Research on the Effectiveness of Information Systems in The Airline Industry in Belize

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Abstract

This paper introduces Zenith for information systems used by Tropic Air as part of the Global Distribution Systems(GDS). It deals with the business process of search in reviewing customer related services. As part of collecting secondary data, a literature review in detail was carried out to assess the success of Customer Relationship Management systems (CRM) in the airline industry. This helped in formulating clarity on concepts for the research. For this purpose, various articles consumed good amounts of time such as website articles, documents and interviews with management in the related field (Tropic Air) to further understand its success. The proposed research follows the systematic data processing approach comprising three major stages: 1) literature gathering and screening, 2) processing (following Delone and Mclean Module), and 3) Data Analysis. This paper provides the rationale for the effective use of Information Systems at Tropic Air to successfully carry out customer relationships. The paper concludes by providing arguments for the value of an effective literature review to IS research on airlines.

Keywords: Zenith, Literature Review, Survey, CRM systems, GDS

Introduction

Tropic Air is the first regional airline in the Americas founded in 1979, which is located in Belize. It has joined the GDS to further develop in the airline industry. As the Airline of Belize, Tropic Air prides itself in being highly motivated to carry out excellent customer service to all its customers' worldwide. Tropic Air currently adopts the Zenith system to carry out all relevant customer service related activities such as issuing flight tickets, creating customer profiles and storing personalized customer information. In this fashion Tropic Air keeps track of frequent flyers and builds a customer bond by providing a frequent flyer program to incentivize loyal customers.

While we discuss information systems in the travel industry, it is to be noted that the established medium of information dissemination, the global distribution systems (GDS) plays a vital role which was evident from various previous research in this field. A report published by Global Aviation Associates (2001) opines that the global distribution systems which we see today was developed from the computer reservation systems which is a proof in itself that technology implementation has great value. The initial idea of the airline while creating GDS was to use it as an efficient and effective vehicle for disseminating their inventory across the globe to the travel agencies. What we see today is the efficient GDS companies backed by technology and this started with the successful commercial implementation of GDS in the late 1970's and today we see the future of distribution safe in the hands of these mediums. It was these GDS companies who made an integrated, centralized, single source for all travel products which can truly be defined or called as an electronic super market which enhanced the efficiency of the travel agencies in serving their customers across the globe.

In relation to Management Information Systems as a team we have decided to look closely at the Customer Relationship Management Systems to better understand the value information systems have brought in the airline industry. The CRM systems provide information to coordinate all of the business processes that deal with customers. This may include sales, marketing and customer service. This also helps management to identify, attract and retain most of its customers. Tropic Air is no different. With the Zenith system a customer can be searched and all flight routes will be acquired. In addition, depending on the flights a customer has taken they can build miles which may give them a free pass on any other flight taken with tropic Air. Furthermore, flight specials are accessible to customers to get flight discounts and flight availability. CRM systems are important in the success and growth of airlines in the travel industry which demonstrates the valuable use of information systems.

Literature Review

Amit R, Zott C. (2001) conducted research on Aer Lingus and British Airways that showed how the internet is a powerful technology for commerce and communication between customers and airline companies; it shows how customers moved from being passive participants to that of being proactive. The internet provides a number of mechanisms to enable the airline to build a direct and enhanced relationship with customers. For example in the past selling their products were done through travel agents now via sophisticated customer profile data basic it is now possible to automatically inform staff of customer preferences such as aisle seats or in-flight entertainment. Croft J (2001) mentioned that purchasing tickets online have reduced transaction pass, as a ticket purchase online from the airlines website typically costs 1-3 dollars overhead where third party vendors cost them typically $25 per ticket. Products and services offered by these organizations are adopted through the internet and increase the expectations of customers.

According to Amit R, Zott C. (2001) the study shows that up-to-date information is available for buyers and sellers, reduction in customer searches and transaction cost, reduction in communication and transaction cost of seller and real time decision making mechanisms, namely the CSR (customer service

representative). The findings had shown that companies from a number of industries are now dealing with virtual travelers.

The internet search tools as in advance xml (extensible mark-up language) will make it possible to identify products features and prices with far great precision. Customers with a great detail search criteria will have access to even richer sources of information such as products and services. These travelers will have global access through the internet for more products and services than before and with instant communications typical constraints for example time and distance will rapidly disappear.

