An ERP System's Success at Belize Electricity Limited: A Developing Country's Perspective

Myric Marin
University of Belize
College Street, West Landivar
Belize City, Belize
2014110281@ubstudents.edu.bz

Denise Bowman
University Of Belize
College Street, West Landivar
Belize City, Belize
2011110780@ubstudents.edu.bz

Sherese Rivero
University of Belize
College Street, West Landivar
Belize City, Belize
2012110965@ubstudents.edu.bz

Abstract

An Enterprise Resource Planning Systems are commonly used by organizations to obtain a competitive advantage as it provides an effective and efficient operation in the workplace. An ERP system is a business process management software that allows an organization to use a system of integrated applications to manage all aspects of a business. Though it's prominently used in developed country, the success rate of an ERP system in developing countries are unknown. With the use of six constructs from the DeLone and McLean IS success model with an additional two constructs of our own(Complimentary technology quality and Self efficacy measure), we executed a quantitative research to find the success rate of an ERP system in a company that is located in developing country. Therefore, this research will be done to find out if Microsoft Great Plains, being used by the Belize Electricity Limited, is performing to its full potential by assisting employees in completing organizational task/ goals in an effective and efficient manner. This study is important since it will provide information on the usefulness of an ERP system within an organization of a developing county. Also with this research, organizations using ERP Systems will be able to see factors that cause an ERP System to fail on a wider scope with the addition of two construct to the already existing Delone and Mclean Model. This research showed an organization that is situated in a developing country has the potential of using and ERP system while performing at a fairly successful rate, consequently completing organizational goals and task. To add, our research result also showed us that the two constructs that were added are necessary in developing countries, as it affected the success rate result of the ERP system in question.

Introduction

The importance of researching 'An ERP System's success at Belize Electricity Limited: A Developing Country's Perspective' is that it provides an understanding of the function of an ERP System within a developing country. With this research, organizations using ERP Systems will be able to see the factors that cause the ERP System to perform the way it does.

The ERP system is unique to Belize and it has been indicated that The Belize Electricity Limited is one of the very few companies that integrates this system in its operation and management of the company. Subsequently, there has been limited knowledge of the success or failure of such a program within the country. Furthermore, it has been said that this study is the first of its kind at the University of Belize an institution of higher learning. It therefore stands that this research topic is original in its purest form.

It is known that the six construct used in the previous literature was successful. These constructs are Information Quality, System Quality, Service Quality, User Satisfaction, Use and Perceived Net Benefits. It is unknown that the two construct added will be successful. These constructs are Complimentary Technology Quality and Computer Self-Efficacy Measure.

The objective of the research is to find out if the Microsoft great plain, being used by the Belize Electricity Limited, is performing to its full potential by assisting employees in completing their task in an effective and efficient manner consequently helping towards organizational goals. The goal of the research is to examine an ERP System's success rate at a company in a developing country.

Literature Review

One of the most important work to be done in this area is on the topic of *"Investigating the success of ERP systems: Case studies in three Taiwanese high-tech industries*" authored by Shih-En Chein and Shu-Ming Tsaur available online 23 March 2007. Shih- Wen Chien is an assistant professor in Department of Commerce Automatic & Management. His current research interest centre on ERP performance Measurement, Knowledge Management and Financial Management and Financial Information Management. He has published the research paper in International Journal of Production Economics.

Shu'Ming Tsaur is an assistant professor in the department of MIS at Ching Yun University (Taiwan, ROC). His research interest include e-business and Financial Information Systems.

The other important document is entitled: "ERP *implementation failures in China: Case studies with implications for ERP vendors*" authored by Yajiong Xue of the College of Business Administration, University of Rhode Island, Kingston, USA; Huigang Liang of the Department of Information Technology and Operations Management, Florida Atlantic University, Ft Lauderdale FL, USA; William R. Boulton and Charles A. Snyder both of the Department of Management, Auburn University, Auburn, Al, USA

In case study document "*ERP implementation failures in China: Case studies with implications for ERP vendors"* sought possible reasons for major international ERP vendors not being able to dominate Chinese ERP Market. Taking an ensemble view of technology, it conceptualized ERP systems as being embedded in complex social contexts, such as heavily influence ERP implementation and use. Based on this conceptualization, it contended that a historical perspective and a social-cultural perspective can offer a rich understanding on ERP implementation in China. From a historical perspective, the paper describes China's ERP evolution and compares it with ERP evolution in Western Countries. From the social-cultural perspective, five cases in which foreign ERP vendors have failed in their Chinese implementations are presented and analysed. Eight factors are identified which have contributed to ERP failure.

Theoretical structure took the ensemble view of ERP and emphasized the contextual influences on ERP implementation. The well -known IS Success Model Delone and McLean (1992) was which postulated that system quality and information quality are two central dimensions of IS success were utilized taking into

account the technical characteristics of ERPs. Whilst in Investigating the success of ERP systems: Case studies in three Taiwanese high-tech industries its purpose of the research is to re-examine the updated DeLone and McLean model of IS success to ERP systems and it attempted to propose a success model for ERP systems and to empirically investigate the multi-dimensional relationship among the success measures. Its goal was to obtain the users perception about the importance of CSF in order to establish a rank among them. The updated DeLone and McLean model was applied to collect data from questionnaires answered by 204 users of ERP systems at three- tech firms in Taiwan. Finally, this study suggests that systems quality, service quality and information quality are most important successful factors. Most of the studies in the literature were based on interviews, case studies and industry surveys.

