

Measuring the Success of the SmartStream System Implemented by the Central Information Technology Office of Belize

Jessica Choco

Faculty of Management and Social
Sciences
University of Belize
2010111076@ubstudents.edu.bz

Sabina Rash

Faculty of Management and Social
Sciences
University of Belize
2010111348@ubstudents.edu.bz

Kimauni Lewis

Faculty of Management and Social
Sciences
University of Belize
2016115317@ubstudents.edu.bz

Stirling Reimer

Faculty of Management and Social
Sciences
University of Belize
2015113054@ubstudents.edu.bz

Abstract

This paper studies the potential success of the six constructs from the DeLone and Mclean's Information System model to evaluate the implementation of SmartStream system utilize at the Central Information Technology Office (CITO) in all government ministries. The aim for this study is to measure the overall usefulness and quality of the implemented SmartStream module and to determine how successful the system has been effective in the various department; currently in use by the Government of Belize (GOB) for its finance, accounting, personnel, and payroll processes. This research was aid through the use of a 35 question survey containing all close-ended questions which were distributed to various ministries. The result indicates that the usage of SmartStream system within the department has contributed to improve employee performance, eliminate tedious work, and better time management in an organization. Hence, the SmartStream system has proven to be expedient to the Governmental sector as it improves effectiveness and efficiency, successively, sustaining the initial hypothesis.

Keywords: Smartstream system, information system, quality, effectiveness, efficiency, usefulness, government ministries.

Introduction

As technology expands both private and public organization should develop and advance its information technology department. In Belize, the institution that administered the technological infrastructure for the government is the Central Information Technology Office (CITO), this office is under the Ministry of Finance. It is responsible for the government's primary accounting system, as well as the application of the Income Tax and Sales Tax department. Another responsibility is for the implementation of the e-Government Policy, server hosting for a number of government offices, and the management of government email servers. This office was established in the early 1980s and was originally called the Belmopan Computer Centre. Thereafter, in 1999 through funding from the European Union (EU) under the Financial Management Development Project (FMDP) the office was reorganized and following that in 2004 the CITO office was established (Wikipedia, 2019).

This research aims to highlight the successful usage of the SmartStream system utilized at the Central Information Technology Office (CITO). The SmartStream system is the Enterprise Application used by the Government of Belize for its financing, accounting, personnel and payroll processes and is used by all governmental ministries. To analyze the success of the system the DeLone and McLean Information Success Model will be applied to focus on the six distinct dimensions of IS success: system quality, information quality, service quality, usage intentions, user satisfaction, and overall system benefits.

Furthermore, the purpose of this research is to focus on the effectiveness, efficiency, and relevance as it relates to an everyday task. As noted on CITO website, the SmartStream system provides a range of solutions for all back-office operations. It provides the right information to the right person at the right time. Additionally, its unique design encapsulates individual task associated with a business process into configurable workflows that enable the Government of Belize to efficiently automate its processes.

Finally, the goal is to determine the success of the SmartStream system and make recommendations. The Government of Belize, financial system, SmartStream has not been analyzed so far, hence this research is original and is dependent on the results collected from the questionnaires.

Literature Review

The information system is the main resource used and practiced in organizations and government agency. There are vast advantages, such that it provides data for better productivity, efficiency, improved decision making, and better communication. This literature review aims to first, define a management information system and present the success of an information system that is implemented and utilized by organizations. These articles will allow for an evaluation to be made about the effectiveness and efficiency of information systems.

A management information system (MIS) is an organized, diverse, and automated information system (IS) that is concerned with the process of gathering, sorting, and transferring relevant information to support management operations in an organization (Mishra, Kendhe, & Bhalerao, 2015). Every private and public organization has its own MIS which is considered the backbone for its operations; since it helps to accomplish the needs and requirements for managers at all levels who use it for decision making, planning, program implementation, and control (Nayak, Sequeira, & Senapati, 2012). However, to analyze the success of all MIS, the DeLone and McLean theory need to be evaluated.

