is totally depending on the correct system chosen for the organizations and on whether the system is implemented properly. Furthermore both positive and negative aspects of enterprise systems implementation should be considered especially in the areas of economic, technical, organization and social (Soja 2008)

Problem Statement

Scholars have examined how organizations achieved high performance and high growth with the ERP solution. User experience(UX) is a hot topic in SAP (SAP know as Popular ERP software vendor) and they created a new product line in order to cater for that UX strategy (SAP Fiori). However, there are considerable amount of ERP implementation failures across the world. ERP end user’s un-satisfaction, lack of benefits, application and system complexity, not easy to adopt to dynamic business environmental changes due unbendingly of the systems and lot more.

Although an ERP application was developed to be an off-the-shelf package, organizations often found this software too complexed to install and run. One of the reasons is that ERP systems can change how people work and how businesses are run. ERP solutions projects are generally known as time consuming complex activity and organization need to spend lots of money. Not only do ERP systems, need plenty of time and money to implement, even successful implementations can dislocate a company’s culture, create extensive training requirements and lead to productivity losses. On the other hand user training, customization, legacy integration and data conversion are the hidden cost of an ERP solution. Due to this reason actual cost attached to ERP
obviously greater than what organization are budgetted. ERP experience business leaders and business process owners suggest that the cost of implementing ERP systems is very close to the cost to rebuild the firm’s information infrastructure (Trott and Hoecht, 2004).

**Significance of this study**

As discussed above, ERP vendors say enormous success stories about their products and services on their web sites and market them in various ways, however, most of the organizations not able to predict the successful adaptation of ERP solution into their business vertical, sometimes it will not become success story due to various reasons.

With special reference to Sri Lanka there is no much empirical evidence on impact of ERP systems on User satisfaction. There is significant relationship between Information systems usage and user satisfaction (Gelderman 1998). Majority of organizations neglecting user’s satisfaction on ERP system. Mortezai says, end user satisfaction as the key success. And it is needed to consider successful information system adaptation into the business because end user plays critical role (Dastgir and Mortezai 2012,Ali and Younes, 2013). Successful ERP adaptation and organization performance shows significant relationship (Alkhaffaf and Aldalahmeh, 2016). And also End user performance impacted to Information system (Ali and Younes 2013). Further, it was very clear that in last decade, ERP systems have begun to attract the attention of researchers. However, little attention has been paid to their impact on individual satisfaction. Hence, there is knowledge gap on “how ERP system influence to user satisfaction and perceived organizational performance” with special reference to Sri Lankan Industry sector who have adopted ERP solution. Hence this study will fill this knowledge gap.

**Objectives of the study**

Main objective in this study is to find out “The Impact of ERP solution on End User Satisfaction in ERP implemented companies in Sri Lankan industry sector. The main objective further subdivided in to three as to provide better clarification into the main objective.

- Find out what extent the ERP systems influence on ERP end user satisfaction
- Investigate overall impact of End User Computing Satisfaction (EUCS) model on ERP systems adopted by the Organization.
- Investigate association the impact of individual characteristics of ERP systems to end user satisfaction.

Therefore in this research paper it is presented the synthesized theoretical and empirical literature to help in the development of propositions on the end user satisfaction on ERP systems.

**Limitations of this study**

This research is limited to ERP end users point of view only.

**II. LITERATURE REVIEW**

**Studies prior to 2000**

Starting in late 1980’s and in the beginning of 1990’s, new software systems known in the industry as Enterprise Resource Planning (ERP) systems have surfaced in the market targeting mainly large complex business organizations. (Rashid, Hossain, and Patrick 2002). By design ERP come as off-the-shelf solution to replace in-house systems to address the key challenge in collaboration and data management.

In 1960’s majority of the organizations automated their Inventory Control (IC) system with centralized computing package. They used the languages COBOL, ALGOL and FORTRAN etc… In 1970’s, MRP were developed and MRP known as Material Requirements Planning systems. This period the organizations mainly focused the high production volume, manage large inventory with low cost and minimize overall cost of the firm (Basoglu et al., 2007; Umble et al., 2003). Main function of that application is to plan the products or parts requirements as per the master production schedule. That took the lead and MRP II came into picture in 1980’s, called Manufacturing Resource Planning (Basoglu et al., 2007). That product focused to optimize manufacturing processes by synchronizing the materials with production requirements. This covers core business areas such as production and distribution management, project management, finance, human resources and engineering.