In the "ERP implementation failures in China: Case studies with implications for ERP vendors" the results concluded that there are implications for both academic researchers and ERP practitioners. For academic researchers it provided insights into the Chinese ERP market and environment. The study further identified eight cultural and environment problems in ERP implementation. This expanded the range of cultural and environmental problems in ERP implementation. The findings could help ERP practitioners to predict weaknesses in their company's ERP implementation ad plan and lead to better planning. The eight problems reveal a set of key areas for foreign ERP vendors to pay attention. The failing cases in China suggest that ad hoc remedies will not save an ERP vendor. Instead strategies to address cultural barriers should be developed before an ERP vendor enters the market. Vendors should also make their systems flexible enough to easily adapt to structural changes being made by ERP customers in the targeted market.

The researchers sought possible reasons for major international ERP vendors not being able to dominate Chinese ERP Market. They discovered that a historical perspective and a social-cultural perspective can offer a rich understanding on ERP implementation in China. They also discovered five cases in which foreign ERP vendors have failed in their Chinese implementations are presented and analysed. Also, they discovered that eight factors are identified which have contributed to ERP failure.

Methodology

The researchers will collect the data using surveys. The eight constructs and the questions used in the surveys will be selected based on their relevance in the collection of data. The irrelevant questions will be taken out and discarded. The surveys will be distributed randomly among managerial and non-managerial staff throughout the entire Belize Electricity Limited Company. Quantitative data collection is the method that will be used in the research. The data will be compiled in Microsoft word and illustrated in tables and histograms.

The methodology in this research is different from the methodology found in previous literature because in our survey, we will be adding two additional constructs which are Complimentary Technology Quality and Computer Self-Efficacy Measure. Complimentary Technology Quality will be added because this research will be conducted in a developing country where technology quality might be of low quality which results in the software to not being operated to its full potential. Computer Self-Efficacy Measure will also be added because the research will be done in a developing country where we suspect that technical knowledge of using the software may be low in comparison to a developed country.

The assumptions of the previous literature is that every participant knows how to use technology and that all the technology being used are operating to its full potential. The limitations for the previous literature review was that it was conducted with a target of only developed countries and did not consider developing countries. While in our research of the Microsoft Grate Plain at the Belize Electricity Limited, it will be done in a developing country which is why the two construct of Complimentary Technology Quality and Computer Self-Efficacy Measure will be added.

This research will be done to find out if the Microsoft great plain, being used by the Belize Electricity Limited, is performing to its full potential by assisting employees in completing their task in an effective and efficient manner consequently helping towards organizational goals. With the use of the eight constructs which are Information Quality, System Quality, Complimentary Technology Quality, Computer

Self-Efficacy Measure, Service Quality, User Satisfaction, Use and Perceived Net Benefits; we will be able obtain the relevant data needed to conduct this research.

