Implementation of an Online Ordering Portal for Customers

|  |  |
| --- | --- |
| Angeneal HamiltonUniversity of BelizeTeakettle Village, Cayo Districtangenealh@gmail.com | Juliet FraserUniversity of BelizeSan Ignacio Town, Cayo Districtjulietfraser55@gmail.com |
| Mirtha WelchUniversity of BelizeRoaring Creek Village, Cayo Districtmirtha.welch@yahoo.com | Tracey BanmanUniversity of BelizeBelmopan, Belize Districttraceybanman@hotmail.com |
| Kavanny PennerUniversity of BelizeSan Ignacio Town, Cayo Districtkavannypenner@yahoo.com |

Abstract

Presently, no previous research has been conducted on the Koop Sheet Metal Information system. This paper studies the potential success of an online ordering portal if integrated and implemented within the current system that is used by the internal users. If implemented, the online ordering portal will allow for one and one interaction between the internal and external users and in turn a more efficient and effective business process. The researchers conducted two different surveys to evaluate the current system and whether the proposed system will be adopted by the external users. The findings revealed that the current system is excellent, and the external users are willing to use the proposed system to conduct transactions. Limitations include the timeframe given to complete the project, limited internal users and researchers had to formulate a model which took more effort than if the system was already in effect. The research was concluded by a discussion and recommendations for future researches.

**Keywords:** KSMIS, Quasar, C.T.I., TAM, Delone & Mclean Model, XML

Introduction

Information systems can be defined as a “set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization” (K. Laudon and J. Laudon, 2016, Page 48). These systems have become an important part of many businesses across the globe. Businesses invest a major part of their capital into the hardware and software of information systems with the aim of creating an information system that helps to achieve the businesses goals and that can benefit their business in some way. (K. Laudon and J. Laudon, 2016). Lastly, information systems are important for many businesses because it helps the business to achieve its goals and allows the business to run more efficiently.

Koop Sheet Metal has created a custom built in house information system that uses sales, accounts receivable, inventory, production and delivery information to assist the business with meeting its operating goals. This customized system is called Koop Sheet Metal Information System (KSMIS). KSMIS is integrated with an accounting information system called Quasar and a CTI system with the aim of meeting accounting purposes and managing account receivables. Therefore, the research conducted is aimed at evaluating the effectiveness of the current information system utilized by Koop Sheet Metal and to suggest a system expansion that will improve the efficiency and effectiveness of the system’s operation. Hence, this research is important because it helps Koop Sheet Metal’s management know the effectiveness of their information system and gives them an idea on how to improve the information system’s efficiency and effectiveness through the proposed expansion.

The research is conducted specifically for this company and this MIS project. So far, we are the first set of MIS students that have undertaken a study on this company information system. So therefore, new knowledge will be shared with whomever that has the opportunity of reading this research paper in the near future. The main purpose is to construct a platform where employees and customers will interact and customers will be able to order and purchase materials through the use of the KSM Information System portal.

After the evaluation of Koop Sheet Metal Management Information System, it has become evident that the business uses a custom-made information system to keep records of daily business operations. This system is integrated with another system known as Quasar which focuses on accounts payables and purchase orders. Furthermore, the business uses I.C.T to access customer personal information and updates. However, it isn’t known how often the business update its information system, how long the system have been effective, relevant changes made to the system and if the system has ever experienced errors.

**Goal of the research**

Our goal for this research is to seek the efficiency of Koop Sheet Metals Information System (KSMIS) and propose a method in which it can become more employee and customer friendly.

**Objectives of the research**

* To analyze the efficiency of using the Koop Sheet Metal Information System (KSMIS) that was integrated in the business for accounting and inventory.
* To access relevant information about the efficiency and effective use of the KSMIS with regards to internal and external users.
* To analyze and understand how the MIS system implemented by Koop Sheet Metal is transforming the business and its relationship between businesses, employees and its customers.
* To ensure that the MIS system provides the genuine value for Koop Sheet Metal.
* To develop a prototype that will have a positive probability to be adopted by the organization.

Literature Review

A fundamental article that contributed greatly to Information Systems Research is W. DeLone’s and E. McLean’s taxonomy titled “Information Systems Success: The Quest for the Dependent Variable”. This article highlighted the need to identify the dependent variable; the success of information systems. It also established levels and events involved in identifying success, along with categorizing different areas of the success. Researchers have conducted studies that try to identify the factors contributing success, but many researchers focus on the independent variable and very few studies focus on the dependent variables (Delone & McLean 1992). Delone & Mclean developed a standardized model of information system success after analyzing a few hundred research papers.

This standardized model primarily identified six major categories of Information system success which are System Quality, Information Quality, Use, User Satisfaction, Individual Impact and Organizational Impact. Therefore, when measuring information system success it must fall into one of these categories. These categories of success are measured using different inputs which relate to structure, efficiency, effectiveness, relevance, experience, usage, overall influence and impact of the information system. The research was unable to create a formal set of criteria to measure any dependent variable. Overall, DeLone’s and McLean’s research paper analyzed and interpreted a very large amount of research, which resulted in them creating a general model to categorized information system success.