In late 1980’s the change began on ERP. In 1990’s they discussed about power of enterprise-wide inter functional coordination and integration. Adopting the technological platform of MRP, ERP systems integrate business processes including Production, Sales and Distribution, Finance and controlling, human resource management, project management, material management, service and maintenance and logistics, providing accessibility, visibility and consistency across the enterprise. (Basoglu et al., 2007; Umble et al., 2003). Revolution begun with this and manufacturing theory was changed with the scope of change in the software. In order to get competitive edge, firms try to focus on the quality. That was the boost for quality professionals (Robert Jacobs and Weston 2007). Main drawback in MRP II was incapability of managing production planning and scheduling, production orders and inventories. Further, limited focus on manufacturing activities, mass production need forecast and poor budget control are some of the drawbacks. That was the turning point of totally integrated solution known as Enterprise Resource Planning (ERP).
In 1990’s, Gartner Group adapted the term ERP (Enterprise Resource Planning). They integrated all operational departments together. The Y2K issue in 2000 course has many issues in the legacy systems and commonly most of the organizations adopted ERP as a fix for Y2K. They wanted to be Y2K compliance. After this incident, ERP industry became strong and matured. Relational Database (RDBMS), client server architecture and Graphical User interface are being incorporated into this. (Basoglu et al., 2007) Financial reports generation was the key in this with the enablement of setting the prices for their products, inventory data integrated with finance and sale. Human Resource Management processors integrated and it helped organizations to manage human resources. (Basoglu et al., 2007; Markus and Tanis, 2000).

Enterprise Resource Planning Systems

Enterprise Resource Planning is witnessed and trusted foundation created to amplify capabilities of the companies in different business verticals. Industry, capacity, size and geographical limitations and barriers are being broken by the latest developments of ERP’s. ERP products leverage role-based access to critical data, applications and analytical tools, streamline the business processes across procurement, manufacturing and logistics, service, sales, finance and HR like core business functions as well as Customer Relationship Management (CRM), Supplier Relationship Management (SRM) like cross business functions also integrated to core ERPs.

Enterprise Resource Planning Systems help managing and organizing all most all the business processors, internal activities, external activities information flow as well as relationship within the departments of the organizations (Basoglu et al., 2007; Koh et al., 2008; Robert Jacobs and Weston 2007). ERP is integrated software solution which manage organizational resources (Basoglu et al. 2007). As per Watson and Schneider, ERP handles all most all the organizational requirements in all the functional areas of the business as integrated customized software package (Watson and Schneider, 1999). ERP systems provide a greater integration of all the information flows in an organization to eliminate cross-functional coordination issues in the business process (Davenport 1998). With ERP implementation, Organization can reduce the overall costs, make accurate data available in real time and exchange information with customers and suppliers (Basoglu et al., 2007; Umble et al., 2003).

ERP System Adaptation

ERP has attracted attention of both academic and industrial communities as packaged application solution that integrate different business functions together that can be adapted by the organization as their primary engine and the platform for integrating data, information and core business processes, in real time, across internal and external value chains (Shang and Seddon 2000). It impounds deep knowledge of business practices that vendors have accumulated from implementations in a wide range of client organizations that can exert considerable influence on the design of processes within new client organizations (Shang and Seddon 2000). ERPs complex functionalities capable enough to cover wider range of business verticals and involve comprehensive knowledge of both implementation and limitation of the software and it has the intelligence to manage processors and information. Comprehensive ERP software packages available in the market facilitates, share common information and activities throughout the organization (sometimes outside organizational), automation and integration of critical business processors, real time data access and real time analytics. Since ERP systems have impact on the productivity and efficiency in firms, the majority of organizations implement ERP systems to increase organizational competitiveness (Davenport 1998). ERP systems touch on many aspects of a company’s internal and external operations and provide organizations with an overall view of the business through multidimensional information (Ragowsky and Gefen 2008). Consequently, successful deployment and use of ERP systems are critical to organizational performance and survival (Markus and Tanis 2000).