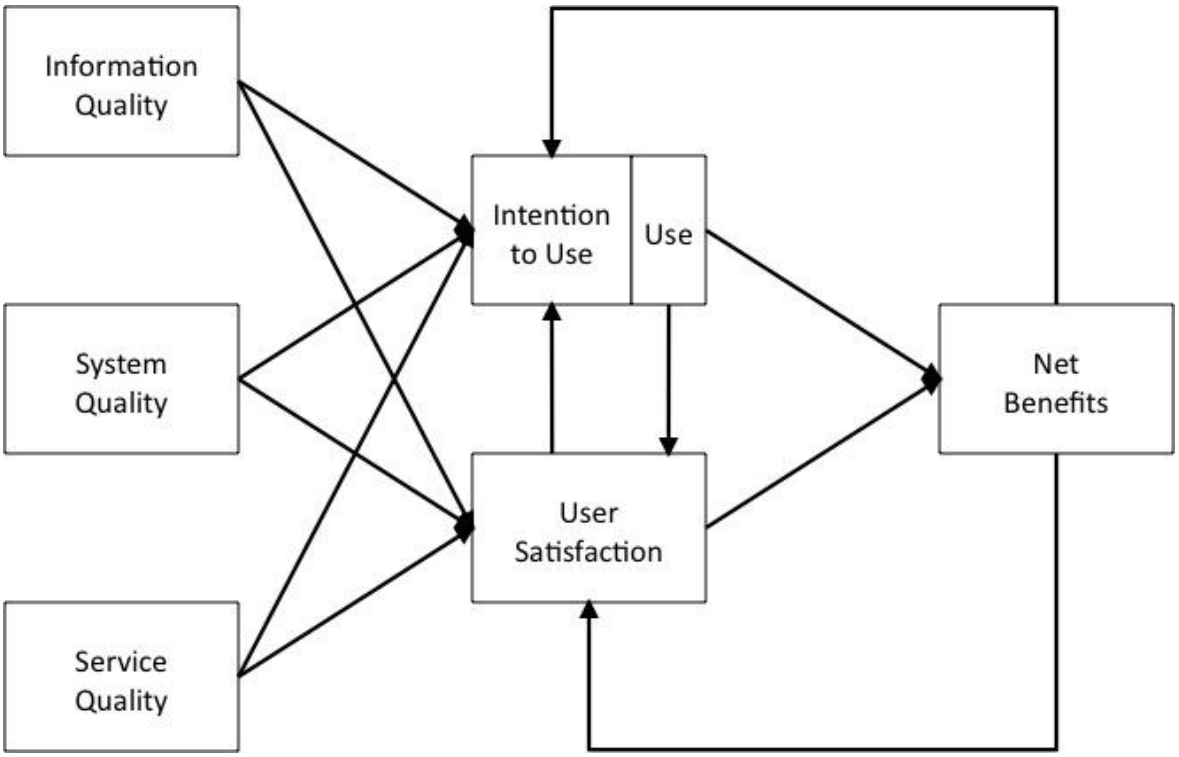

Figure 1: The Delone and Mclean Model

Table 1. Measurement Items for Questionnaires		
Construct	Survey Questions	Source
Information Quality	IQ1: The information system provides information that is easy to understand IQ2: The information system provides relevant information IQ3: The information system provides is sufficient. IQ4: The system provides up to date information.	Bailey and Person (1983)
System Quality	SQ1 The system is user friendly and easy to use. SQ2: I feel the system is high speed access. SQ3: I feel the system provides interactive features between users and system.	Alshibly (2011)
Complementary Technology Quality	CTQ1: The software on the device (desktop computer, laptop, mobile device) used to access the information system is adequate. CTQ2: The device's hardware (desktop computer, laptop, mobile device) used to access the information system is adequate. CTQ3: The device (desktop computer, laptop, mobile device) used to access the information system has an adequate internet connection in regards to speed and reliability.	Teece, D. J. (1988)
Computer Self Efficacy Measure	CSE1: I can complete tasks with this information system if there was no one around to tell me what to do as I go. CSE2: I can complete tasks with this information system if I had never used an information system like it before. CSE3: I can complete tasks with this information system if I had only the information system manuals for reference. CSE4: I can complete tasks with this information system if I had seen someone else using the information system before trying it myself. CSE5: I can complete tasks with this information system if I could call someone for help if I got stuck.	Compeau, D. R., & Higgins, C. A. (1995)

	CSE6: I can complete tasks with this information system if someone else had helped me get started. CSE7: I can complete tasks with this information system if I had just the built-in help facility for assistance. CSE8: I can complete tasks with this information system if someone showed me how to do it first. CSE9: I can complete tasks with this information system if l had a lot of time to complete the job for which the information system was provided. CSE10: I can complete tasks with this information if I had used similar information systems before this one to do the same job.	
Service Quality	SV1: The support staff keeps the information system software updated. SV2: When users have problems with the information system, support staff shows a sincere interest in solving the problem. SV3: The information system support staff responds promptly when users have a problem. The information system support staff tell users exactly when services/maintenance will be performed.	Chang et al., (2009)
User Satisfaction	US1: I bring a positive attitude or evaluation towards the information system function. US2: I think that the perceived utility of the information system is high. US3: I believe that the information system has met my expectations. US4: I am satisfied with the information system.	Seddon and Yip (1992)
Use	U1: My frequency of use with the information system is high. U2: My everyday functions at work depend upon the information system. U3: I am able to utilize the information system to complete tasks when no one is around to tell me what to do as I go. U4: I have the knowledge necessary to use the information system.	Balaban et al., (2013) Rai et al., (2002)

Perceived Net Benefits	NB1: The information system helps me to improve my job performance. NB2: The information system helps the organization save costs. NB3: The information system helps the organization achieve its goals. NB4: Using the information system helps improve my assessment and training. NB5: Using the information system at work increases my productivity. NB6: Overall, using the information system enhances recruitment and performance management.	Alshibly,(20 11); Tansley et al, (2001)

Table 1: Measurement Items for Questionnaires

Data Analysis and Discussion

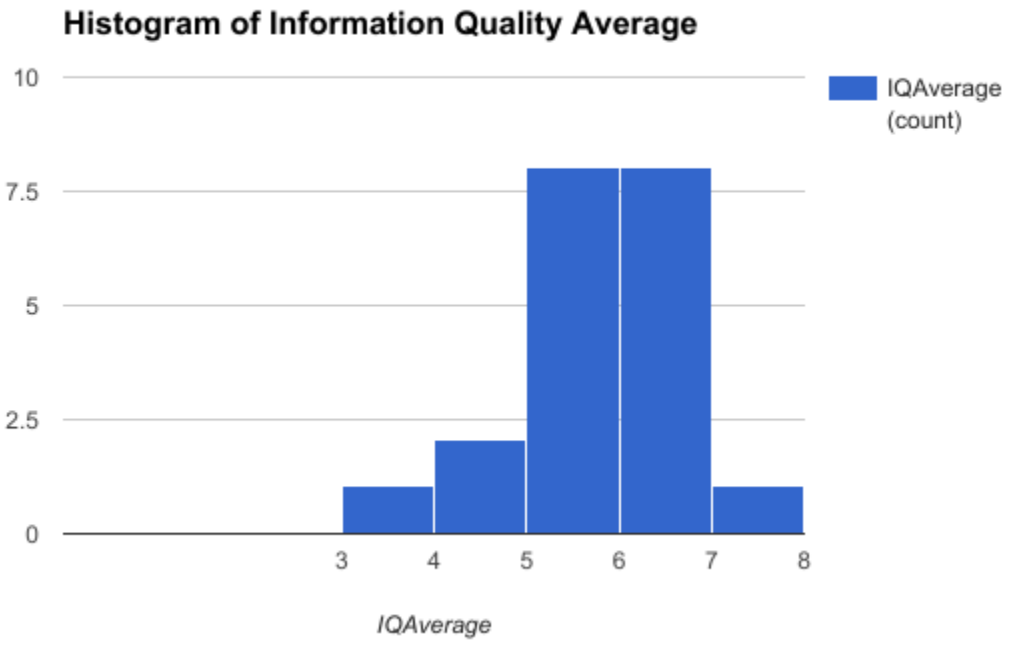

Figure 2

The first graph shows the results of the average response rates for information quality. Overall the results of this construct were fairly good. There was some variance between responses, which shows that not all the employees are satisfied with information the system provides. Despite the few, majority of the participants rated this construct between a 5 and 6. We can conclude that the system is providing adequate information to employees to further organizational task and goals.