DeLone and McLean (2003) model focus on six variables of information systems (IS) which are information quality, system quality, service quality, usage intentions, user satisfaction, and overall system benefits. Each variable measures different aspects of the information system. According to Van Cauter, Verlet, Snoeck, and Crompvoets (2017), the explanation of each variable of the DeLone and McLean model is as follows: information quality focuses on the desirable characteristics of systems outputs. It is measured by completeness, sufficiency, and accuracy. Secondly, system quality measures the quality of information processing within the system through the ease of learning, ease of use, and performance. Thirdly, service quality looks at the quality of the system support which users receive from the information system and is measured by reliability, empathy and follow up services from the IS. The fourth variable is the intention of use and this measure the user's attitude towards IS. The fifth is, user satisfaction and this is about the extent to which users believe that the available IS meets its information requirements. The sixth variable is net benefits and this is the extent to which an IS contributes to the success of individuals that use the system. Overall, the measurements of the success of these variables are evaluated and remarked by its users.

As researched by Hendricks (2012), one of the most common financial management reform practices in governance is the introduction of an integrated financial management information system. With an aim to promote efficiency, effectiveness, accountability, transparency, the security of data management and comprehensive financial reporting.

Scott, Judy; Konsynski, Benn; Blanning, Robert; and King, David, "The Measurement of Information Systems Effectiveness: Evaluating a Measuring Instrument" (1994) stated that the effectiveness of information system is a critical aspect for both practitioners and researchers.

From what was read, there is a major similarity between the articles. This is that in order to measure the effectiveness of an information System you must talk to the end users. If the end users are satisfied with that they are receiving, this is something good. If they have high expectations and the actual result is nothing as expected then this is not an effective system. This is a very important factor simply because the system is made to satisfy the end users. This makes it vital to be aware of their level of satisfaction with the system.

Methodology of the Study

This quantitative research uses the DeLone and McLean (2003) Model of Information System Success to explain the success of the SmartStream System that is used by all government ministries. However, the information collected was conducted through a survey questionnaire distributed at several government ministries. By using the DeLone and McLean Model of Information System Success areas this study will look at Information Quality, System Quality, Service Quality, User Satisfaction, Use and Perceived Net Benefits. The survey also included one additional construct which is Contemporary Technology Quality. By including this aspect this can contribute to the research analysis on information system success in developing countries, such as Belize.

Approach

The method that was chosen to administer the questionnaires to respondents will be the self-administration method. This is mainly due to this method being cost-effective and because it has a high response rate. The researchers' hand delivered 35 questionnaires containing all close-ended questions. This was done to ensure that the questionnaires were completely and properly filled out and returned in a timely manner.

Participants

The participants selected to evaluate the success of this information system were the employees of various ministries. A majority of the employees were from the Ministry of Labour, Local Government, and Rural Development while others were from other ministries within Belmopan. Table 1 presents the research model constructs and related items used for measurement of each construct (Strongly Disagree to Strongly Agree).

Table 1. Measurements from the Questionnaire

Table 1. SmartStream System Survey Construct		
Construct	Survey Questions	Source
Information Quality	IQ 1: Does SmartStream provide you with the exact information needed? IQ 2: Does SmartStream provide you with the information needed at the right time? IQ 3: Does SmartStream provide you with information that is relevant to your job/task? IQ 4: Does SmartStream provide you with sufficient information? IQ 5: Does SmartStream provide you with information that is easily understandable? IQ 6: Does SmartStream provide you with up-to-date information?	(Bailey & Pearson, 1983)
System Quality	SYQ 1: SmartStream is very easy to use. SYQ 2: SmartStream is a very user-friendly system.	(Alshibly, 2011).
Complementary Technology Quality	CTQ 1: The hardware that you normally use to access SmartStream adequate? CTQ 2: Is the hardware that you normally use to access SmartStream have a fast and reliable internet connection?	(Teece, 1986)
Service Quality	SVQ 1: How often does the support staff normally keep the SmartStream up-to-date? SVQ 2: What is the level of interest that the SmartStream support staff show in solving problems users may have? SVQ 3: How fast does the SmartStream system support staff respond to a user problem? SVQ 4: How often does the SmartStream support staff tell users exactly when services will be performed?	(Chang, Wang, & Yang, 2009)
User Satisfaction	US 1: You have a good attitude towards the SmartStream system. US 2: The SmartStream system has met your expectations. US 3: You are satisfied with the SmartStream system overall.	(Seddon & Yip, 1992)
Use	U 1: How frequently do you use the SmartStream	(Balaban et al., 2013)