Some scholars stated that the key purpose of a ERP system is to generate new value and costs by providing the relevant information timely to the employees managing resources productively and proactively.

III. CONCEPTS AND THEORETICAL MODEL OF THE STUDY

Customer Satisfaction

Theories that are cope up with this study is giving important understand to study the differences and similarities between customer satisfaction and user satisfaction. After deep review on the available literature for ERP’s it was found few definitions for customer satisfaction. Customer satisfaction is an overall post-purchase evaluation based on the perceived product performance compared with pre-purchase expectations (Fornell 1992). Furthermore, customer satisfaction is defined as “conceptually, an outcome of purchase and use resulting from the buyer’s comparison of the rewards and costs of the purchase relative to anticipated consequences. Operationally, similar to attitude in that it can be assessed as a sum of satisfactions with various attributes” (Churchill and Surpremante 1982.). It is considered as a judgment that the product or service itself or a product or service feature, provided (or is providing) a pleasurable level of consumption-related fulfillment (Oliver, 1999). When consider those three definitions customer satisfaction depends on the customer behavior and it is subjective.
On the other hand companies focusing on user satisfaction outperform on the market (Carson 2008). Furthermore, measuring and understanding user satisfaction can enable a company to save lots of money and to take relevant decisions regarding the future of the firm (Lang and Analyst 2012) given that there are lots of theories in this field and to present the ERP market.

**Value and Satisfaction Model**

When consider the value, it is something added to the customer’s life by the product or service purchased. This addition can be cast in terms of utility, monetary worth or additional pleasure (Oliver, 1999). In terms of monetary and non-monetary cost (time and effort) value is the function of perceived sacrifices. These sacrifices are treated as cost-based value. Value is a negative function of what is sacrificed to purchase the good or service and a positive function of what is received from the purchase of the good or service (Oliver, 1999). What the customer receives from the purchase is the performance outcome of the product. Value-as excellence is equivalent to the quality of the product or service purchased (Oliver, 1999). In consumer’s point of view, they assess value partly based on the quality. In reality, quality amplifies their consumption experience and provide them added utility. Quality can be visualized in three different perspectives which is attainment, desirability and usefulness.

Attainment describes the subjective object has achieved high level of technical accomplishment and desirability refers to the consumer’s needs for attachment to the good or service. This perspective is related to the attractiveness of the consumable and suggests a level of quality that can be acquired. Usefulness reflects the influence of utility-based reasoning on different definitions of quality (Oliver, 1999). Performance outcome and the cost base value of the compression consider one of the antecedents of satisfaction. This is one of the comparative operations in post-purchase judgment (Oliver, 1999). This theory is being used in the research because it is fit to the purpose of given that cost based value does not only include the price but also the time and effort invest in the transaction.

**Organizational Performance**

An Enterprise Resource Planning (ERP) system is an amazing robust solution firms can adopt and combine business Fosser (2011) call “Vanilla” software specially used by SAP ERP which considers the most suitable solution for the business organization. What will happen to the business environment of the entire organization use this solution as corporate business solution and what will happen to the competitiveness and competitive advantage (Fosser et al. 2011).

As it exists strong relationship on user satisfaction, individual performance and organizational performance, this study focused on analyzing the ERP user satisfaction. ERP and its capabilities creates firm competitiveness with better information integration (Al-Mashari, et al., 2003; Davenport et al, 2007; K.-K. Hong and Kim 2002). But there are some research available and they reports organizations fail to get the complete advantage and benefits from their ERP.

According to the scholars, though it is exists strong relationship on user satisfaction, individual performance and organizational performance, this study focused on searching the literature on ERP user satisfaction. Findings in the research not exactly match with the real world of ERP implementation because focus of those research are more towards to financial performance.