F.O'Connell (2006) studied that the designing of information systems is very essential and its management helps them reach the organization's purpose. Their findings revealed that in order to develop stronger relationships with their customers, CRM has always been a matter of great concern for airlines aspiring to improve relationships with the customers. Airlines that can effectively target, attract, serve and hold the best customers will definitely experience significant benefits. The better the bonding the airline holds with these customers, the more opportunities will be open for selling additional products and services. However, as the 'e-business' is evolving, the hurdles of establishing customer relationships have become even greater. The ultimate aim of the airline industry is to make the passengers' journey comfortable and convenient. The different procedures in the airport and airplane should be simplified and the highest degree of customers' satisfaction has to be maintained in order to succeed in today's competitive world. They discovered that the airline industry is constantly evolving and incorporating the latest innovations and technologies all with a common aim to make the journey of the passengers more comfortable and convenient. All the different procedures that the passengers go through in the airport and airplane have to be simplified and the highest quality of satisfaction for customers have to be maintained by airlines in order to succeed in today's competitive airlines. Their theories are that many vendor companies are doing constant research and development in the technologies which have a prime aim to improve customer satisfaction and provide better services to the customer. Huge investments are also being made in this area which has a lot of scope of improvement. Examples of such service can be self- checking kiosks, in-flight entertainment and connectivity, check-in via mobile phones, airport and baggage management services. Currently what can be seen as the prime objective of the airlines is: Optimizing revenues while maximizing customer relationships. How they analyzed the issues was that the airlines ensure that they strike a proper balance between the customer services and operating costs. In the aviation industry, the competition is ever increasing as more players enter each year. Effective management of information systems can definitely help in attaining these goals and also assist to incorporate the innovative solutions as well. In order to meet these challenges, many companies and firms are working on different software and solutions with a common objective in mind to make travel both – easy and convenient. It is said that it is important to choose the suitable information that will help managers observe their situation clearly. When airlines observed management information systems that included loss in the revenue due to not selling empty seats or rooms, they managed ways to get some value from latecomers at deep discounts. Another study found similar data, showing that with different preferences, personality traits and motives, customer relationship management (CRM) emerges as a more appropriate strategy for online poker companies to personalize their marketing effort in the empowered and technological online environment. In fact, studies show that when companies entertain and satisfy the needs of the individual consumer, they would be maximizing relations for the long run according to Eid and Zaidi, (2010). The CRM is significant since differentiation becomes easier for those companies with potential to develop long-term relationships, (Lancaster & Luck, 2010). Both studies involved different airlines on how they operate with CRM systems.

How does technology change customer service for airlines service?

DeLone and McLean (1992) proposed that service quality be added as a measure of effectiveness of technology. New technology is revolutionizing air travel across the world. It is making flights more efficient and eco-friendly. It is helping to improve security and make flight planning and Operations more effective. And, of course, it is constantly changing passengers' lives for the better from faster check-ins and a better airport experience through innovations that make flying more comfortable and rewarding.

With technology constantly improving airlines are now adopting new systems to make customers' life easier and their work smarter. Today, the airline sector is beginning to utilize new technologies. For example, the industry has reduced costs by putting in place self-check-in systems, automated passport control, and custom clearance. One of the most common technologies which have been added to improve customer service is self-check-in allowing passengers with bags to check-in at Self Bag Drop machines. The way this system works is Passengers attach their own baggage tag and drop their bag at the baggage drop belt (PARODE, 2019). In more modern countries such as the United States and Canada they have a system called the Automated Passport Control (APC) which is a U.S. Customs and Border Protection (CBP) time-saving traveler entry program for eligible U.S. citizens, U.S. legal permanent residents, Canadian citizens (Automated Passport Control (APC), 2019).

Disadvantages

Information system is very complex since each airport contains thousands of information systems from direct vendors responding to business-critical functions in the area of operation, finance, engineering, maintenance and public relation. Information or data are the key element airports must manage to achieve high performance in all its business functions, as the air traffic, the number of travelling passengers and transported freight continue to increase; data collection and information sharing become an important attribute of an integrated information system. Making sense of the disparate systems and volumes of information is a key challenge facing the aviation industry today. Discovering that air traffic is expected to increase continuously and gathering data in real time accurate management, flight or traffic control decisions become a very important challenge. Many airports continue to use legacy systems and do not benefit from the operational control and efficiency and integrated airport information system can provide. They also stated that bringing together more than one system from different vendors is very complex and challenging. Additional research analyzing information system integration (Paton, Gobler and Bechhofer, (2000) declares that "as it is well known in engineering circles, because of the interconnectedness of the components within systems. It is possible for an event at one part of the system to affect other parts in unintended ways, through unanticipated channels' '. However the benefit of the system integration outweighs its complexity and implementation cost that researchers continue to study the integration framework to improve airports performances observing the attributes, such as flight delay, service quality, cost, stakeholders' decision makers, safety and security improvement.