	system? U 2: How dependent are you upon the SmartStream system? U 3: Were you able to complete a task using the system despite not having even someone around to tell you what to do? U 4: Do you think you have the necessary knowledge to use the SmartStream system?	
Perceived Net Benefits	PNB 1: Do you believe that the SmartStream system helps in improving your job performance? PNB 2: Do you believe that the SmartStream system helps the organization save on various costs? PNB 3: Do you believe that the SmartStream system helps your organization to achieve its goal? PNB 4: Does using the SmartStream system help in improving assessment and training? PNB 5: Do you believe that using the SmartStream system increases your productivity? PNB 6: Overall, does using SmartStream enhances performance?	(Alshibly, 2011)

Sampling and Data Collection

This paper doesn't only use the DeLone and McLean model of Information System success but also as a framework to evaluate the success of SmartStream by using quantitative research to gather information. The sample size of the population for this study as 35 persons primarily due to time constraints.

Characteristics	Quantity	Percentage
Gender		
Male	7	20%
Female	28	80%
Age		
Less Than 25	13	37%
25 to 35	7	20%
35 to 45	7	20%
45 to 55	8	23%
Older than 55	0	0%
Educational Level		
PhD	4	11%

Masters	1	3%
Bachelors	12	34%
Associates	9	26%
High School	9	26%
Primary School	0	0%
Work Experience		
Less than 5 years	8	23%
5 to 10 years	3	9%
11 to 15 years	1	3%
Greater than 15 years	23	66%

Data Analysis and Discussion

In relation to the data analysis, we coded and analyzed each construct survey question to create maximum accuracy of data. Below are bar charts depicting the results gathered from the 35 questionnaires that were administered. The charts show the results from key specific sections of the questionnaire that would help in evaluating or determining the success of the information system among its users.

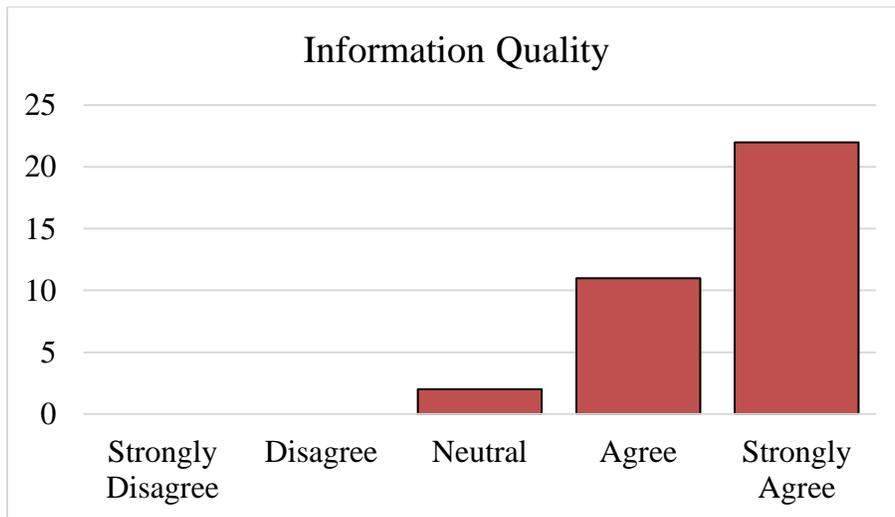


Figure 1: Bar Chart on the Information Quality Results

Figure 1: The graph illustrates that 63% of the employees that use SmartStream strongly agree that the system provides information that is complete, sufficient and accurate to carry out the

tasks that it was intended. This shows that whatever information SmartStream provides, it is very helpful and easy to understand.

