aAn Empirical Study Measuring the Success of an Information Technology Department's Information System: The Case of a Financial Institution

Giovan Guerra
University of Belize
St. College Street, West Landivar,
Belize City, Belize
2015113134@ubstudents.edu.bz

Rubi Hoare
University of Belize
St. College Street, West Landivar,
Belize City, Belize
2016114905@ubstudents.edu.bz

Delmi Garcia
University of Belize
St. College Street, West Landivar,
Belize City, Belize
2016114870@ubstudents.edu.bz

Camila Bolon
University of Belize
St. College Street, West Landivar,
Belize City, Belize
2016115268@ubstudents.edu.bz

Abstract

Although a substantial amount of research has been conducted on Information Success models, minimum research has been carried out to address the conceptualization and measurement of IT management software success within an organization in Belize. This study provides an empirical test of an adoption of Delone and McLean IS success model in the context of IT management software. The model consists of six dimensions: Information quality, system quality, service quality, use, user satisfaction and perceived net benefit. In addition, complementary technology and computer self-efficacy were added to measure the IT management software success within organizations. The findings provide several important implications for IT research and practice. This paper concludes by discussing the limitations of the study, which can be addressed in future research.

Keywords: Information Success Model, Information Technology management software, Information Technology

Introduction

Throughout the years there has been a drastic change in technology and firms are using information technology (IT) to aid business functions in their daily operations. Therefore, firms are finding new ways to manage IT and to have an effective information system (Seddon, Staples, Patnayakuni & Bowtell, 1999). According to Urbach, Smolink, & Riempp an information system is successful if the individual using the system is satisfied using it and if the information system enhances their work performance (2009). The purpose of this research study is measuring the Success of an Information Technology Department's Information System: The Case of a Financial Institution. Hence, the importance to measure the Information system success as Delone and McLean reconstructed an Information system model

focusing on the six success dimensions which are information quality, system quality, service quality, use, user satisfactions and perceived net benefits (2003). In addition, the researchers have included three sections apart from the traditional model these are complementary technology, and self-efficacy due to Belize being a developing country and not meeting all technological standards as a developed country would have.

The Financial Institution selected sets a competitive advantage by carrying a tradition of excellence in service as the first and oldest financial institution. In addition, it is the largest full-service commercial banking operation in providing a range of banking and financial services to both domestic and international customers. Belize being a country with immense growth potential and Belize bank being a leading bank its customer base increases by the day and in order to operate efficiently and effectively it uses an IT management software for network administrators. This system software is Spiceworks.

Spiceworks is an IT management software used to manage networks with up to 250 devices which provides inventory status and monitors data on networked systems (Dubie, 2006). It is the first free social IT management software which includes IT management software capabilities, crowdsourcing, social networking and community collaboration features together into an IT professional daily workflow. As Petter, Delone & Mclean study on the models and dimensions of information systems states that information systems are developed using IT to help individuals performing a task in respect to Spiceworks this is affirmed (2008). As this software facilitates the IT managers to get their jobs done effectively and efficiently as it is easy for them to manage their networks, collaborate to solve technology problems, and find the best practices, products and services they need on a day to day basis (White, 2009).

The objective of this research is to measure the overall performance of this IT management software used by a Financial Institution and also to see how this software benefits employees' productivity on their daily operations and its efficiency. The researchers do so by firstly reviewing the development of IS success models (Delone and Mclean, 2003) and previous studies on IT management IS success model. Secondly, develop a research model and hypotheses. Thirdly, the results of the study are presented. Finally, the limitations and recommendations are indicated in order for managers to determine if that IS works good for them or may consider to change to a more suitable IS.

Literature Review

The financial institution selected is a leading financial institution within the country and internationally with excellent growth potential for a larger customer base and a more developed economy. This financial institution uses Spiceworks, an IT management software, that is easy for businesses to manage IT products and services on-premise or in the cloud, collaborate to solve technology problems, and find the IT knowledge and products they need daily ("Computer software Technology, "2010). According to Petter, Delone and Mclean IS are developed using IT to aid an individual in performing a task (2008). This is exactly what Spiceworks does as it facilitates the IT managers to get their tasks done effectively and efficiently as it is easy for them to manage their networks. In addition, According to Business wire Version, 5.0 of the free Spiceworks IT management application was honoured as the best Networking & Communications Software for 2010 ("Business Wire, "2010).

Information system (IS) success is a significant matter of interest for managers and Information technology (IT) professionals. Delone and Mclean (2003) developed a model to measure the success of an information system. This model uses the constructs to measure the connection between the quality and satisfaction of the user to the system. There are six major IS factors that relisted under the model. The model for evaluating an information systems success includes System Quality measures the quality of the information processing within the system. The IS output is measured by Information Quality. Use is seen as the demand or consumption of IS output. User Satisfaction describes the reaction of the recipient to the use of the IS output. The impact of information on user/receiver behaviour is measured by Individual Impact. Finally, Organizational Impact describes the influence of information on overall organizational success (Delone& Mclean, 2003).