The categories of the information system success model are all interrelated and interdependent on one or the other, causing a correlation between categories. “Information Systems Success Revisited” and “The DeLone and McLean Model of Information Systems Success: A Ten-Year Update”, are related articles by DeLone and McLean that critique, enforce and improve on their Information system success model. In the “Information Systems Success Revisited” article, there was a reformulation of the model that consisted of adding a new category titled service quality and merging individual impact and organizational impact into one category called Net Benefits (Delone& McLean 2002).

The article, “The DeLone and McLean Model of Information Systems Success: A Ten-Year Update”, supported, critiqued and analyzed the model further by displaying how the model could be adopted to a specific information system such as e-commerce (Delone& McLean 2003). Hence, DeLone’s and McLean’s articles contributed greatly to the development of information system research through their development and enhancement of the Information Systems Success Model.

Technology Acceptance Model has frequently been used to analyze the adoption and use of new technology advancement. According to Park (2009), a research conducted by Konkuk University to Analysis the Technology Acceptance Model in Understanding University Students’ adoption and use of e-learning yielded results, which proved TAM to be an effective and accurate theoretical tool. The researchers used “The structural Equation Model technique and LISREL program”, they surveyed 628 students from e-learning courses with the assistance of lecturers in charge of each e-learning course (Park, 2009).

The completed instrument consisted of four parts, included TAM and TAM 2 to analyze and interpret results (Park, 2009). The overall findings strongly supported TAM constructs to have a direct and indirect effect on University students’ behavioral intention to use e-learning. However, there was certain restriction regarding this study because: 1. It only included e-learning students who already had experience on e-learning thus did not include non-users 2. The study was only carried out at the Konkuk University, which does not represent the whole population and 3. It does not prove e-learner graduates’ competency over non-e-learners.

In addition, another study was conducted in Mayalasia, which involved users and non-users of on-line banking. The research was achieved by the distribution of 180 questionnaires to participants and they used a convenience sampling method to collect data. This method included respondents of different banks, which aimed to test the “applicability of TAM in predicting intention to use internet banking among current and future bank users”, they focused only on the internal variables of the model (Jantan, 2002). After the information was gathered and analyzed, it became evident that TAM was more applicable for users who found it convenient to conduct their banking transactions. Some respondents were not inclined to the technology innovation and not intended to use the on-line banking facilities. Nevertheless, there were certain limitations of the study such as, the model that was used which did not include the extended model, the samples were only base on a limited number of respondents and some of the variables did not include other influences of use.

Furthermore, in a research performed at the University of Nebraska- Lincoln in support of Information Literacy concluded that TAM was useful to help determine professionals’ competency and productivity. The study was achieved by the use of literature reviews that were closely related to the subject of TAM and Literacy Information. According to Duro Dolu (2016), fear to use information systems to access information further prevented the adoption of advancement in technology in information literacy. In all previous studies, results have been gathered with the use of surveys, population samples and cannot be generalized to other parts of the world. On the other hand, barriers have been evident due to the environment of the study, which mostly included an academic atmosphere.

Information Systems in developing countries come across a lot more challenges than the already developed countries because of government IT liberation policies, lack of resources, ignorance, and unqualified personnel. The Zimbabwean manufacturing sector had experienced a serious decline in companies. According to Choga, “In 1980, the sector had 1260 companies and the number went down to 912 by 2012. The employment rate declined from7.2% in 1997 to 3.1% in 2004” (Choga, 2014, 1).Because Zimbabwe was technologically behind other countries, they looked into Information Systems. Which assisted them greatly in their overall efficiency in merging labor with investments, and network impacts, which lowers transaction costs and rapid innovation?

The Technology Acceptance Method was done within a highly dynamic and competitive education industry in a developing Middle-Eastern Country, Jordan. The technology acceptance model was helpful in the Jordanian educational setting. According to Akour, it is helpful because “Jordanian educational industry is one of the fastest growing industries not only in Jordan but also in the entire Middle-East” (Akour, np, 3). The Technology Acceptance Method allows people in Jordan to enhance the work and educational levels.

Moreover, in a study conducted by Abu-Dalbouh for a healthcare industry, the researchers developed a mobile tracking model that is tailored around gathering of information on the patients’ conditions and so forth instead of them always visiting the hospital for a simple checkup. Four components of the technology acceptance model used were Perceived of Usefulness, Perceived Ease of Use, User Satisfaction and Attribute of Usability, which were modified to suit the evaluation. It was limited to only using questionnaires to dictate the methodology and the outcome of the study.

Accounting systems is a necessary function for any type of business enterprise. Businesses must be able to keep a record as a reference point of their income and expenses, and the records should be as detailed as possible in order to have accurate accountability. The systems used should provide internal and external users instant reports/feedback on stock evaluation, profit and loss, customers’ accounts, sales analysis, and payroll. It should also save time allowing for faster data entry as well as documents to be assembled and printed quickly and accurately.