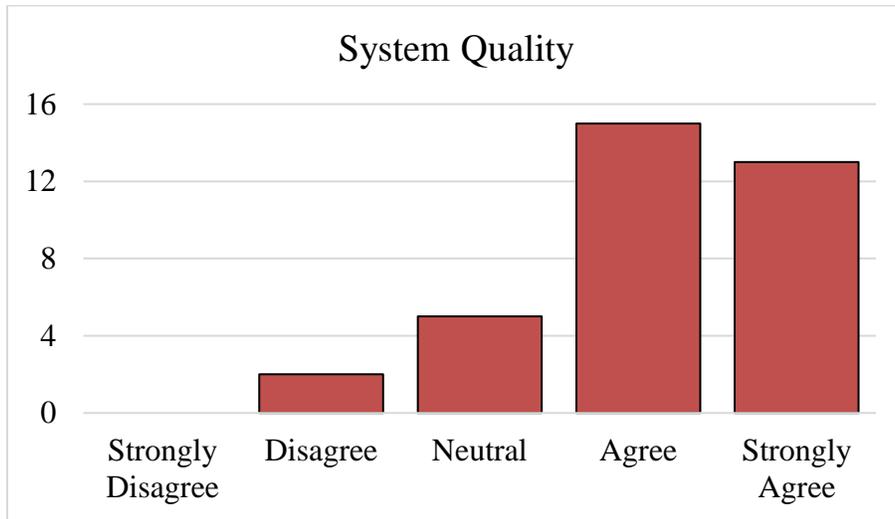


Figure 2: Bar Chart on the Service Quality Results

Figure 2: The graph shows that 43% of the employees that use SmartStream agree that it is a capable system quality. From this, it can be said that the information system is adequately easy to use and is user-friendly.

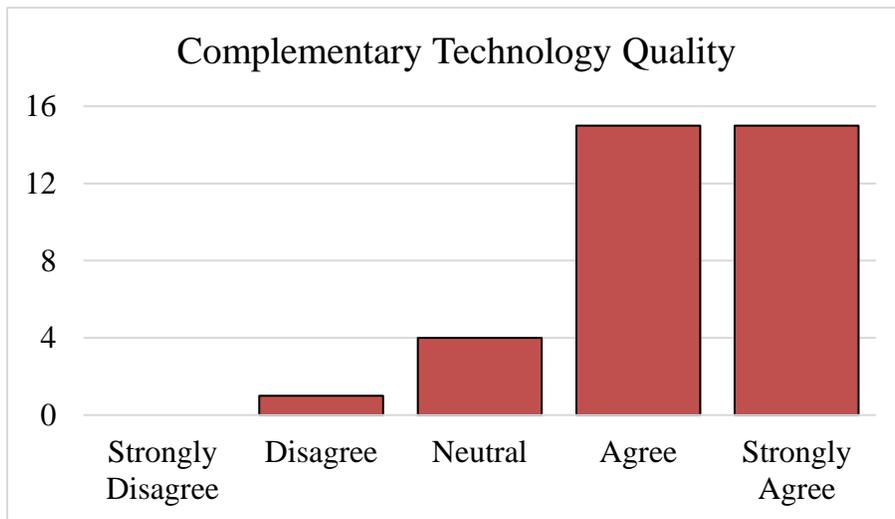


Figure 3: Bar Chart on the Complementary Technology Quality Results

Figure 3: Based on the results, it is clear that there is a tie of 43%, all respondents say they strongly agree and agree that the software and hardware that their offices have are capable to allow the SmartStream system to run properly. The software and hardware tools are in balance, the software gives clear instructions and the hardware device is able to clearly comprehend the command of it

and process such command for end users instantly. Therefore, it can be concluded that the Central Information Technology Office system administrators are carrying out the necessary task to ensure the SmartStream systems work well.