A research published on the Information Society by Richard Heeks, on Information Systems and Developing Countries: Failure, Success, and Local Improvisations provided verification that various Information Systems in developing countries even though successful they can still be categorized as failing either totally or partially. The study went on to develop a new model that its aim is to explain the high

rates of failure. This model contributes to the identification of two high-risk archetypes which is believed to affect Information systems in Developing Countries. The model and the theories have a two-way relationship with information systems in developing countries (Heeks, 2002). The Model is also beneficial according to Heeks because it leads to explaining the constraints that exist to local Information system improvisations in developing countries.

The article "Information technology success factors and Model in developing and emerging economies" by Narcyz Roztocki and Roland Weistroffer highlights that sustained economic development requires functional infrastructure, and Information Technology is often an enabler and catalysts. However, it makes note that not all Information technology succeeds in the intend of results and that the factors that differentiate successful IT implementation from the many failed attempt are the focus of the issue. The authors make a distinction between developed countries and developed economies. According to Roztocki and Weistroffer Information technology implementation in developed economies also suffer from high failure rates and that IT applications in developed countries typically have a different focus. The article emphasizes the importance of taking into consideration the specific environment in which IT is implemented when it comes to the field of Information System.

Ghobakloo and Tang (2015) develop an integrated model of Information Systems (IS) success based on Delone and Mclean model of Information Success: A ten-year update. They conducted the study to provide small and medium-sized enterprises (SME'S) in developing countries with the importance and knowledge of IS success. They found that Information System among SME's is not limited to the technological factors identified in the Delone and Mclean (2003) Information Model. Furthermore, Information System success (SME's) is also determined by some key organizational and environmental determinants. Some of the organizational determinants of SME's include top management support, which also provides financial and technical support. Top management support can ensure a sufficient allocation of resources and function as an agent to provide a more conducive environment for Information System Success. Ghobakloo and Tang (2015) highlighted the many SME's are suffering from the lack of internal IS expertise. They emphasized that smaller businesses in developing countries must overcome the lack of Internal IS expertise by either getting assistance from external sources or developing their own internal end user's computing skills. Ghobakloo and Tang (2015) also found that system quality is an important factor in Information System Success.

Boynton, Zmud, and Jacobs (1994) conducted research for a pragmatic explanation of key factors affecting Information Technology (IT) use in large, complex organizations. They developed a structural equation model to assess the relative effects of and interrelationships among these constructs: IT management client, managerial IT knowledge, IT management process effectiveness and IT use. They found that, managerial IT knowledge is a dominant factor in explaining high levels of IT use and that both managerial IT knowledge and IT management process effectiveness are influenced by IT Management process effectiveness are influenced by IT management climate. Boynton, Zmud, and Jacobs (1994) emphasized the theory of absorptive capacity to examine why some organizations are able to exhibit greater success than others in managing IT processes. According to Boynton, Zmud, and Jacobs (1994), Absorptive capacity theory, when applied to the domain of IT Use, suggests that an organization's ability to effectively apply IT is dependent on the development a mosaic of IT-related knowledge and processes that bind together the firm's IT managers and line managers.

Poddar (2017) conducted research to find out constraints of the user interface of the banking software package used by different commercial banks in India. They used 8 checkpoints (the compatibility, consistency, flexibility, learnability, minimal action, memory load, perceptual limitations, and provide user guidance) of various categories were identified and used to analyse the user interface of the software packages were not matched with the user's expectations. In addition, it was revealed that stresses related to flexibility and user guidance were perceived higher while operating the software. Furthermore, Poddar (2017) found that the software packages which has been designed for fulfilling the purpose of core banking and generate revenue for the financial organization were not perceived that usable by the bank employees. They conducted their research by stating that there is a need to reconsider the design of user interface aspects of the banking software.

Karimi, Bhattacherjee, Gupta, and Somers (2000) conducted research on hypothesizing relationships between the level of sophistication of IT steering committees and level of IT sophistication of IT steering committees and level of IT Sophistication of Management with firms and tested those relationships

empirically via a field survey of 213. IT managers in the financial services industry. They found that the presence and roles of IT steering committees are significantly related to the level and nature of the IT management sophistication within firms. They emphasized that accurate identification and use of IT resources (technology and people) are absolutely vital for their sustenance. In addition, they found that steering committees help enhance the overall level of IT management sophistication within firms is important.

According to David Miller and Mark Woodman (2010), "Over a forty-year period, there have been many surveys at frequent intervals by different organizations designed to understand the success rates of projects that deliver software or, more generally, IT systems.". IT systems are in demand by many organizations across every continent; however, despite the large amounts of information available many surveys have indicated that there is no correlation between the practical use of current tools and successful business results. The article mentions that the best way to successfully target and meet the customer's expectations is by recognizing that a service-oriented approach is the best way to meet the needs of the customers' software needs. The author's emphasis that software engineers are not treating their customers with the right approach or quality of service. Hence, there is a gap between software and customers. The software that was sold to the customer might not achieve all that the customer would want it to achieve. Additionally, the software might have added features that are deemed useless by the customer. In return, the useless feature makes the software be perceived with low remarks and takes away from the functionality of the software and customer satisfaction in using IT, such as a Business Service Management IT system.