As stated by Bentham, in the world of enterprises there are various accounting packages available such as QuickBooks, Peachtree, Cougar Mountain and Microsoft’s Small Business Accounting, which are able to track income and expenses, pay bills, invoice customers and keep track of inventory records. He introduced Quasar which is considered to be user interface friendly and it allows for quick and easy data entry. It is designed so that users keep their hands on the keyboards by using special shortcuts, of which allows for faster data entry that is both efficient and effective. Its menu layout is controlled by XML file that allows for the accessibility of customizing reports, adding company’s information and logos, and new reports can be created by copying existing templates and customizing to specific preferences.

Another Management Information System includes a Computer Telephony Integration (CTI) that connects the phone system to the computer network to be integrated or coordinated for the use of the organization to handle the sending and receiving voicemails as emails; outward calls using the internet; merging all messages such as emails, voicemail, fax and phone messages into one inbox that uses an incorporated messaging technology. It also improves customer service so that customer’s records can be automatically presented to staff members taking calls and increasing its efficiency by automating routine tasks by dialing numbers automatically from the organization’s computer.

# **Methodology of Study**

# **Hypothesis**

 *Figure 1 Modified Research Model*

The hypothesized relationship between Koop Sheet Metal Information system success variables are based on the theoretical andempirical work reported by Delone and McLean (2003). Therefore, the study hypothesized the following 11 hypotheses tested:

*H1.* Complementary technology quality will positively impact user satisfaction.

H2. Complementary technology quality will positively impact system use.

H3. System quality will positively impact user satisfaction.

H4. Information quality will positively impact user satisfaction.

H5. Service quality will positively impact user satisfaction.

H6. Use will positively impact user satisfaction.

H7. Information quality will positively impact use.

H8. System quality will positively impact use.

H9. Service quality will positively impact use.

H10.User satisfaction will positively impact perceived net benefit.

H11.Use will positively impact perceived net benefit.

**Methodology Used**

The surveys, were distributed via email to different partakers throughout the country for it to be possible to generalize the information and responses retrieved from the participants. The questionnaires dispatched to internal users were on the basis of random sampling, meaning individuals were chosen on the basis of how accessible and available they were to participate in the study. For external users on the other hand, random sampling was also used due to the fact that emails were sent to their email addresses without any special motives. In the previous literature reviews the researchers used either quantitative or qualitative methods to conclude their findings. However, the methodology used in this research was a mixed method of both Quantitative and qualitative. Further differences are the setting, the data source which includes the database in a specific location (KOOP SHEET METAL) and the sample size.

After analyzing and reviewing previous Literature review papers it was noted that there were a few assumptions and limitations among the reviews. In the research of Information Systems by W. DeLone’s and E. McLean’s taxonomy titled “Information Systems Success: The Quest for the Dependent Variable,” it was assumed that many researchers focus on the independent variable and very few studies focused on the dependent variables (Delone& McLean 1992). Furthermore, it’s presumed that when measuring Information system success, it must fall into one of six categories. On the other hand, in all studies conducted, there were certain limitations which stood out such as, the models used which did not include the extended model of TAM, the samples were limited to a specific area either academic or work environment and the influences of use.

To enhance the efficiency of the system being researched, an expansion of the system is being proposed. Currently, Koop Sheet Metal Information System (referred to as KSMIS) is a system that involves sales, accounts receivable, inventory, production management and delivery scheduling. This system was custom built with an aim to efficiently coordinate the activities of the company. To further develop the system, the integration of an online portal for repeated customers to purchase from will add a connection to sales, account receivable, inventory, production and delivery. This proposed system expansion will allow customers’ online orders to be forwarded to the sales staff for verification of order details and status. Payments will be made through the means of checks, bank deposits or credit cards. Before any production and delivery scheduling are made, managers must confirm the order specifications with customers to avoid error. The connection this online portal will have with the system, is that through the confirmation from sales staff, they will input the information into the database which the database will then distribute to sales, production, inventory, accounts receivable and delivery. This entire system expansion will improve the overall ordering process by allowing customers to place orders at times convenient to them. The online portal will be able to efficiently transfer information from the customers to employees and vice versa through the use of XML which was designed to carry data. XML also organizes and stores information that will be transferred and displayed to the receiver or on the website itself. Therefore, whenever a message is sent from the online portal, it will be directly delivered to the respective persons. Since some customers will be regular, when an order is received, and it isn’t the usual, it would be flagged and in turn the sales staff dealing with the order will readily notice it and it will be easy for them to request the sender to confirm their order. The portal will allow two levels of verification by customers whose managers or supervisors stress on reviewing the order before it is sent. By that process, customers would fully accept the proposed system because managers can authorize the order before sending. The new system addition will be integrated into the system as illustrated:



Figure 2 Proposed Model for Customers to place orders and interact with Employees

# **Data Analysis and Procedures**

The ever-changing business environment calls for the appropriate use of modern technology because technology has become a tool that promotes the use up-to-date information resources to advance productivity and development. The efficient access and utilization of information resources depends on the ability to effectively use the apparatus of information technology. However, the inability to demonstrate expertise in this area can lead to impediment in embracing new technology systems. Therefore, the primary purpose of this study was to evaluate the current system and propose an online ordering portal for customers. This can lead the business to review their normal business routine and invest in the newly suggested way of conducting business.