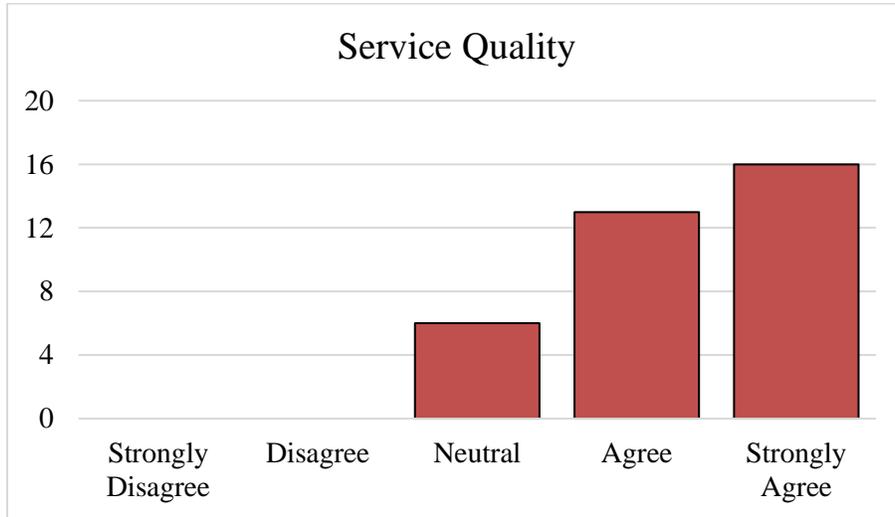


Figure 4: Bar Chart on the Service Quality Results

Figure 4: Based on the data gathered, the majority of respondents (46%) strongly agreed that the SmartStream System was kept up to date and that the Central Information Technology Office responded quickly to any issue that may have arisen from the system.

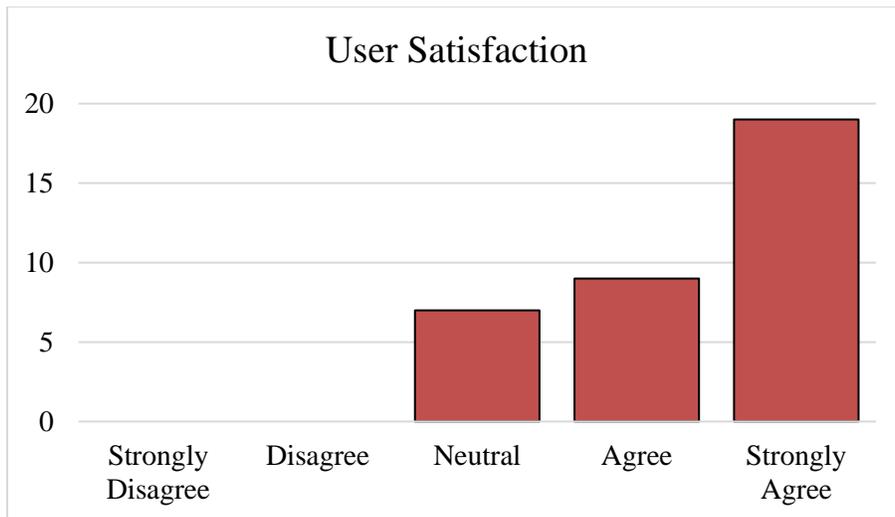


Figure 5: Bar Chart on the User Satisfaction Results

Figure 5: Given the response displayed on the Bar Chart above, 54% of the users strongly agree that the element of user satisfaction met their expectations. The users are satisfied and as such the perceived utility is very high.