The research paper Strategic Integration of IT and Business Service Management by Brenda F. Richardson and Ahmed Y. Mahfouz indicates that IT (Information Technology) can solve problems related to business management. The software industry is growing ever since the early decades of the introduction of personal computers being used to aid in work setting within an organization. Richardson and Mahfouz (2009) stated that "The IT management industry consists of information technology and management which focuses on the management of a collection of systems, infrastructure, and information that originated from the practice of IT Portfolio Management". Meaning that the IT management leads way to a better and more efficient running of an organization through the collection of the system, infrastructure, and information. IT has its main focus on managing information technologies towards a business form, whereby Business Service Management is aimed at automated and reduce the various business processes. Business Service Management software is shaping up the future to be an automated form of management solutions. It is known that one of the ways of achieving efficiency in an organization is to attempt to automate as much as possible; when it is possible. Software's are becoming more sophisticated every decade and are outperforming humans in some areas of forecasting and solving problems.

Methodology of the Study

Construct Measurement

This research used Delone and McLean (2003), to measure the Information Quality, System Quality, Complementary Technology Quality, Service Quality, User Satisfaction, Use, Perceived Net Benefits, Self-efficacy. The System Quality, Complementary Technology Quality, Service quality, User Satisfaction and the Use section consists of four questions each. The perceived net benefits section consists of five questions. The Information Quality section consists of six questions and the Self-efficacy section consists of ten questions. This instrument was used to measure the success of an Information Technology Department's Information System. The instrument has proven to be effective for reliability and validity by several researchers. Also, this research involved the use of Google Forms to distribute the survey. The google form was constructed using the Likert Scale with anchors ranging from Strongly Agree (7) to Strongly Disagree. Google form is user friendly, easy to access, involves flexibility of data validation technique and free of cost (Hallur, 2016).

Construct	Survey Questions	Source
Information Quality	IQ1: Belize Bank's Spiceworks system provides information that is exactly what you need	Bailey and Person (1983)
	IQ2: Belize Bank's Spiceworks system provides information you need at the right time	
	IQ3: Belize Bank's Spiceworks system provides information that is relevant to your field of work	
	IQ4: Belize Bank's Spiceworks system provides sufficient information	
	IQ5: Belize Bank's Spiceworks system provides information that is easy to understand	
	IQ6: Belize Bank's Spiceworks system provides up-to-date information	
System Quality	SQ1: Belize Bank's Spiceworks system is easy to use	Bailey and Person (1983)
	SQ2: Belize Bank's Spiceworks system is user-friendly	
	SQ3: Belize Bank's Spiceworks system provides high-speed information access.	
	SQ4: Belize Bank's Spiceworks system provides interactive features between users and the system	
Complementary Technology Quality	CTQ1: The device (desktop, laptop, mobile device) you normally use to access Belize Bank's Spiceworks system is adequate	Bailey and Person (1983)
	CTQ2: The device (desktop, laptop, mobile device) you normally use to access Belize Bank's Spiceworks system has a fast and reliable internet connection	
	CTQ3: The speed of the Internet connection used to access Belize Bank's Spiceworks is adequate.	
	CTQ4: The reliability of the Internet connection used to access Belize Bank's Spiceworks is adequate.	
Service Quality	SV1: The support staff keeps Belize Bank's Spiceworks system software up to date	Bailey and Person (1983)
	SV2: When users have a problem Belize Bank's Spiceworks system support staff	
	show a sincere interest in solving it	
	SV3: Belize Bank's Spiceworks system support staff respond promptly when users	
	have a problem	
	SV4: Belize Bank's Spiceworks system support staff tell users exactly when services will be	
	performed	

User Satisfaction	US1: You have a positive attitude towards Belize Bank's Spiceworks system	Bailey and
	Atlantic Bank's Online system function.	Person
	US2: You think that Belize Bank's Spiceworks system is useful	(1983)
	US3: Belize Bank's Spiceworks system has met your expectations	
	US4: You are satisfied with Belize Bank's Spiceworks system	
Use	U1: Your frequency of use of Belize Bank's Spiceworks system is high	Bailey and
	U2: You depend upon Belize Bank's Spiceworks system	Person
	U3: You were able to complete a task Belize Bank's Spiceworks system even when there was no one around to tell you what to do.	(1983)
	U4: You have the knowledge necessary to use Belize Bank's Spiceworks system.	
Perceived Net Benefits	NB1: Belize Bank's Spiceworks system helps you improve your job performance	Bailey and
	NB2: Belize Bank's Spiceworks system helps you save time and costs	Person
	NB3: Belize Bank's Spiceworks system helps the organization achieve its goal	(1983)
	NB4: Overall, using Belize Bank's Spiceworks system enhances your productivity	
	NB5: Overall, using the Spiceworks enhances recruitment and performance management	
Self- Efficacy	I could complete my job using the Belize Bank's Spiceworks systems:	Bailey and
	CSE1: if there was no one around to tell me what to do as I go.	Person
	CSE2: if I had never used an information system like it before.	(1983)
	CSE3: if I had only the information system manuals for reference.	
	CSE4: if I had seen someone else using the information system before trying it myself.	
	CSE5: if I could call someone for help if I got stuck.	
	CSE6: if someone else had helped me get started.	
	CSE7: if l had a lot of time to complete the job for which the information system was provided.	
	CSE8: if I had just the built-in help facility for	