In order to better understand the internal users of the KSMIS system, a total of 20 questionnaires were distributed and only 12 were returned, generating a 60 percent response rate. The respondents’ characteristics are presented in the tables below.

The study shows that, male participants represented a higher percentage of the sample (approximately 92% for internal users and 60% for external users) compared to female participants who contributed to 8% and 40% of responses for internal and external users respectively. 42% of the internal participants were aged 35-45 years and 67% had obtained education up to High School level. These internal participants worked at Koop Sheet Metal for 5 to 10 years (75%). Approximately 60% of respondents for the external users were aged between less than 25 to 35 years and 65%, 15%, 10%, 8% and 5% were Associates, High-school, Masters, Primary School and Bachelor graduates respectively.

Table 1 Characteristics of Internal User Respondents

|  |
| --- |
| Characteristics of Internal User Respondents |
| Gender |   | Age |   | Education |   | Working Experience |   |
| Male | 92% | Less Than 25 | 25% | PhD | 0% | Less Than 5  | 25% |
| Female | 8% | From 25 to 35 | 17% | Masters | 0% | Over 5 to 10 | 75% |
|  |  | Over 35 to 45 | 42% | Bachelors | 25% | 11 to 15 years | 0% |
|  |  | Over 45 to 55 | 17% | Associates | 8% | Over 15 years | 0% |
|  |  | Older than 55 | 0% | High School  | 33% |  |  |
|  |  |  |  | Primary School | 33% |  |  |

Table 2 Characteristics of External User Respondents

|  |
| --- |
| **Characteristics of External User Respondents** |
| Gender |  | Age |  | Education |  | Working Experience |
| Male | 60% | Less Than 25 | 30% | PhD | 0% | Less Than 5  | 45% |
| Female | 40% | From 25 to 35 | 30% | Masters | 10% | Over 5 to 10 | 55% |
|  |  | Over 35 to 45 | 20% | Bachelors | 5% | 11 to 15 years | 0% |
|  |  | Over 45 to 55 | 15% | Associates | 65% | Over 15 years | 0% |
|  |  | Older than 55 | 5% | High School  | 15% |  |  |
|  |  |  |  | Primary School | 8% |  |  |

Two questionnaires on Koop Sheet Metals Information System (KSMIS) were given to both external users and internal users. The external users based the questionnaires on the Delone model, whereas the internal user questionnaire was based on the TAM model. In response to the internal data, it indicated that persons working at Koop Sheet Metal had a positive feedback stating that the KSMIS system currently being used provides information quality, sufficient and easily understandable information, a system quality that has interactive features which complements technology in an adequate manner; and lastly is considered an efficient system that enhances the overall performance and management of the organization.

The response data of external users had a positive feedback as well in regards to the implementation of an online ordering portal for customers. They stated that the system would enhance their effectiveness when conducting their work, having control to use the system when needed and would use the system even when it would not be compulsory to use it. Thus, we can state that the MIS system would be an important aspect of the business’ model since it would help the organization achieve its goals, by transforming the business and its relationship among the business, employees and its customers allowing Koop Sheet Metal to run more efficiently and providing genuine value to the organization.

As stated before, the proposed model for the organizational performance management would be an expansion of the system (KSMIS) that is already being utilized. To enhance its efficiency an online portal would be integrated for repeated customers to purchase from the variety of items offered at the organization. As noted in many organizations outside Belize, the self-service system is becoming the preferred method of interaction for organizations. By implementing an online customer portal, the system expansion would:

(1) Save time for both the organization and their customers which would allow for a secure and efficient way to get information that bypasses the cost of travelling, waiting in line to check out, etc. It would also enable Koop Sheet Metal’s customers to get information such as copies of invoices, order status, inventory quantity, due dates, placing order, and reviewing past orders without having to call, email or visit the company office.

(2) The proposed model would also enhance customer retention (experience) by allowing customers to interact with the organization in a convenient manner, at any time and any place. It would enable customers to make instant payments in a safe environment and if any issues, concerns or complaints arise in regards to a particular product or service, they can communicate by submitting a message to the support team. In this way customers remain satisfied.

By implementing a customer portal Koop Sheet Metal will be able to stay in touch with their customer needs, improve their customer experience, improving their brand, reduce internal tasks, retain existing customers, and stay competitive.

Information systems are extremely important in the successful managing of any business and efficiently increases the business performance. However, with the advancement in technology, people would sometimes find it difficult to adapt to new methods of conducting business. The empirical studies of TAM have revealed potential user's overall attitude toward using a given system which is hypothesized to be a major determinant of whether/not individuals use it. Attitudes towards using the system, in turn, are a function of two major beliefs; perceived usefulness and perceived ease of use.