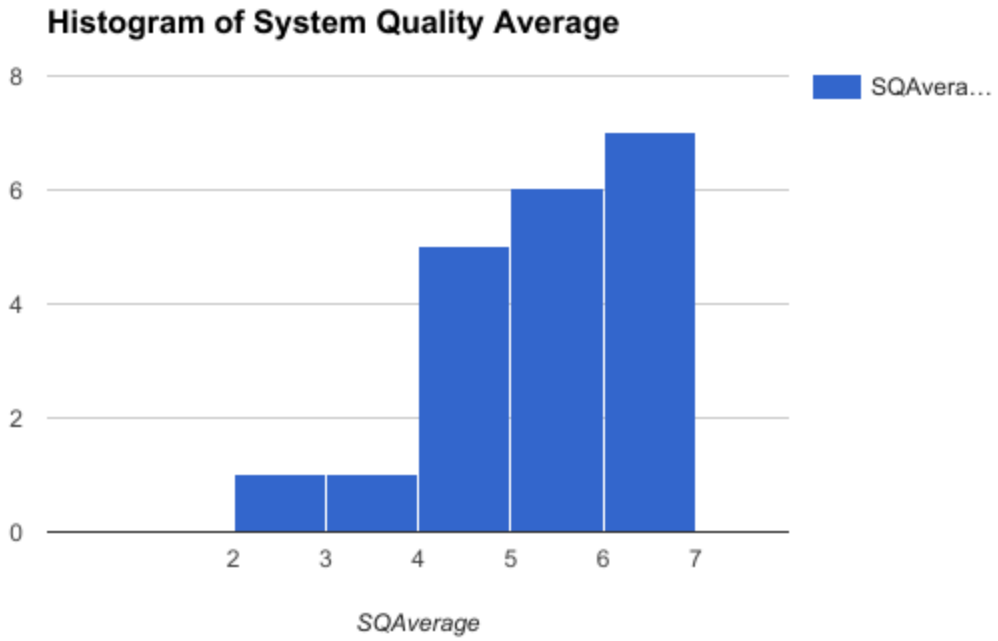

Figure 3

Graph two illustrates the average responses for system quality within this study. System quality shows some variance within the responses. This happened because some employees found an aspect of the system such as user interface or software to be unsatisfactory. However it shows a high number of responses that rated it a five or above, which shows the majority of the sample think that the system quality is satisfactory and helps with their job and task completion.

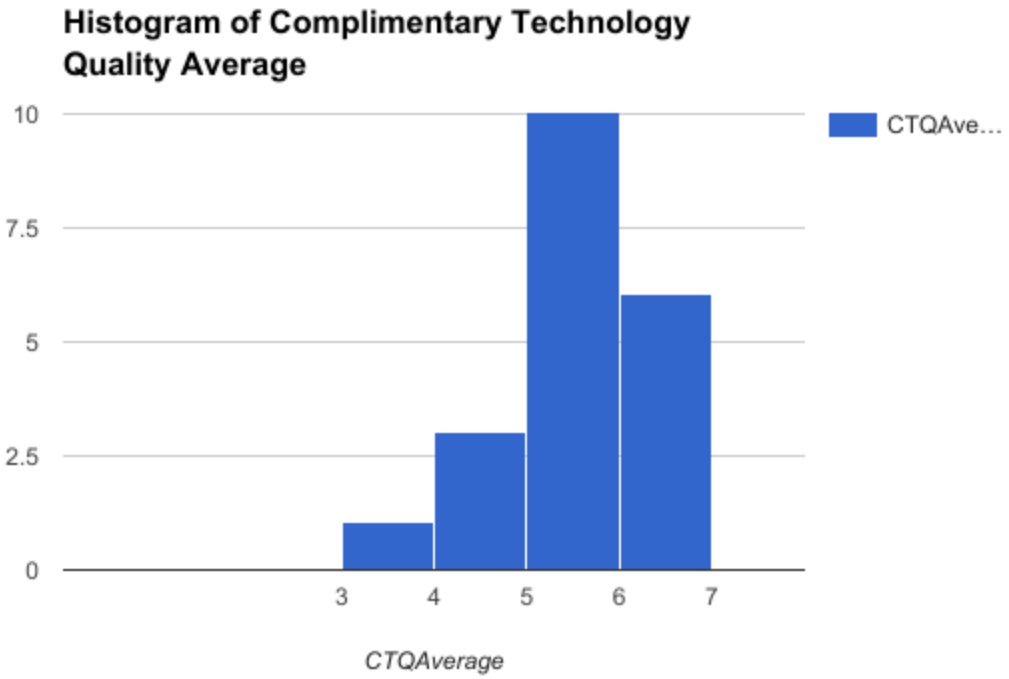

Figure 4

The complimentary technology quality construct was one which we added. This construct also has variance within the graph. Some employees are not satisfied with things such as internet speed and quality of hardware while others are. The majority of participants responded with a 6, which means most found this aspect of the system a little over satisfactory.