	assistance.	
	CSE9: if someone showed me how to do it first.	
	CSE10: if I had used similar information systems before this one to do the same job.	

Table 1: Measurement items for Questionnaire

Sampling and Data Collection

The data was collected from the financial institution. The participants have direct interaction with the Spiceworks system since they use it to get their job done. A population size of 30 was collected in order to fill out the survey. The table below is a summary of the years of work experience and level of education.

Characteristics	Participants	Percentage
Work Experience		
<5	4	13.3%
5-10	6	20%
11-15	6	20%
>15	14	26.7%
Degree		
PhD	0	0%
Masters	1	3.3%
Bachelors	13	43.3%
Associate	15	50%
High School	1	3.3%

Table 2: Characteristics of Respondents
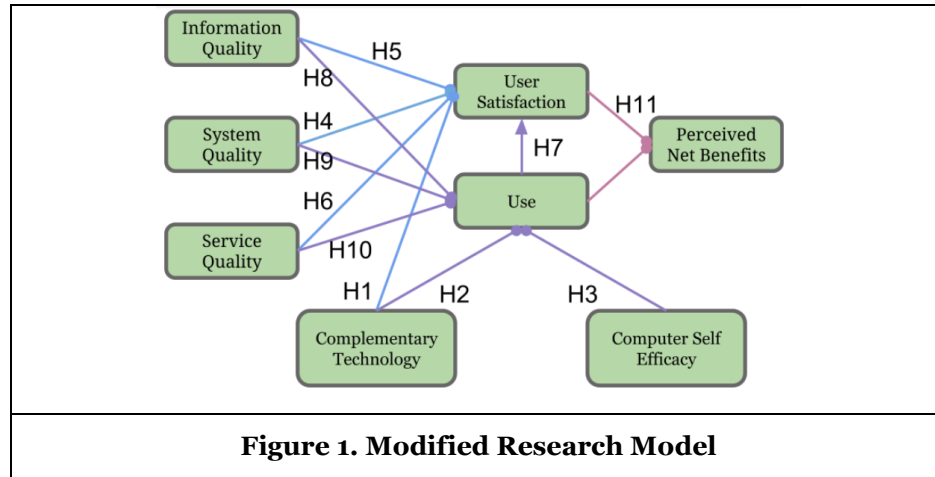
Research model and hypothesis

This study proposes a comprehensive model of the IT Management software Success, which suggests that Information quality, system quality, complementary technology quality, system quality, service quality, user satisfaction, use, perceived net benefits and self-efficacy are success variables in IT management software.

Information Quality was measured in terms of accuracy, timeliness, completeness, relevance, and consistency (Delone & McLean, 2003). We also measured the system usefulness for the user. Information Quality has shown to be an important success factor when investigating overall IS success (Mckinney et al., 2002). System quality considers performance characteristics, functionality, and usability among others (McKinney et al., 2002). It can be regarded as the extent to which the system is easy to use to accomplish tasks (Schaupp et al., 2006). Service Quality covers aspects such as responsiveness, reliability, empathy, and competence of the responsible service personnel (Pitt et al., 1995). User Satisfaction is considered to be one of the most important measures when investigating overall IS success (Alishibly, 2014). Use measures the perceived actual use of the system.

The IT management software perceived net benefit can be defined as an achievement of a firm's objective for using the IT management software and the achievement of end user related objectives from using them. This measures the perceived individual and organization benefits that employees gain when using the IT management software. These benefits cover aspects like tasks performance, job efficiency, quality management improvement and cost reduction (Alishibly, 2014). Different individuals or stakeholders may have different opinions as to what constitutes a benefit to them (Delone & McLean, 2003). Delone

and McLean (2003) emphasized that researchers need to clearly and carefully define stakeholders and the context in which IS success or net benefits are to be measured.

This study focuses mainly on the perspective of the employee, and uses the six updated IS Success dimensions: Information quality, system quality, service quality, system use, user satisfaction, and perceived net benefit. In addition to these six updated dimensions, two other success dimensions were added: complementary technology quality and computer self-efficacy. Computer self-efficacy refers to a judgement of one's capability to use a computer (Compeau & Higgins, 1995).