**ERP information Content**

ERP content is a very vast area to be discussed. In nutshell, all business related data such as Sales data, Production schedules, Production Plan, Material planning, Sales revenues, Profitability analysis, human resource information, working shifts, all related documentations, daily reports and lots more (Yoon et al., 2013). Here in this study prove that the content have positive relationship to user satisfaction. ERP content being taken by Dastgir and Mortezai in 2012 to measure the user satisfaction and he hypothesized and proved, that the content of information system affects the end user satisfaction. Instrument of EUCS develop (Doll et al. 2004; Doll and Torkzadeh 1988a, 1988b; Doll et al., 1994) is containing “ERP Content” as the measure for user satisfaction. Mohamed (Mohamod et al., 2009) in their research use the same EUCS mode and he has taken the same instrument for the study. Yasoa also used the same model in his study (Yasoa and Iliaus 2006) and have also used the same construct in their study ERP content user as measure in the Sharabati’s Study (Sharabati 2015). In Yoon and Chin study too used content (Yoon et al, 2013).In this study same model has been adopted and drawn content from there and measured user satisfaction from six items.

By examining all those studies, this research hypothesized that:

**H1 = Content of ERP systems positively impact on ERP user satisfaction.**

**ERP information accuracy**

According to ISO 5725-1, the general term "accuracy" is used to describe the closeness of a measurement to the true value. When the term is applied to sets of measurements of the same measured, it involves a component of random error and a component of systematic error.

After reviewing literature, it has been proven that the accuracy of information produced by the system is important to measure the overall EUCS. Finally, it affects to create a better perception of the end user to overall satisfaction. Bailey and Pearson’s study (1983) introduce 39 system-related items for measuring user satisfaction.
satisfaction. Among their ten most important items, in descending order of importance were information accuracy, output, timeliness, reliability, completeness, relevance, precision and currency. In previous to Bailey’s study, Ahituv (1980) incorporated five information characteristics into a multi-attribute utility measure of information value name accuracy, timeliness, relevance, aggregation and formatting. Further, Olson and Lucas (1982) proposed report accuracy and appearance as measures of information quality in office automation systems. Subsequently, it seems to suggest that accuracy is one of the factors that represent the overall EUCS. The respondent who is satisfied with the accuracy of information is also satisfied with overall system.

By examining all those studies, this research hypothesized that:

**H2 = Accuracy of ERP systems positively impact on ERP user satisfaction.**

**ERP user-friendliness**

ISO 9241 defined Ease of use or usability as “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use”. In order to give biggest strength to this definition this can be explained in an expanded manner; that can include five characteristics that should include product or service that is Effective, Efficient, Engaging, Error Tolerant, Easy to Learn. Globally this is known as 5 Es. Davis (1989) defined EoU as “the degree to which a person believes that using a particular system would be free of effort” Maldonado and Sierra (2013) have found that the EoU has positive impact on the ERP user satisfaction”. Number of studies pointed out the importance that as user satisfaction measure and following studies use Ease of Use as a measurement for the user satisfaction. (S., Kedem-Yemini, Pliskin N., Goltz S. 2010), (Yoon, Nah, and Chin 2013).

Further, Branscomb and Thomas say in software development and design Ease of Use considers as a very important factor (Branscomb and Thomas, 1984). There are lots of evidence available to prove that the effective functioning of an application depends on its ease of use or usability (Goodwin, 1987). When user finds an application is easy to use they automatically become advanced users and they will use all most all the capabilities of the application system and also they will find new way of doing things in an efficient manner within the system boundaries. Doll and Torkzadeh say Ease of Use may improve productivity and those who are making decision empowered investigate more alternatives (Doll and Torkzadeh, 1988). The goals of each system determine what factors of Ease of Use are the most important. If the system is not easy to learn, it will not be used. Management will be reluctant to invest large amount of time in training the clerical and sending them for the trainings which incur additional cost to the company. In addition, managers will invest even less time in any attempts to learn to use the system by themselves. Ease of Use is expected to increase the level of overall EUCS. It shows that Ease of Use is one of the factors that represent the overall EUCS. The respondent who is satisfied with Ease of Use of the system is expected to satisfy with overall system.

By examining all the angles, this research hypothesized that:

**H3 = Ease of Use of ERP systems positively impact on ERP user satisfaction.**

**ERP information format**

This is commonly known as layout of data. As a simple example, any computer application accepts data in any kind of format and processes it and produces the output in another format. Bailey and Pearson (1983) classified format of information reported as one of the description measures in their study. Doll and Torkzadeh (1988) used format in their study as the second dimensions in determining EUCS. Mihir and Bijan (2002) identified six relevant dimensions (relevance, confidence, and usefulness, ease of use, format and playfulness) of user satisfaction under a research framework for user satisfaction with decision support and usability of a DSS. In Sri Lanka Format of the financial report to cater for statutory requirements should be in agreed format. (Act need to put) This study expects that the satisfaction with the format of the report might have the relationship with the overall satisfaction.