Perhaps the biggest technological buzz in the air travel industry is centered on Blockchain technology, the system that powers the secure, virtual currency Bitcoin described as a 'secure digital ledger of transactions and agreements' by IATA (2018), Blockchain offers tamper-proof data that can be managed and shared via authorized access.

Blockchain could be a game changer for flight operators, which can use it to transform their maintenance and safety regimes. Data entered into the blockchain would allow companies to track where every part on a plane came from and exactly who had handled it, and when – bringing security and safety to new levels.

The technology could be also huge for passengers. Blockchain has the potential to link biometric ID with check-in and baggage handling systems, passport control, hotels, car rental agencies and much more – making the passenger experience fast and seamless without the risk of compromised or counterfeited personal data.

The Blockchain technology is currently going through a phase in which it is gaining more maturity and the concrete benefits are becoming clearer. However, it is still not trivial how to leverage the benefits within the context of an appropriate use case where this technology is the most suitable solution. Classification of a wide range of use cases, consistently shows formation of clusters around a few areas of application, with many specifically leveraging Tokenization and Smart Contracts.
While there are many reasons why this technology is uniquely positioned as a solution to many problems in business and beyond, there are still a few key challenges that need to be dealt with before adoption gains traction. Scalability, governance and cost of usage have been identified as the main obstacles.
The value chain across the aviation industry is inherently very collaborative with many partnerships between providers to collectively orchestrate the delivery of travel products and services. Smart Contracts have a high potential to enable streamlining of business to business interactions. In particular to disrupt processes such as invoicing, reconciliation, settlement and accounting.
Blockchain comes with tangible benefits, however, in order to leverage its benefits, the approach from the outset should be a solution driven discovery, investigation and implementation, while maintaining an open mind set about alternative solutions throughout the entire process. Additionally, there are many design options related to the type of, and configuration of Blockchain that need to be carefully considered and compared. The recommended approach is to include Blockchain as one of the potential solutions to be considered.

Methodology

The method used to carry out the research in terms of the effectiveness of the Zenith for Tropic Air to meet the GDS criteria in the airline industry was a survey. This helped the group to analyze the use of the system amongst the users. Thirty (30) random employees at Tropic Air were selected to complete a survey with their utmost honesty.

On previous reviews conducted in the Airline Industry, researchers did not complete any surveys to get primary data on the effectiveness of information systems in the airline industry. This gave our group a step ahead on the analysis of the data since our survey was to assess users of Tropic Air.

Previous reviews made assumptions based on comparison research whilst our research was conducted on bases of primary data. Employees were not asked to write their names on the survey paper but were asked for their full and honest cooperation. In conducting the survey the entering of the data on a provided spreadsheet using Delone and Mclean Module, made the data analysis easier to understand. The graphs on the spreadsheet gave a vast and immediate understanding of the information gathered. Other reviews lack this primary source of information.

Previous reviews were limited with primary data on users of the information system available to airline travelers/ employees and to know how it helps its effectiveness in the industry.

Table1. The Measurement Items for survey:

Construct	Survey Questions
Information Quality	IQ1 The Zenith system provides information that is exactly what you need IQ2 The Zenith system provides information you need at the right time IQ3 The Zenith system provides information that is relevant to your job IQ4 The Zenith system provides sufficient information IQ5 The Zenith provides information that is easy to understand IQ6 The Zenith provides up to date information IQ7 The Zenith provides adequate information
System Quality	SQ1 The Zenith is easy to use

	SQ2 The Zenith is user friendly SQ3 The Zenith provides interactive features for the users
Service Quality	SV1 The support staff keep the Zenith software up to date SV 2 When users have a problem the IT Department show sincere interest in solving it SV3 The IT Department respond promptly when users have a problem SV4 The IT Department tell users exactly when services will be performed
User Satisfaction	US1 Most of the users have a positive attitude of the Zenith US2 You think that the utility of the system is high US3 Has the Zenith met your expectations US4 You are satisfied with the Zenith
Use	U1 Your frequency of use of the Zenith is high U2 You depend upon the Zenith to complete task(s) U3 You have the knowledge necessary to use the system U4 Were you able to complete task using the Zenith even when there was no one around to tell you what to do
Perceived Net Benefits	NB1 The Zenith helps you improve your job performance NB2 The Zenith helps company save costs NB3 The Zenith helps achieve organizational goals NB4 Using the Zenith helps improve assessment NB5 Using the Zenith at work increases your job productivity NB6 Overall, using Zenith enhances job performance

In the survey conducted the following was gathered:

Gender	**Age**	**Education**	**Work Experience**
Males=13	> 25=10	1st year = 3	>5 = 13
Females= 17	25-35 = 16	2nd year = 9	5-10 = 6
	36-45 = 02	3rd year = 6	11-15 = 6
	46-55 = 02	4th year = 12	> 15 = 5

Table 2: Demographics

Data Analysis

After gathering the information from the survey used, we analyzed that thirteen males and seventeen females participated in the research. The majority being sixteen participants were between twenty five to thirty five years old. In education twelve had completed a 4th year. Thirteen of them were working for less than five years.