Figure 1. Modified Research Model

The hypothesized relationship between IT Management software system success variables are based on the theoretical and empirical work developed by Delone and McLean (2003). Delone and McLean (2003) suggests that the updated success model needs further development and validation before it could serve as a basis for the selection of appropriate IS measures. Accordingly, the hypothesized the following 12 hypotheses tested:

H1. Complementary Technology Quality will positively impact User Satisfaction

H2. Complementary Technology Quality will positively impact Use.

H3. Computer Self-Efficacy will positively impact Use

H4. System Quality will positively impact Use

H5. Information Quality will positively impact User Satisfaction

H6. Service Quality will positively impact User Satisfaction

H7. Use will positively impact User Satisfaction

H8. Information Quality will positively impact Use

H9. System Quality will positively impact Use

H10. Service Quality will positively impact Use

H11. User Satisfaction will positively impact Perceived Net Benefits

H12. Use will positively impact Perceived Net Benefits.

Figure 1 illustrates our research model including the hypothesised relationships between the magnitude of TRI, TAM, and actual use of technology.

Data Analysis

Basic research was conducted in order to measure the success of Spiceworks in financial institution. The data collected is displayed in histograms which provided the results of the responses gathered. This research does not aim to test the significance of the research model used. The central focus is on basic research to assemble information on the success of the Spiceworks system in the financial institution. Below are the figures with brief explanations:
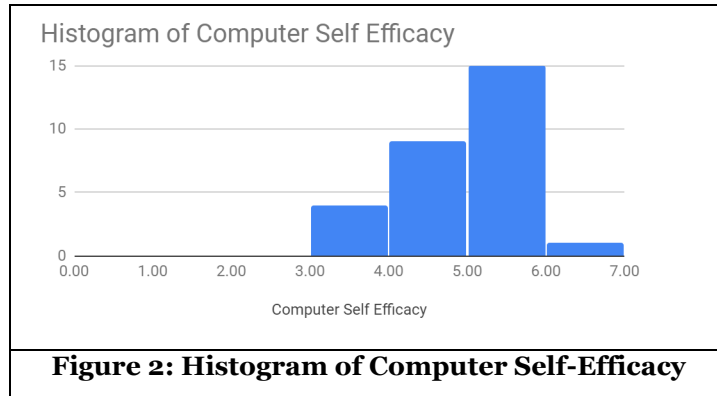

Figure 2: Histogram of Computer Self-Efficacy

Figure 2 shows the results for computer self-efficacy which indicates the level of competence the users believe they have over their computer systems. The results show that there was no participant that strongly disagreed. A majority of the results are from 4-6, with 6 being the highest.

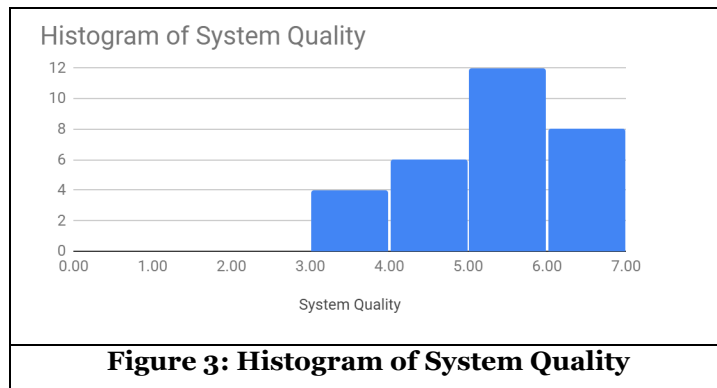**Figure 3: Histogram of System Quality**

Figure 3 shows that more than half agree that the system quality is good within the organization. Spiceworks information system is a satisfactory system to use. The results indicate that the majority are well off with the system and feel it provides the best results to their work. A total of 26.7% strongly agree that the system quality is at a satisfactory level.

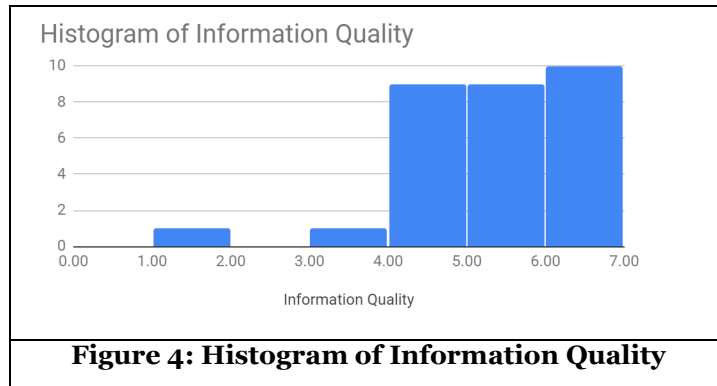**Figure 4: Histogram of Information Quality**