Tam has many advantages in the behavioral aspect of individuals’ acceptance of new information system, however, it only supplies very general information on users’ opinions about a system. TAM has improved the understanding of user acceptance processes, providing new theoretical insights into the successful design and implementation of information systems. Also, TAM has provided the theoretical basis for a practical user acceptance testing methodology that enables system designers and implementers to evaluate proposed new systems prior to their implementation. TAM provides useful information about the relative likelihood of success of proposed systems early in their development where such information has the greatest value. TAM has yielded results which actual evaluate system usage, user attitudes and performance impacts.

Furthermore, TAM has impacted the growing emphasis that system designers are placing on transforming raw computing capability into systems that fit the needs of end users. In attempting to design more successful systems, developers have found that testing system prototypes with actual prospective users is an effective way of evaluating and refining proposed designs. The existing model testing procedures reveal considered valuable information in the techniques used to measure user responses to new information systems. Businesses’ performance gains are the desired outcome from the use of new information systems, however, these gains will not be obtained if users fail to adopt the new systems. The features of the system, affect the degree to which target users actually use the system. Namely, the characteristics of the system affect how motivated users are to use the system, which in turn affects the actual system use or non-use. Such measures make it possible to empirically test the proposed model and may provide the instrument needed for applied use of the proposed model in the user acceptance testing.

**Consistency of the data**

Data consistency is essential to the functioning of programs, applications, systems, and databases. According to Chapple, “database consistency does not mean that the transactions are correct, it means that it did not break the rules defined by the program.” Data consistency helps state the accuracy of database transactions. There were two questionnaires done on Koop Sheet Metals Information System (KSMIS) which were distributed to the external users and internal users. The internal users based the questionnaires on the Delone & Mclean’s model, whereas the external user questionnaire was based on the TAM’s model.

 The Delone Model Analysis consists of eight main topics, which are information quality, system quality, complementary technology quality, computer self-efficacy measure, service quality, user satisfaction, use and perceived net benefits.

Firstly, based on the information quality most respondents agreed that, the KSMIS system provides both sufficient information and easily understood information. Secondly, the responds base on the system quality mostly stated that, the KSMIS system provides interactive features between users and the system. Thirdly, the responds for complementary technology quality according to the graph stated that, the device hardware and internet connection was both adequate to access the KSMIS. Fourthly, the Computer self-efficacy measured the highest response, which was that, the respondents have never used an information system like KSMIS before and that they had just the built-in help facility for assistance. Fifthly, on the service quality question the respondents answered that the KSMIS support staff tell users exactly when services will be performed. Sixthly, most respondents were satisfied with the KSMIS system. Seventhly, the respondents had the adequate knowledge necessary to the use of KSMIS. Lastly, the perceived net benefits showed that the KSMIS improves the assessment and training. Overall, using the KSMIS enhances recruitment and performance management.

The Technology Acceptance Model (TAM) Analysis consists of six main topics, which are the Perceived Usefulness, Perceived Ease of Use, Perceived Behaviour Control, Subjective Norm, Voluntariness, and Behaviour Intention.

First, for Perceived Usefulness, respondents agreed that the KSMIS system enhances their effectiveness on the job. Second, for Perceived Ease of Use, respondents would become more frustrated when using the KSMIS system. Third, the respondents for the Perceived Behaviour Control stated they had control over the use of the KSMIS system. Fourth, the Subjective Norm respondents answered that their close friends think they should use the KSMIS system and people whose opinion they valued would prefer them to use the KSMIS system in their work. Fifth, on the voluntariness question the respondents answered the KSMIS system would be helpful but it was not compulsory in their job. Lastly, the Behaviour Intention depicts that customer overall behaviour towards the continuous usage of the system to perform their jobs vary.

KSMIS has integrated many different technologies in order to make the system highly efficient. Telephones, desktop computers, printers, fax machines, Wi-Fi routers, cables and other minor technologies have been used to connect the system both physically and wirelessly. In order to make the system more efficient, information technology can be used to connect the company’s website to the system in order to support the proposed customer ordering portal. Emails, instant messaging and telephones can be used to improve the efficiency of this proposed system expansion. These Information and communication technologies will be useful for customers who are using the portal because it will allow them to have a quick connection with company personnel for ordering assistance. This system expansion will have all the technological elements that KSMIS currently has and more.

For the efficiency of KSMIS to improve, an instant messaging platform should be added to the system for employees to communicate more easily and faster. The integration of an instant messaging portal into the system will allow for employees to communicate in real time for any system problem they encounter and will also allow them to ask for assistance with any system confusion. This instant messaging addition can have message filters that separate customers’ messages from employees’ messages which will make it a more organized platform. Included in this platform can be audio calling for customers who want to contact staff about concerns and who don’t want to spend their phone credit calling. Overall, KSMIS efficiency and functionality can be improved by using an instant messaging platform that allows easy communication with and between company personnel.