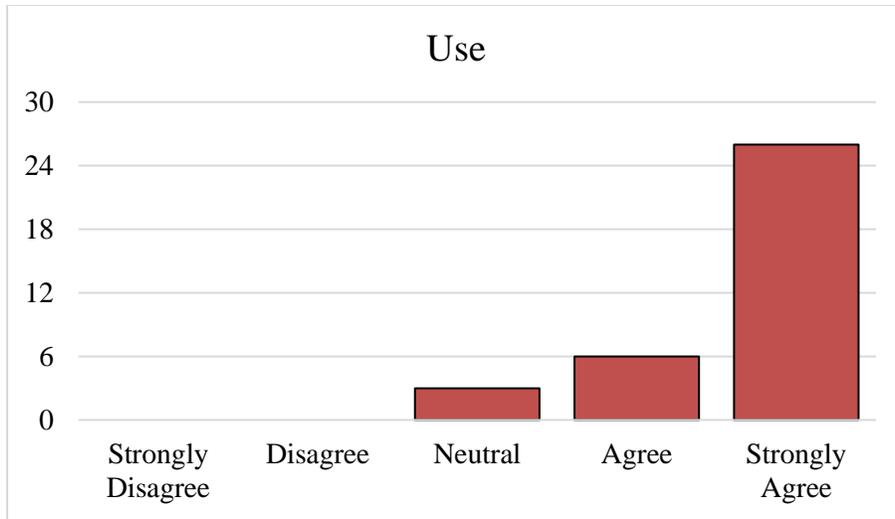


Figure 6: Bar Chart on the Use Results

Figure 6: Results of the data collected revealed that the ministries are very much dependent on the SmartStream System. This allows the researchers to determine that the system is very frequently being used within the various government ministries and that users have a practical knowledge of the system. All of this is being represented by the 91% of the respondents who both strongly agree and agree to the system.

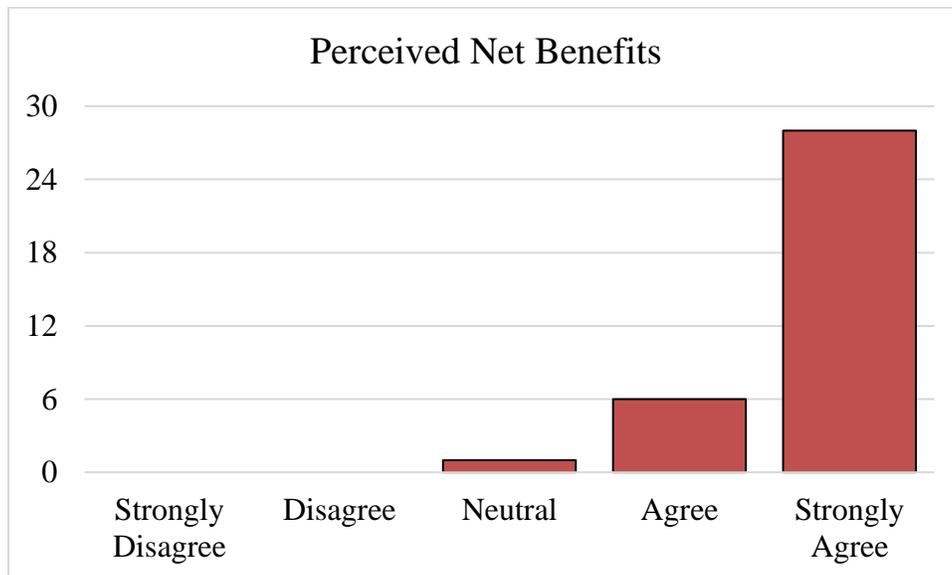


Figure 7: Bar Chart on the Perceived Net Benefits Results

Figure 7: The users were very satisfied with the system personally, they acknowledge that SmartStream has helped the users to improve their individual performance as well as increase the

overall productivity. This shows that 80% of the users strongly agree that the system has ultimately helped in achieving both personal and departmental tasks and objectives.