Figure 4 indicates that on average the information that is provided by Spiceworks is of great quality. Most of the results are from 5-7 with the mean falling on 5.07 which would represent a satisfaction with the information Spiceworks provides to the users. A total of 33.3% strongly agree that the system provides quality information.
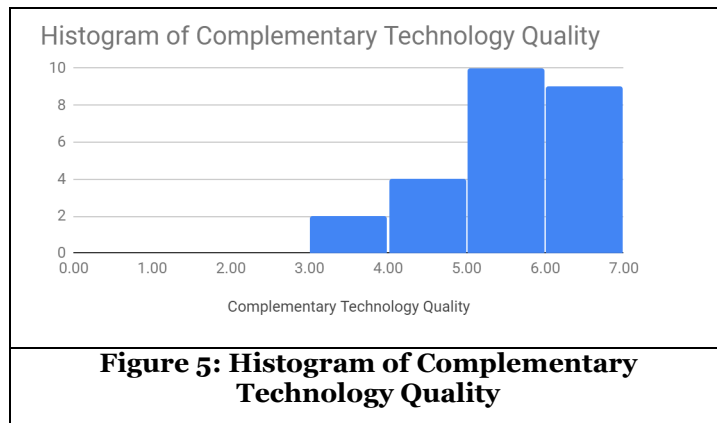

Figure 5: Histogram of Complementary Technology Quality

Figure 5 shows the average of complementary technology quality. The results symbolize that the satisfaction level with complementary counterparts is at an optimum standard of quality. The majority indicates that the organization is satisfied with the quality. No participant states that they are displeased with the current quality of complementary technology available for use.

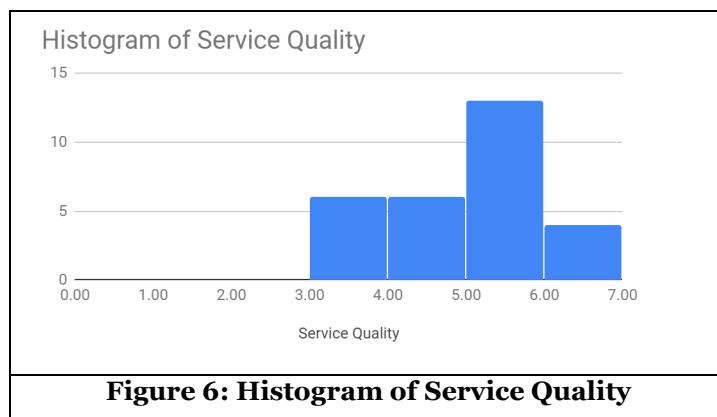**Figure 6: Histogram of Service Quality**

Figure 6 shows the results of how the respondents feel about the service quality of IT maintenance. Based on the results the majority of respondents feel that the quality of maintenance service is up to a quality standard and are satisfied. This means that the staff in charge of keeping the Spiceworks system do so with a positive attitude that meets the users' high expectations.
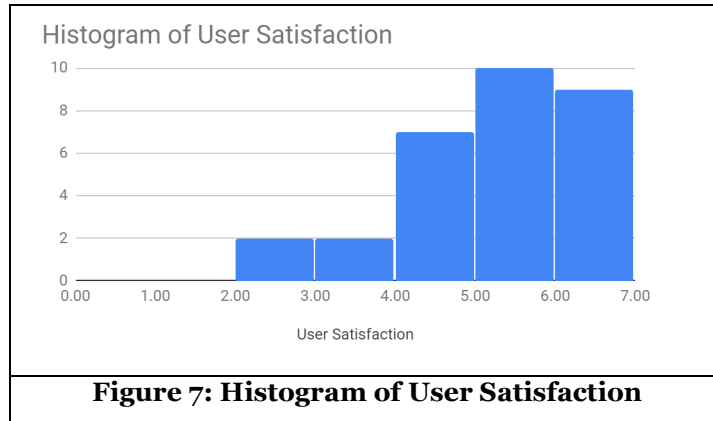

Figure 7: Histogram of User Satisfaction

Figure 7 displays user satisfaction with the Spiceworks system. On average the results show that the participants feel that the system is good enough and meets their satisfaction level. Therefore, the majority perceive the utility of Spiceworks to be good. However, a few indications that there are not fully content with the system that is currently being used.
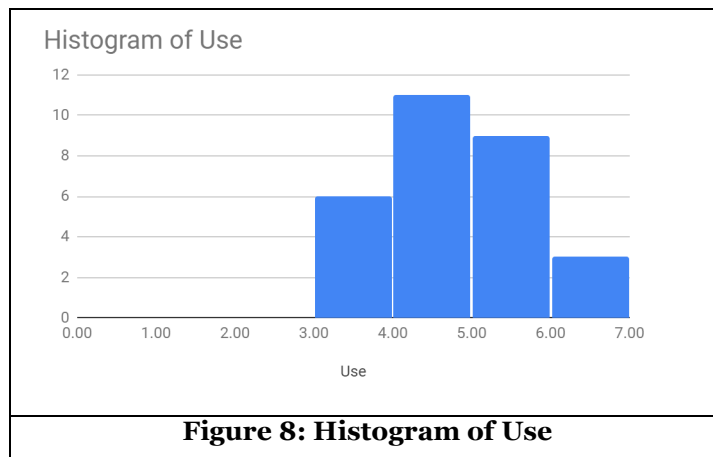

Figure 8: Histogram of Use

Figure 8 shows the results of the use of the system. Based on the data it is shown that on average the Spiceworks system is used in order to perform their respective jobs. The participants depend on and constantly use the system with their claim that they have the knowledge needed to use the system.