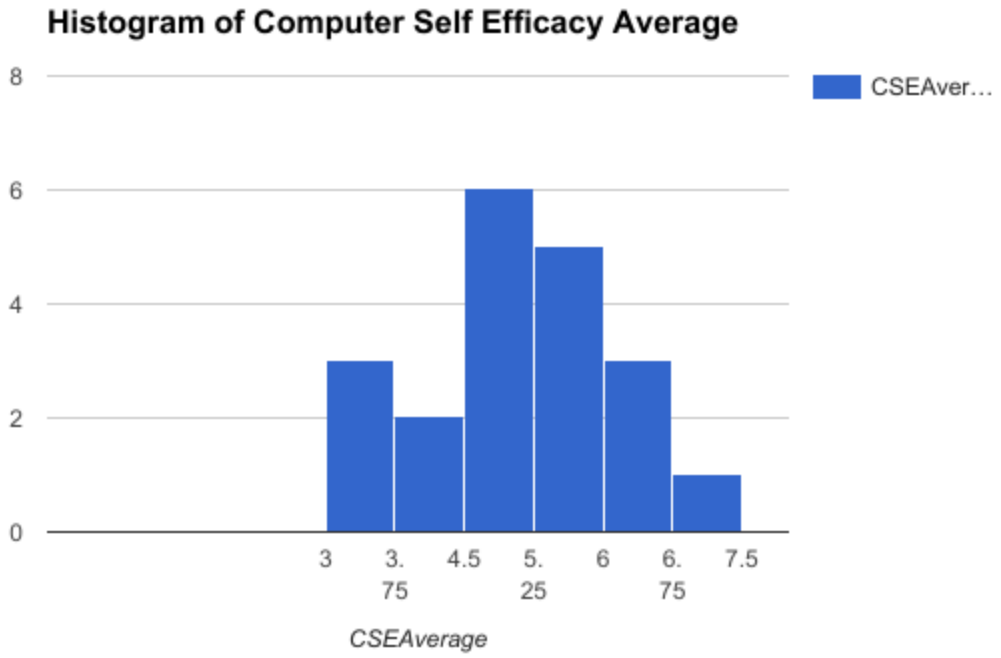

Figure 5

The Self Efficacy measure, one which was added, deals with how confident and comfortable one feels in using the system to get task and goals done. The results shows a wide range of responding, none out weighing the other by far. An explanation for this is that some employees may not be trained for the use of the ERP system while some others are well trained in that area. Though some employees may not feel comfortable with using the system, this construct earned an average above 5, which means this aspect of the system is not failing either but a few investment into this area can be made to boost overall efficiency.

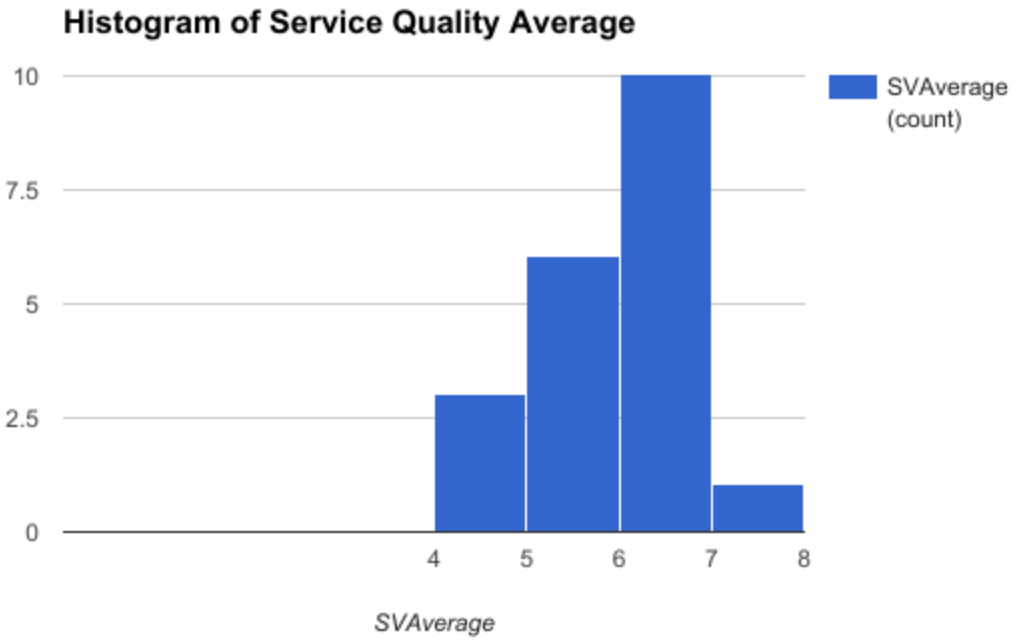

Figure 6

Usually in developing countries a big problem noticed would have been the service quality. Despite the norm, the ERP system studied in this particular company yield a very different result. In fact service quality earned the highest score of all construct studied. There were some variance in the responses, that showed come inconsistency of the service quality but majority of the participants found this construct very well handled. The service tech team at the company seems to be doing a good job in the up keep of the system.