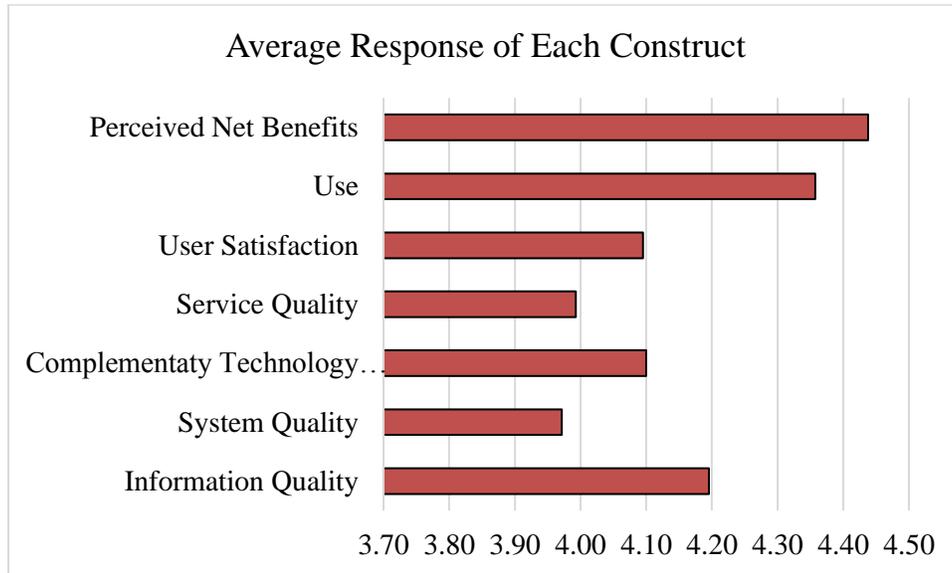


Figure 8: Bar Chart on the Total Average for Each Construct

Figure 8: The top three constructs the SmartStream System performed well in were Perceived Net Benefits, Use and Information Quality. The construct that SmartStream did not so as well was System Quality.

Conclusion and Recommendations

Management Information Systems (MIS) are geared to better assist the operation of the day to day office duties. It is implemented to help eliminate tedious work and save time in an organization. This research is the concern of evaluating the success of the information system, SmartStream used by the Government of Belize. The group concluded that the SmartStream System is successful. Although there were some individuals who were not too pleased with the system the overall majority would say otherwise. With public officers being very dependent on the system it is important that it be up to date in order to keep users pleased. For instance, service and system quality needs continuous improvement by support staff making it more understandable to use. Since system quality was the lowest construct among the others, CITO can provide recurrent training to users to become more familiar with the system. Thus, the Central Information Technology Office (CITO) can analyze the results from this research to see how to better the

system to please individuals. They can look at each category and improve on them to increase the overall success of the system.

Despite having a rough start the group came together in the limited time frame and got the job done. The biggest limitation the group endured was having to go back to the ministries on multiple occasions as the questionnaires were hand delivered and the group did not collect all questionnaires in one round as most employees were busy. This then delayed the collection process and the overall working process of the group.

For future researches, it would be recommended to get your organization and information system approved as early as you can at the beginning of the semester. Also, it would be recommended that there be a larger population size so that the generalization of results are more accurate. Overall, it would be best to find some means to make the workload less difficult for the group.

Reference

- Al-Shibly, H. (2011). Human resources information systems success assessment: An integrative model. *Australian Journal of Basic and Applied Sciences*, 5(5), 157-169.
- Bailey, J.E., and Pearson, S.W. (1983). Development of a tool for measuring and analysing computer user satisfaction. *Management Science*, 29, 5, pp.530–545
- Balaban, I., Mu, E., & Divjak, B. (2013). Development of an electronic Portfolio system success model: An information systems approach. *Computers & Education*, 60 (1), 396-411.
- Chang, H. H., Wang, Y. H., & Yang, W. Y. (2009). The impact of e-service quality, customer satisfaction and loyalty on e-marketing: Moderating effect of perceived value. *Total Quality Management*, 20 (4), 423-443
- DeLone, W., & McLean, E. (2003). The DeLone and McLean Model of Information System Success: A Ten-Year Update. *Journal of Management Information Systems*, 10-15.
- Hendriks, Chris. (2012). Integrated Financial Management Information Systems: Guidelines for effective implementation by the public sector of South Africa. *SA Journal of Information Management*. 14. 10.4102/sajim.v14i1.529.
- Mishra, L., Kendhe, R., & Bhalerao, J. (October 2015). Review on Management Information System (MIS) and its Role in Decision Making. *International Journal of Scientific and Research Publications*, 5(10). doi:10.9737/hist.2018.658
- Nayak, Gautham & Sequeira, A.H. & Senapati, Sanjay. (2012). Management Information System for Effective and Efficient Decision Making: A Case Study. *SSRN Electronic Journal*. 10.2139/ssrn.2174035.
- Pitt, L. F., Watson, R. T., & Kavan, C. B. (1995). Service Quality: A Measure of Information Systems Effectiveness. *MIS Quarterly*, 19(2), 173–187. <https://doi.org/10.2307/249687>