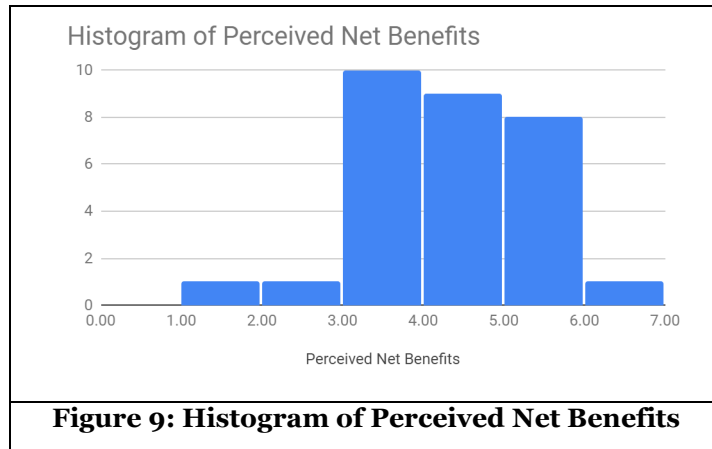**Figure 9: Histogram of Perceived Net Benefits**

Figure 9 indicates the perceived net benefits of the participants. Based on the results it is shown that there is a neutral feeling of the net benefits whereby the most users don't perceive the system to be the only viable system option in order to perform their jobs or organizational goals set. Only 6.8% of the participants feel that there is little satisfaction in the net benefits the system brings.

Conclusion

Discussion

The research conducted strived to measure the level of success of Spiceworks system implemented within the organization by the administration of the financial institution. In order to measure the Information System's success, an existing model created by Delone and Mclean (2003) was selected. The model takes a glance at the dimensions that mainly contribute to the system implementation; this framework is generally used to judge and operationalize the level of success of the Information System. Moreover, self-efficacy and complimentary technology quality measure were added in order to get more viable data to support the research. Those two constructs were added to allow the research some data concerning the success of Spiceworks with the users' interactions.

This research indicates that different constructs result in different variances. The difference can be explained by the various responses by the employees of the organization. Based on the constructed model, perceived net benefits signal out if the Information System is successfully implemented with the users' satisfaction being high. In Figure 10, the average response for perceived net benefits construct was 4.27; which was the lowest average that was shown when compared to the other constructs. The fact is that the perceived net benefits are due to the perceived information quality, user satisfaction, and system use. These three constructs should be closely monitored by the organization so as to result in higher users' satisfaction with the system. Therefore, it is a significant management decision to monitor these constructs since employee satisfaction leads to a higher level of productivity and organization thrives (Preston, 2017).
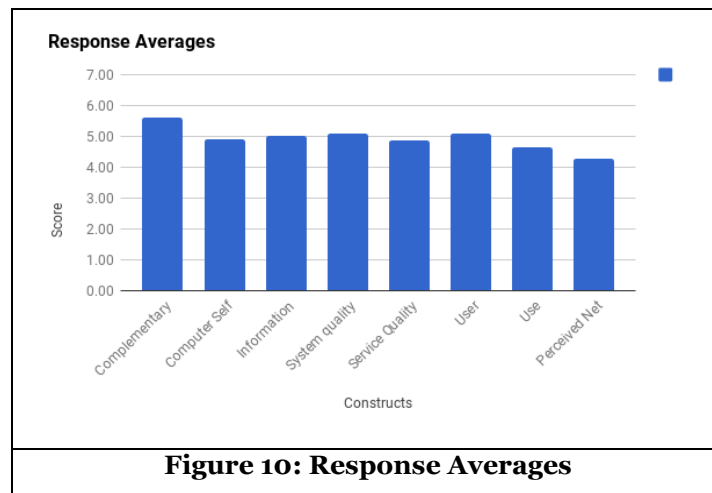
Figure 10: Response Averages

The results of the research show that the highest average distribution came from complementary technology. The average result was 5.6, with 36% of respondents strongly agreeing that the complementary technology was at a valid standard of quality that highly satisfies their expectations. This indicates that the employees are well equipped with proper devices, hardware, and adequate internet (connection, speed, and reliability) to access and run the Spiceworks system properly. The frequency distribution that resulted in the second lowest score was service quality at 4.86 average. The score indicates that the employees are satisfied with the quality of maintenance; however, it is closer to neutral when compared to the other constructs. This construct affects the Spiceworks system since the level of staff support for the system is crucial for the satisfaction of the employee.