Therefore, this research hypothesized that:

**H4 = Format of ERP systems positively impact on ERP user satisfaction.**

**ERP information timelines**

Timeliness is known as a capability of any software solution that retrieves up to date data or historical data and information at any given point of time efficiently. User might request current information, forecasting information or historical data that they require to comply with statutory requirements. Timeliness is the last dimension in EUCS model that also measures the user satisfaction. Same as other construct almost all the studies use this as a valuable measurement to measure the user satisfaction.

According to Chang et al. (2003), timeliness is referring to the speed and frequency of information provided by accounting information system (AIS). Consistent with Chenhall and Morris (1986) and Choe (1996), they measured timeliness with two items, namely speed and frequency, using a seven-point Likert type scale. Miller and Doyle (1987) conducted studies and employed report timeliness as their descriptions of measures. In general, if the end-users satisfy with the timeliness of the report produced by the CAS, they may be satisfied with the overall of the system. Hence, timeliness is assumed to increase the level of overall end user computer satisfaction (EUCS). This study suggests that timeliness is one of the factors that represent the overall EUCS.

This work is licensed under a Creative Commons Attribution 4.0 International License
Therefore, this research hypothesized that:

\textbf{H5 = Timeliness of ERP systems positively impact on ERP user satisfaction.}

\textbf{Table1: Synthesized Hypothesis Related Literature}

<table>
<thead>
<tr>
<th>#No</th>
<th>Description of Hypothesis</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Content of ERP systems positively impact to ERP user satisfaction</td>
<td>(Yoon, Nah, and Chin 2013) Dastgir (Dastgir and Mortezaie 2012) EUCS develop( Doll et al. 2004; Doll and Torkzadeh 1988a, 1988b; Doll, Xia, and Torkzadeh 1994) (Yasoa and Ilias 2006) Sharabati’s Study (Sharabati 2015) (Yoon, Nah, and Chin 2013) (Yasoa and Ilias 2006)</td>
</tr>
<tr>
<td>H2</td>
<td>Accuracy of ERP systems positively impact on User Satisfaction</td>
<td>(Ilias et al. 2009) Mohamed (N. Mohamed, Hussin, and Hussein 2009) Yasoa also used the same model in his study (Yasoa and Ilias 2006) Chin and Yoon (Yoon, Nah, and Chin 2013) Yoon and Chin Study also used Accuracy and measure (Yoon, Nah, and Chin 2013) (Yasoa and Ilias 2006)</td>
</tr>
</tbody>
</table>

By examining all the hypotheses following conceptual framework is presented.

\textbf{Conceptual Framework of the Study}
IV. CONCLUSION

There are few reasons why companies implement ERP solutions. Increased demand for real-time information generation for decision making; integration of applications. Salient feature is IT organizations are investing in ERP systems at a higher frequency than almost any other technology, but the adoption rate has increased very slightly over the past three years (ERP Adoption and Investment Trends 2011). This research proposed and evaluated EUCS with ERP systems to examine the factors which are contributing to End User satisfaction among the ERP users in the organization who have adopted ERP solution. The factors such as Content, Accuracy, Ease of Use, Format and Timeliness are being considered.

Directions for future research

This study has investigated and demonstrated the EUCS factors in the ERP implemented organizations in Sri Lankan Industry sector. And it has suggested that content, accuracy, format, ease of use, timeliness to the ERP solutions with reference to Sri Lankan Industry. Thus, ERP software developers must address rich system features and powerful system functionality as important design objectives when developing systems in ensuring better output for user satisfaction. Further, in this study the researcher found that the factors of the EUCS model and overall EUCS mediate the organizational performance. And it was not proven due to lack of empirical evidence and therefore that area needs to be focused in future researches.

Sources of funding of the study

This study was self-financed by author.

V. REFERENCES