Figure 3 Illustration of our solution through the use of ICT

Figure 3 illustrates how an instant messaging platform will be integrated into the system for the customer and employee communication peruses. Since the Instant messaging platform will become a part of KSMIS, all messages will be processed through the information system that will filter the communication between customers and employees. This minor ICT system addition will allow for the system’s efficiency to be improved.

# **Discussion, Conclusion and Recommendations**

Developing specific business objectives have assisted us in the creation of a manageable and feasible method in which to carry out our task. In order to achieve the task objectives, we had to seek the assistance of Koop Sheet Metals’ administrator. He provided us with the management information system we needed in order to conclude this research. Also, we conducted in-depth literature reviews to further broaden our understanding of different techniques used to improve information systems usability and the acceptance to make improved implications. Furthermore, an internal and external analysis was conducted with the use of surveys which assisted us in gaining a general view of customers and employees attitudes, impressions, opinions and satisfaction level of Koop Sheet Metals’ business processes.

Our main aim in this study was to evaluate the effectiveness of the current information system utilized by Koop Sheet Metal and to suggest a system expansion that will improve the efficiency and effectiveness of the system’s operation. This study will definitely assist Koop Sheet Metal’s management to improve the effectiveness of their information system and to have a better idea on how to implement a more efficient and effective information system through the proposed expansion. Thus, can become a more productive and profitable business.

As with any research conducted, several limitations are encountered during the process. Koop Sheet Metal currently has an information system set up that solely comprise of the internal users and not their external users, therefore we had to locate the customers with the assistance of a manager and in order for them to fill out our surveys. Due to the system only being used for internal purposes we had to formulate a model that would be useful for them to integrate and it took more time to formulate a questionnaire for those external users. Also, the company had a maximum of twenty internal users, so we had to issue more surveys to the external to reach the target amount. Overall, the time was the most important limitation. The task was too demanding to be completed during the length of the semester.

After conducting this study, there are a few recommendations to be made. Firstly, for future studies on KSMIS to be very accurate in analyzing the system, the researchers should physically examine the system’s software and hardware in order for the company to get an objective outside view on the effectiveness of their system. Secondly, the questionnaire used for the research was not fully understood by majority of the survey population. This is due to the broad questions asked in the questionnaire. In order for the research to be more successful, some questions on the questionnaire need to be more specific and some removed. Lastly, it is recommended for more time to be allocated for the completion of this research. Due to the small time-frame, a very detailed analysis of the system could not be done. Therefore, the study conducted on KSMIS could have been much more analytical, but due to the small time frame, there was limited analysis of the system that could have been done.

For future research into KSMIS, it is recommended that the researchers be given more time to analyze the system and for researchers to improve on past research flaws. Future researchers can improve the questionnaire by making some questions more specific and they can better analyze the system by physically examining components of the system. The future direction of the study could be aimed towards analyzing the entire system including the newly proposed addition if the company decides to integrate the proposed expansion into the system. All in all, it can be said that there is great potential for future research into KSMIS which can provide greater analytical depth.

# **References**

Abu-Dalbouh, H. M. (2013). A Questionnaire Approach Based On The Technology Acceptance Model For Mobile Tracking On Patient Progress Applications. Retrieved September 17, 2017.

ADempiere. What is ADempiere? (2010). Retrieved on September 22, 2017. Retrieved from http://www.adempiere.com /What\_is\_ADempiere%3F

Akour, I. A. (np). International Journal of Business and Social Science. *Testing Technology Acceptance Model in Developing Countries: The Case of Jordan*, 2, 1-6. Retrieved September 14, 2017.

ApacheOFBiz. (2017). ApacheOFBiz-Home. Retrieved on September 22, 2017. Retrieved from https://ofbiz.apache.org/

Bentham, Joshua. Quasar Accounting: A Cost Effective Software Solution. Retrieved on September 22, 2017. Retrieved from https://www.accountingweb.com/technology/

 accounting-software/quasar-accounting-a-cost-effective-software-solution

Brockmeier, Joe. (2005). A look at Quasar Accounting. Retrieved on September 22, 2017. Retrieved from https://lwn.net/Articles/119805/

Chapple, M. (2017, August 15). Database Consistency. Retrieved October 30, 2017. https://www.thoughtco.com/database-consistency-definition-1019249

Choga F. (2014, November). The Impact of Production Information Systems (IS) on Zimbabwe

 Manufacturing Sector. *The Application of the Updated Delone and Mclean Information Systems (IS) Success Model*, 1-36. Retrieved September 14, 2017.

DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1), 60-95. Retrieved September 17, 2017, from https://pdfs.semanticscholar.org/a041/45f1ca06c61f5985ab22a2346b788f343392.pdf

DeLone, W. H., & McLean, E. R. (2002).Information Systems Success Revisited. *Proceedings of the 35th Hawaii International Conference on System Sciences*, 1-12. Retrieved September 17, 2017, from <https://pdfs.semanticscholar.org/3bf0/dc52885a44a69a522fbbbe2ad6ea72215c56.pdf>

DeLone, W. H., & McLean, E. R. (2003).The DeLone and McLean Model of Information Systems Success: *A Ten-Year Update. Journal of Management Information Systems*, Vol. 19, No. 4, 9–30. Retrieved September 17, 2017, fromhttp://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.88 .3031&rep=rep1&type=pdf

Durodolu, O.( 2016) Technology Acceptance Model as a predictor of using information system’ to acquire information literacy skills . Retrieved from http://digitalcommons.unl.edu/cgi/viewcont ent.cgi?article=4029&context=libphilprac

Hoffman, Chris. (2014). What is a Windows Domain and How Does It Affect My PC? Retrieved on September 22, 2017. Retrieved from https://www.howtogeek.com/194069/what-is-a- windows-domain-and-how-does-it-affect-my-pc/

Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioural Intentionto Use e-Learning. Educational Technology & Society, 12 (3), 150–162. Retrieved from http://www.ifets.info/journals/12\_3/14.pdf

Ramayah, T., Siron, R., Dahlan, N., &Mohamad, O. (2002). Technology Usage Among Ownners/Managers OfSme’s: The Role Of Demographic And Motivational Variables, *The proceedings of The 6th Annual Asian-Pacific Forum for Small Business on “Small and Medium Enterprises Linkages, Networking and Clustering*, Kuala Lumpur, Malaysia. Retrieved from http://webcache.googleusercontent.com/search?q=cache:http://ce.sharif.edu/courses/88- 89/1/ce428-1/resources/root/extrref/4.TECHNOLOGY%2520ACCEPTANCE%2520MODEL.doc

# **Appendices**

**Questionnaire I – “Effectiveness of the KSMIS” (All Employees)**

**Purpose**

**This questionnaire asks for information about yourself and how often and whom you communicate with at work, both online and offline. Your company uses an Information System that is integrated with an accounting system (Quasar) and a Computer Telephony Integration (CTI) that serves the purpose of recording sales, accounts receivable, inventories, production management, production, delivery schedule and so forth. We would like to measure the efficiency of the KSMIS at work and how we can improve it to become more effective for both you as the internal users and the external users.**

**Instructions**

**This is a survey, not a test; there are no rights or wrong answers. Please print in the spaces provided and tick the boxes to mark your answers. Your individual responses to the questionnaire will be strictly confidential. Thank you for your time and participation.**

|  |  |
| --- | --- |
| **1. Background Information** | **Answers:** |
| Please enter your age: |  |
| 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[ ]  10[ ]  |
| 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?  | Manager [ ]  Forman/Supervisor [ ] Non-Manager [ ]  |

**Measurement items for questionnaire:**

|  |  |
| --- | --- |
| **2. Information quality** | **Very Poor ----------------------Outstanding** |
| IQ1: The KSMIS system provides information that is exactly what you need | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| IQ2: The KSMIS system provides information you need at the right time | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| IQ3: The KSMIS system provide information that is relevant to your job | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| IQ4: The KSMIS system provides sufficient information | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| IQ5: The KSMIS system provides information that is easy to understand | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **3. System quality** | **Very Poor ----------------------Outstanding** |
| SQ1: The KSMIS system is easy to use. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SQ2: The KSMIS system is user-friendly. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SQ3: The KSMIS system provides high-speed information access. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SQ4: The KSMIS system provides interactive features between users and system. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **4. Complementary technology quality** | **Very Poor ----------------------Outstanding** |
| CTQ1: The software on the device (desktop computer, laptop, mobile device) used to access the KMIS is adequate. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CTQ2: The device hardware (desktop computer, laptop, mobile device) used to access the KMIS is adequate. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CTQ3: The speed of the Internet connection used to access the KMIS is adequate. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CTQ4: The reliability of the Internet connection used to access the KMIS is adequate. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

I COULD COMPLETE THE JOB USING THE KMIS...

|  |  |
| --- | --- |
| **5. Computer Self-Efficacy Measure**  | **Disagree -------------------------------Agree** |
| CSE-1 .... if there was no one around to tell me what to do as I go.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-2 .... if I had never used an information system like it before.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-3 .... if I had only the information system manuals for reference.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-4 .... if I had seen someone else using the information system before trying it myself.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-5 .... if I could call someone for help if I got stuck.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-6 .... if someone else had helped me get started.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-7 .... 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 [ ]  |
| CSE-8 .... if I had just the built-in help facility for assistance.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-9 .... if someone showed me how to do it first.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| CSE-IO.... 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** | **Very Poor ----------------------Outstanding** |
| SV1: The support staff keeps the KSMIS system software up to date. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SV2: When users have a problem, the KSMIS system support staff show a sincere interest in solving it. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SV3: The KSMIS system support staff responds promptly when users have a problem.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| SV4: The KSMIS support staff tell users exactly when services will be performed.  | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **7. User satisfaction** | **Very Poor ----------------------Outstanding** |
| US1: Most of the users bring a positive attitude or evaluation towards the KSMIS system function. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| US2: You think that the perceived utility about the KSMIS system is high. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| US3: The KSMIS has met your expectations. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| US4: You are satisfied with the KSMIS system. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **8. Use** | **Very Poor ----------------------Outstanding** |
| U1: The frequency of use with the KSMIS system is high. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| U2: You depend upon the KSMIS system. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| U3: I was able to complete a task using the KSMIS even if there was no one around to tell me what to do as I go. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| U4: I have the knowledge necessary to use the KSMIS. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **9. Perceived net benefits** | **Answers:** |
| NB1: The KSMIS system helps you improve your job performance. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| NB2: The KSMIS system helps the organization save cost. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| NB3: The KSMIS system helps the organization achieve its goal. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| NB4: Using The KSMIS improves the assessment and training | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| NB5: Using The KSMIS in job increases my productivity. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| NB6: Overall, using the KSMIS 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.