Seddon, P. and Yip, S. K. (1992), "An Empirical Evaluation of User Information Satisfaction (UIS) Measures for Use with General Ledger Account Software," *Journal of Information Systems*, 6(spring), 75-92.

Teece, D. J. (1988). Capturing value from technological innovation: Integration, strategic partnering, and Licensing decisions. *Interfaces*, 18(3), 46-61.

Van Cauter, L., Verlet, D., Snoeck, M., & Crompvoets, J. (2017). The explanatory power of the Delone & McLean model in the public sector: A mixed method test. *Information Polity: The International Journal of Government & Democracy in the Information Age*, 22(1), 41–55. <https://doi.org/10.3233/IP-170404>

Appendix

Questionnaire I – “Success of SmartStream” (End Users)

Purpose

This research is required for the CMPS3012 MIS course at University of Belize University. This questionnaire asks for information about yourself and how often you use the SmartStream System. The data gathered will be analyzed to determine the success of the SmartStream system by CITO.

Please answer each question based on your use of SmartStream. Your individual responses to the questionnaire will be strictly confidential and used solely for this research.

Instructions

This is a survey, not a test; there are no right or wrong answers. Please tick the boxes to mark your answers.

1. Personal Information	Answers:
What is your gender?	Male <input type="checkbox"/> Female <input type="checkbox"/>
How old are you?	Less than 25 <input type="checkbox"/> 25-35 <input type="checkbox"/> 36-45 <input type="checkbox"/> 46-55 <input type="checkbox"/> 55+ <input type="checkbox"/>
Kindly indicate the highest education level you have achieved	PhD <input type="checkbox"/> Associates <input type="checkbox"/> Masters <input type="checkbox"/> High School <input type="checkbox"/> Bachelors <input type="checkbox"/> Primary School <input type="checkbox"/>
How many years working experience do you have?	Less than 5 <input type="checkbox"/> 5-10 <input type="checkbox"/> 11-15 <input type="checkbox"/> 15+ <input type="checkbox"/>

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

2. Information Quality	Strongly Disagree ---Strongly Agree
Does SmartStream provide you with the exact information needed?	1 2 3 4 5
Does SmartStream provide you with information needed at the right time?	1 2 3 4 5
Does SmartStream provide you with information that is relevant to your job/task?	1 2 3 4 5
Does SmartStream provide you with sufficient information?	1 2 3 4 5
Does SmartStream provide you with information that is easily understandable?	1 2 3 4 5
Does SmartStream provide you with up-to-date information?	1 2 3 4 5
3. System Quality	Strongly Disagree ---Strongly Agree
SmartStream is very easy to use.	1 2 3 4 5
SmartStream is a very user-friendly system.	1 2 3 4 5
You are satisfied with the SmartStream system overall.	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
7. Use	Strongly Disagree ---Strongly Agree
How frequently do you use the SmartStream system?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
How dependent are you upon the SmartStream system?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Were you able to complete a task using the system despite not having even someone around to tell you what to do?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Do you think you have the necessary knowledge to use the SmartStream system?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>

EVALUATING THE SUCCESS OF SMARTSTREAM

8. Perceived Net Benefits	Strongly Disagree ---Strongly Agree
Do you believe that the SmartStream system helps in improving your job performance?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Do you believe that the SmartStream system helps the organization save on various costs?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Do you believe that the SmartStream system helps your organization to achieve its goal?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Does using the SmartStream system help in improving assessment and training?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Do you believe that using the SmartStream system increases your productivity?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
Overall, does using SmartStream enhances performance?	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>

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

Thank you for your participation.