The data is consistent with the result gather that Spiceworks is useful and is considered to be at an adequate level of quality, since most of the results during the analysis show the content of the majority with the program.

Limitations

The research was successful in locating the necessary construct models that would adequately measure the success of the information system. However, the success didn't come without some limitation. Time and resources were a huge part of developing this research study. Time was limited since we only had a few weeks to develop the research, and there are so many factors that add on to hours of work. Additionally, some limitations that were faced were the limited amount of available papers/studies on the Spiceworks information system. Moreover, another limitation of this research is that it was based on the response of 30 participates. The financial institution had more employees that use Spiceworks; but due to time, they were not able to form part of the study. Therefore, the results might not properly represent all the employees that use the system. As previously mentioned, time allocation was a huge limitation due to our conflicting schedule and individual priorities we all have.

In conclusion, the Spiceworks system is widely accepted as being useful and practical for the financial institution. Results show a positive attitude towards the system in the workplace. However, the perceived net benefit is low due to the employees feeling that the system doesn't fully help in all aspects of their job task or enhance their productivity. They note that it is a genuine system; though, it doesn't benefit them in ways they wished it did in areas such as time-saving and performance management. This could be as a result of the software not being built specifically for this particular financial institution. Hence, there are features or features that are missing in order for it to be perceived with more value. A recommendation that could aid in increasing the net perceived benefit is to engage the software in a way that the user is able to integrate it in more in their daily task. So not only a few specific tasks but a variety of tasks that gives the user a more meaningful experience in use. A satisfied worker in his job will lead to them being more productive with their jobs, which benefits the organization in a whole. The other frequency distribution scores positively towards the Spiceworks system. These results lead us to affirm that the Spiceworks system is successful for the financial institution.

This study provides a structure for understanding IT management software success. The detailed framework we have developed we developed from theory and empirical research provides a foundation for future research.

References

Alishibly, H. H. (2014). Evaluating E-HRM Success: A validation of the Information Systems Success Model. International Journal of Human Resources Studies, 4.

Boynton, A. C., & Zmud, R. W. (1994). The Influence of IT Management Practice on IT Use in Large Organizations. MIS Quarterly/September, 299-318.

Compeau, D. R., & Higgins, C. A. (1995). Computer Self Efficacy: Development of a measure and Initial Test. MIS Quarterly, 19, 189-211.

Delone, W. H., & McLean, E. P. (2003). The Delone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 19, 9-30.

Ghobakhloo, M., & Tang, S. H. (2015). Information system success among manufacturers SMEs: case of developing countries. Information Technology for Development, 21, 573-600.

Heeks, R. (2002). Information Systems and Developing Countries: Failure, Success, and Local Improvisations. The Information Society, 101-112.

Karimi, J., Bhattacherjee, A., & Gupta, Y. P. (2000). The Effects of MIS Steering Committees on Information Technology Management Sophistication. Journal of Management Information Systems, 17, 207-230.

McKinney, V., Yoon, K., & Zahedi, F. M. (2002). The Measurement of web-customer satisfaction: an expectation and disconfirmation approach. Information Systems Research, 296-315.

Miller, D., & Woodman, M. (2010). Software Engineering Systems as Services Using A Business-Focused Service Framework. Evaluation of Novel Approaches to Software Engineering, 1-6.

Petter, S., Delone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. European Journal of Information Systems, 236-263.

Pitt, L., Watsin, R., & Kavana, C. (1995). Service Quality Measure: A measure of Information Systems effectiveness. MIS Quarterly, 173-187.

Poddar, E. (2017). Analysis on User Interface Aspects of Software Used by Commercial Banks in India. The XXIXth Annual Occupational Ergonomics and safety conference, 142-148.

Richard, B. F., & Mahfouz, A. Y. (2009). Strategic Integration of IT and Business Service Management. Communications of the IIMA, 9, 65-78.

Roztocki, N., & Weistroffer, H. R. (2011). Information Technology Success Factors and Models in developing and emerging economies. Information Technology for Development, 17, 163-167.

Schaupp, L. C., Fan, W., & Belanger, F. (2006). Determining Success for Different Website Goals. Proceedings of the 39th Hawaii International Conference on System Sciences, 1-10.

Seddon, P., Staples, S., Patnayakuni, R., & Bowtel, M. (1999). Dimensions of Information Systems success. Communications of The Association for Information Systems, 2-61.

Teece, D. J. (1988). Capturing Value from Technological Innovation: Integration, Strategic Partnering, and Licensing Decisions. Interfaces, 46-61.

Urbach, N., Smolnik, S., & Riempp, G. (2009). The State of Research on Information Systems Success. *Business & Information Systems Engineering*, *1*(4), 315-325. doi: 10.1007/s12599-009-0059-y