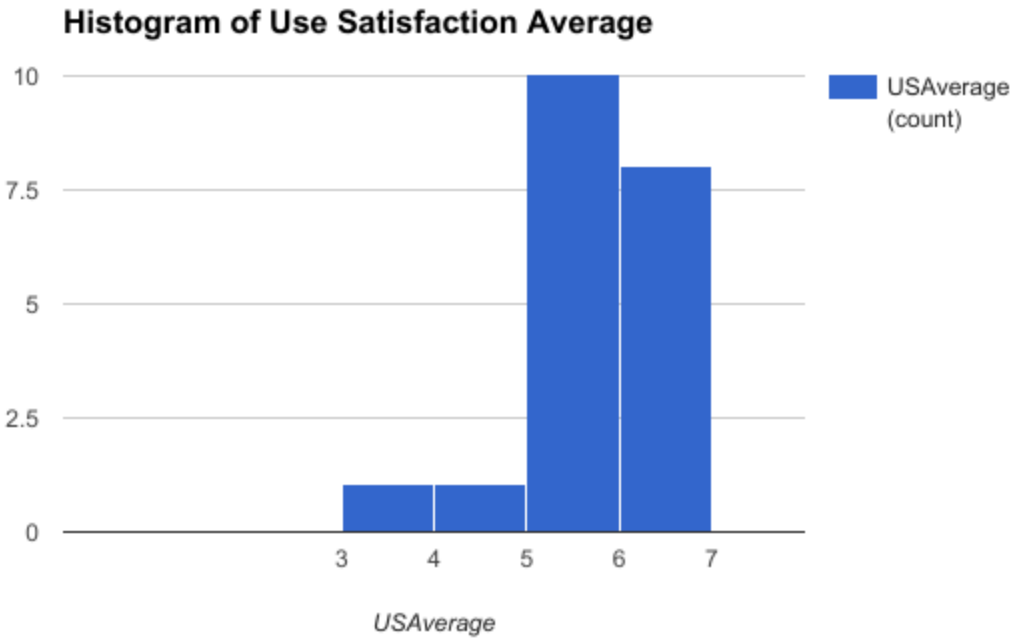

Figure 7

User Satisfaction was one of the higher scored construct as well, the employees seem to be pretty happy with how the system is performing. This can be explained through the high responses for service quality and information quality. With both being average, the system will be producing efficient work, which in turns increase productivity and user satisfaction.

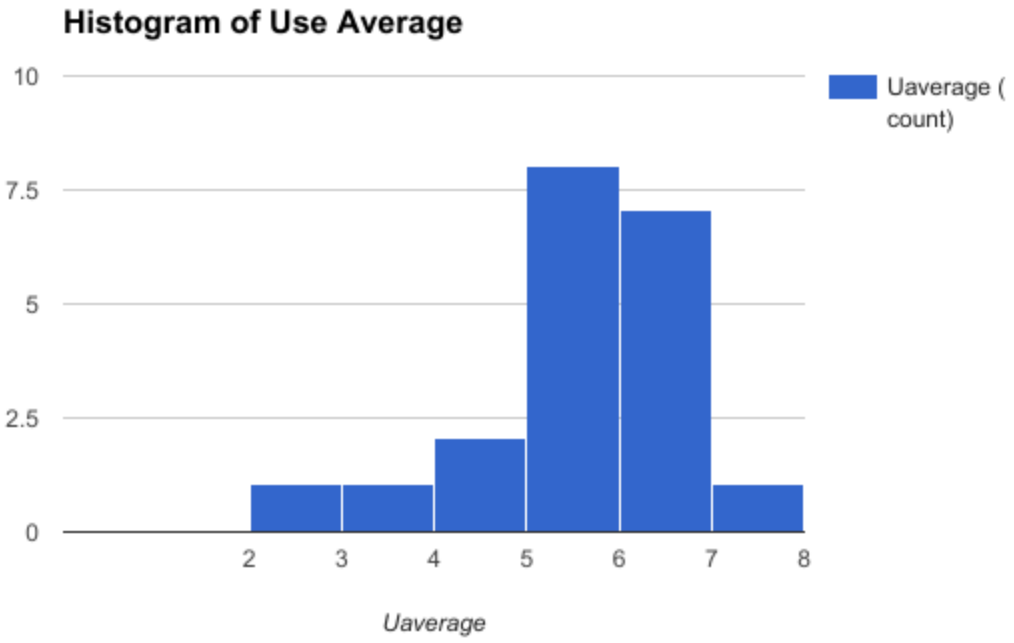

Figure 8

This was also a very strange construct, as the use of the system was lower than that of the user satisfaction. The graph shows a wide variance for "use", some participant scoring as low as 2 but other rating as high as 7. This shows some employees rarely use the system while other probably incorporates it on a daily basis. Management can try and minimize that gap to boost efficiency in obtaining organizational goals.

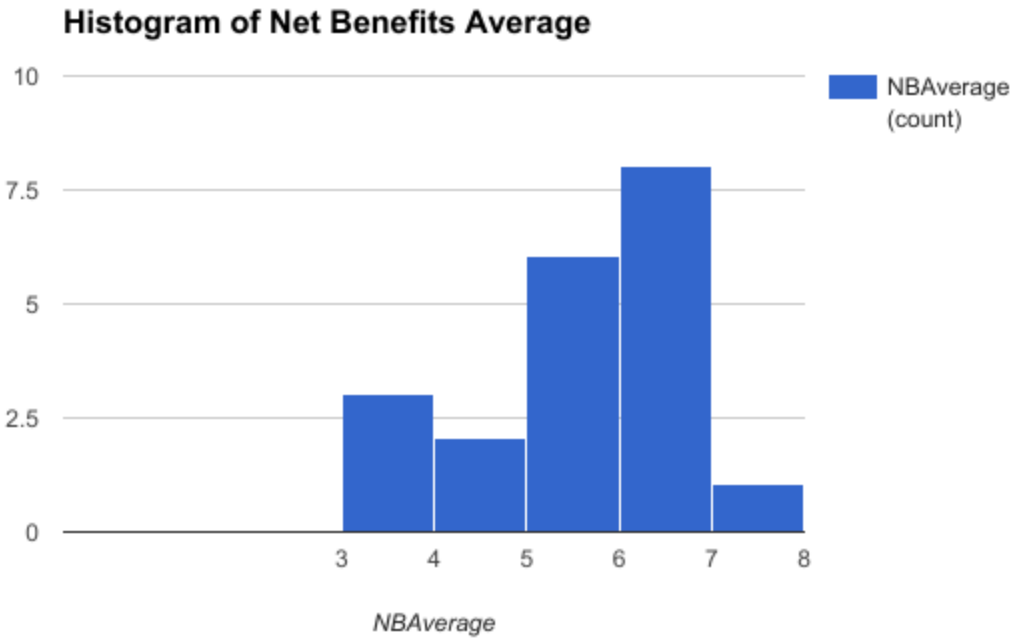

Figure 9

This figure illustrates the net benefits of the ERP system. This also has wide variance of responses ranging from a score of 3 to scores of 7. A large variance shows that some people find the system's benefits satisfactory while others think it needs enhancement.