**Questionnaire 2 – “Effectiveness of Koop Sheet Metal Information System (KSMIS)” (All Customers)**

**Purpose**

This questionnaire asks for information about yourself and how often and with whom you communicate at work, both online and offline. Hypothetically, your company recently adopted the Koop Sheet Metal Information System (KSMIS) system. We would like to measure the use of the KSMIS at work and the effects the system would have on individuals’ communication patterns and job performance. The proposed KSMIS would allow you as loyal customers to **order and purchase materials** online through a platform that will be integrated with the current system at Koop Sheet Metal. Customers will have the ability to log into the portal, make orders, present signature (optional) submit order and choose a method of payments.There will also be employees that will review and approve the order before final submission and someone always available to answer any queries and concerns.

**Instructions**

This is a survey, not a test; there are no rights or wrong answers. Please print in the spaces provided and tick the boxes to mark your answers. Your individual responses to the questionnaire will be strictly confidential. Thank you for your time and participation.

|  |  |
| --- | --- |
| **1. Background Information** | **Answers:** |
| Please enter your age: |  |
| 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[ ]  10[ ]  |
| 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?  | Manager [ ]  Forman/Supervisor [ ] Non-Manager [ ]  |

**Measurement items for questionnaire:**

|  |  |
| --- | --- |
| **2. PU (Perceived Usefulness)** | **Very Poor ----------------------Outstanding** |
| Would the KSMIS system enable you to accomplish tasks more quickly? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would the KSMIS system improve your quality of work. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would the KSMIS system make it easier for you to do your job? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would the KSMIS system improve your productivity? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would the KSMIS system give you greater control over your job? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would the KSMIS system enhance my effectiveness on the job.? |  |

|  |  |
| --- | --- |
| **3. PEU (Perceived Ease of Use)** | **Very Poor ----------------------Outstanding** |
| Would my interaction with the KSMIS system be clear and understandable? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would my overall use of the KSMIS system be easy to use? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would learning to operate the KSMIS system be easy for me? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I rarely become confused when I use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I rarely make errors when using the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I rarely become frustrated when using the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **4.PBC (Perceived Behavior Control)** | **Very Poor ----------------------Outstanding** |
| Would I be able to confidently use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I have the knowledge to use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I have the resources to use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I have the ability to use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I have control over the use of the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **5. SN (Subjective Norm)** | **Answers:** |
| Would people who influence my behavior think I should use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would people who are important to me think I should use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would my immediate supervisor think I should use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would my close friends think I should use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would my peers think I should use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would people whose opinions I value prefer me using the KSMIS system in my work? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **6. V (Voluntariness)**  | **Very Poor ----------------------Outstanding** |
| Would my use of the KSMIS system be voluntary? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would my supervisor require me to use the KSMIS system? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Although it would be helpful, using the KSMIS system is not compulsory in my job. | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

|  |  |
| --- | --- |
| **7. BI (Behavior Intention)** | **Very Poor ----------------------Outstanding** |
| Would I intend to continue using the KSMIS system to perform my job? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |
| Would I intend to frequently use the KSMIS system to perform my job? | 1 [ ]  2 [ ]  3 [ ]  4 [ ]  5 [ ]  6 [ ]  7 [ ]  |

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

Thank you for your participation.

**Delone and Mclean’s Response Graphs**

Figure 4 Information Quality responses of Internal Users

Figure 5 System Quality responses of Internal Users

Figure 6 Complementary Technology Quality responses of Internal Users

Figure 7 Computer Self-Efficacy Measure responses of Internal Users

Figure 8 Service Quality responses of Internal Users

Figure 9 User Satisfaction responses of Internal Users

Figure 10 Use responses of Internal Users

Figure 11 Perceived Net Benefit responses of Internal Users

**TAM’s Response Graphs**

Figure 12 Perceived Usefulness responses of External Users

Figure 13 Perceived Ease of Use responses of External Users

Figure 14 Perceived Behavior Control responses of External Users

Figure 15 Subjective Norm responses of External Users

Figure 16 Voluntariness responses of External Users

Figure 17 Behavior Intention responses of External Users