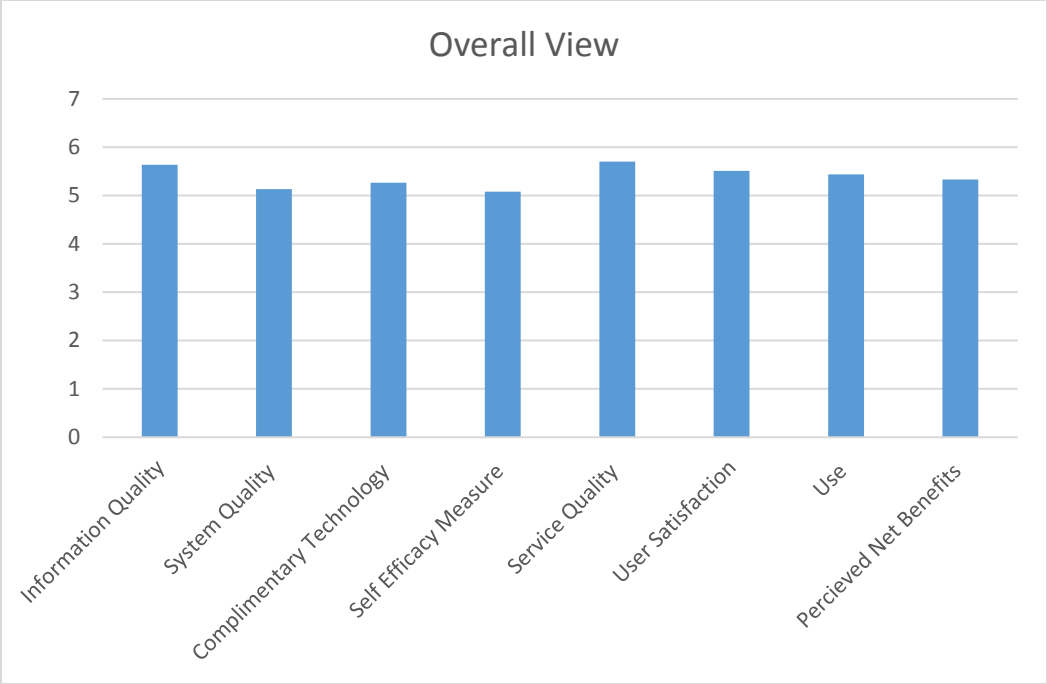

Figure 10

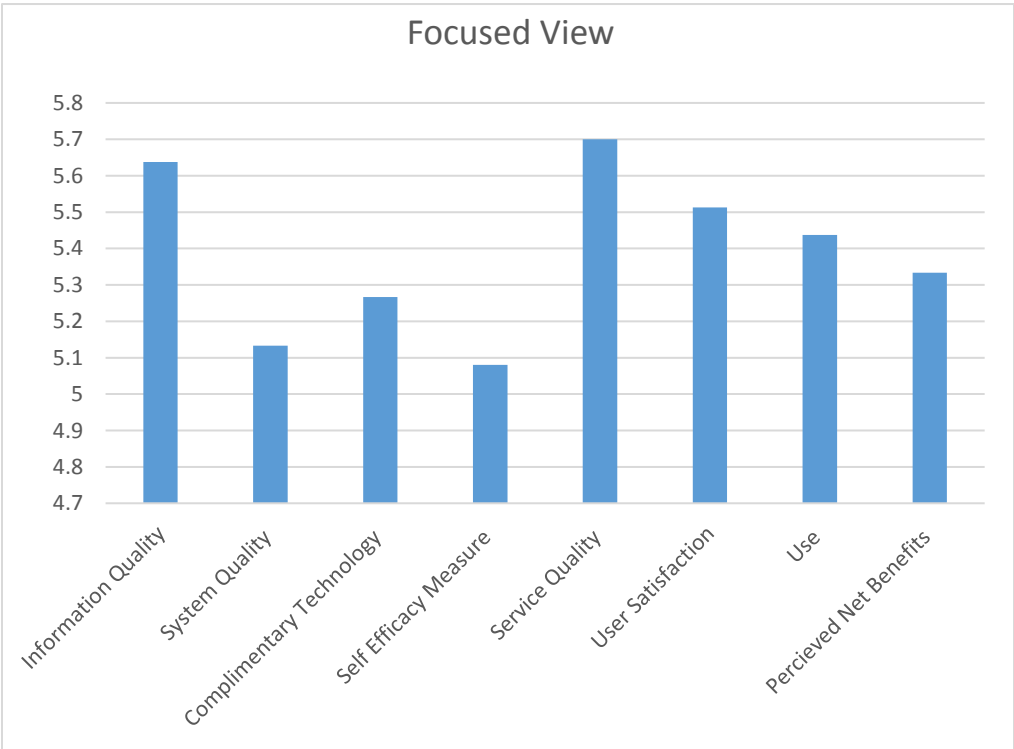

Figure 11

The last two graphs give you a summary of all the constructs and their average rate of responses. The two graphs are the same result, one taking it from a focus view, the other a general view. Taking a look at it as a whole give you a better picture as to where investments can be made to boost efficiency. It also shows the relation among constructs, both already defined and added ones. It shows that the "use" construct is low, but then further investigation shows that the system quality scored low as well. This can explain as to why people are not using the software. As we continued to study, we found out that the self-efficacy construct could provide us with essential information. We know that a low self-efficacy is a lack of confidence to use the system; this can explain as to why the participants scored low on system quality consequently leading to a low use of the system.

Conclusion

According to the results stated/illustrated above it shows that the ERP system (Microsoft Great Plains) implemented at the Belize electricity limited has a Perceived Net Benefit of 5.33 out of a possible 7, which means that the system is performing fairly and is satisfactory to its users. However there is always room for improvement. The results showed that the use of the system was a little low, strangely the user satisfaction was higher than use of the system. This means that they enjoy using the system more than they actually use the system. The information quality of the system was good, however the system quality was an undesirable result. It was low, which shows the employees do not like some aspect of the user interface or software. This can explain as to why the "use "of the system is low. If employees were to find the interface hard to use, they would avoid using such a software altogether. With the two construct added, complimentary technology was fair (could be better) while self-efficacy measure was the lowest of all construct response averages. This gives us a deeper understanding of why both "use" and "system quality" are low. The self-efficacy measure is a construct that evaluates how confident and comfortable a person feels when using the software. Being that the results show a low self-efficacy measure, we can deduce that people are not feeling comfortable or confidence while using this system. The lack of self-efficacy can explain why the system quality had a low value which consequently leads to them not wanting to physically use the system (Low "use"). Overall this did affect the success rate of the ERP system. We suggest that the company invest into the human labour of its organization. The company should have more workshops and trainings to ensure that their employees know how to operate the software given to them.

Appendix

Survey

Questionnaire I – "The success of B.E.L information management system" on internal staff

Purpose

This questionnaire asks for information about your organization to find out if the system being used (**Microsoft Great Plains**) by the company is performing to its full potential by assisting employees in completing their task in an effective and efficient manner consequently helping towards organizational goals.

Please answer the questions in relation to your company. The system in question is Microsoft Great Plains. Your individual responses to the questionnaire will be strictly confidential and used only for educational purposes.

Instructions

This is a survey, not a test; there are no "right" or "wrong" answers. Please print in the spaces provided and tick the boxes available that indicates your answer.

1. Background Information	**Answers**
Please enter your age:	18-30☐ 31- 40☐ 41-50☐ 51-60☐
Please enter amount of computer experience you have in years:	
Please indicate the number of years you have been working for this company:	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ +9☐
Please indicate your gender:	Male ☐ Female ☐
Please indicate highest education level attained:	PhD ☐ Masters ☐ Bachelors ☐ Associates ☐ High School ☐ Primary School ☐

Which of the following best describes your position in this company?	Managerial staff ☐ Non-managerial staff ☐

Indicate your answer for each statement by rating it from (1) strongly disagree to (7) strongly agree.

2. Information Quality	**Disagree ----------Agree**
The information system provides information that is easy to understand	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system provides relevant information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system provides is sufficient.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The system provides up to date information.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
3. System Quality	**Disagree ----------Agree**
The system is user friendly and easy to use.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I feel the system is high speed access.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I feel the system provides interactive features between users and	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

system.	

4. Complementary Technology Quality	**Disagree ----------Agree**
The software on the device (desktop computer, laptop, mobile device) used to access the information system is adequate.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The device's hardware (desktop computer, laptop, mobile device) used to access the information system is adequate.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The device (desktop computer, laptop, mobile device) used to access the information system has an adequate internet connection in regards to speed and reliability.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

5. Computer Self-Efficacy Measure	**Disagree ----------Agree**
I can complete tasks with this information system if there was no one around to tell me what to do as I go.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if I had never used an information system like it before.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if I had only the information system manuals for reference.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if I had seen someone else using the information system before trying it myself.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if I could call someone for help if I got stuck.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if someone else had helped me get started.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if I had just the built-in help facility for assistance.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information system if someone showed me how to do it first.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

I can complete tasks with this information system if l had a lot of time to complete the job for which the information system was provided.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I can complete tasks with this information if I had used similar information systems before this one to do the same job.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

6. Service Quality	**Disagree----------Agree**
The support staff keeps the information system software updated.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
When users have problems with the information system, support staff shows a sincere interest in solving the problem.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system support staff responds promptly when users have a problem.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system support staff tell users exactly when services/maintenance will be performed.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

7. User Satisfaction	**Disagree ----------Agree**
I bring a positive attitude or evaluation towards the information system function.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I think that the perceived utility of the information system is high.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I believe that the information system has met my expectations.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I am satisfied with the information system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

8. Use	**Disagree ----------Agree**
My frequency of use with the information system is high.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
My everyday functions at work depend upon the information system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I am able to utilize the information system to complete tasks when no one is around to tell me what to do as I go.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I have the knowledge necessary to use the information system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

9. Perceived Net Benefits	**Disagree ----------Agree**
The information system helps me to improve my job performance.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system helps the organization save costs.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The information system helps the organization achieve its goals.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Using the information system helps improve my assessment and training.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Using the information system at work increases my productivity.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Overall, using the information system enhances recruitment and performance management.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

Please return this survey to the person who gave you the form.

Thank you for your participation.

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