This information gives us the idea that the employees are capable of understanding the system. Also, the system used did not require employees to have high degrees to be able to operate the system used at Tropic Air.

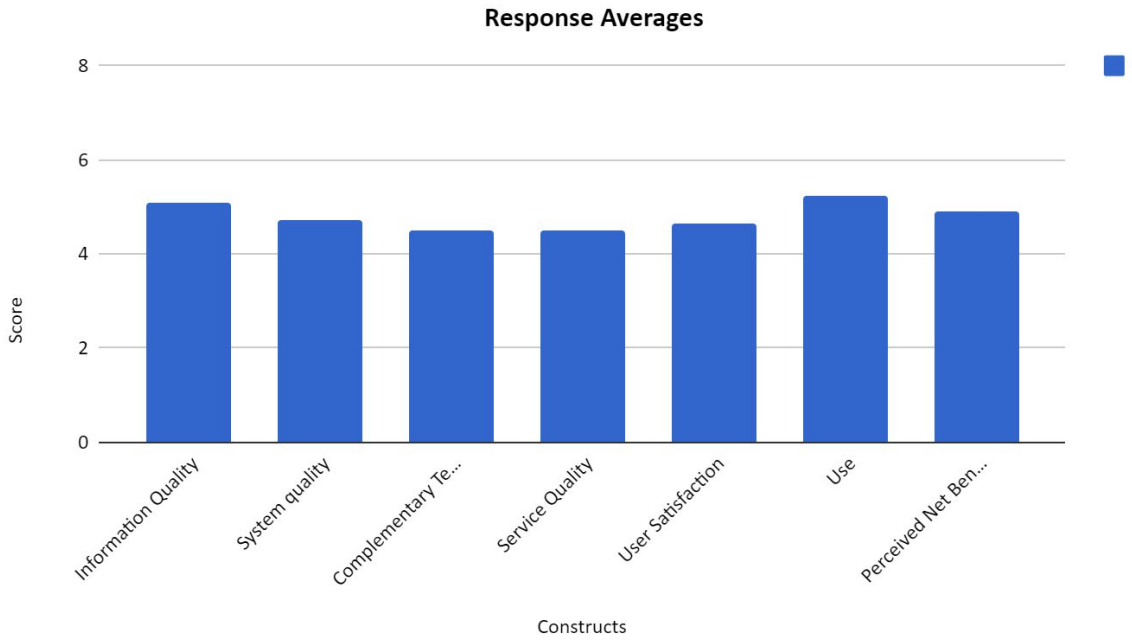

Table3. Response Averages

The use of the Zenith system for Tropic Air has the highest score average, implying that this is the primary system used by employees to carry out daily tasks to complete job requirements. Employees at Tropic Air state that the information quality meets the daily tasks in a satisfactory manner. The Zenith system perceived benefits confirm that employees see an adaptable intervention or treatment. The quality of Zenith and user satisfaction has improved customer satisfaction as it is a system integrated with multiple features to provide customer bookings/ reservations and search flight availability.
Table 3 shows the average responses gathered for the Information Quality, System Quality, Complementary Technology Quality, Service Quality, User Satisfaction, Use and Perceived Net Benefits. When analyzing the graph we can conclude that Information quality and the use of the CRM system at Tropic Air are averages equal with a score of 5. System quality, user satisfaction and Perceived benefits are averaged with a score above 4. Contemporary Technology Quality and System Quality averaged with a score little above the 4. In observing the average responses Tropic Air has an effective CRM system that employees can understand and appreciate its use.

Conclusion

In general, the airlines have to ensure that they strike a proper balance between the customer services and operating costs. In the aviation industry, the competition is ever increasing as more players enter each year. Effective management of information systems can definitely help in attaining these goals and also assist to incorporate the innovative solutions as well.

In order to meet these challenges, a lot of companies and firms are working on different software and solutions with a common objective in mind to make travel both – easy and convenient.

It is important to choose the suitable information that will help managers observe their situation clearly. When airlines observed management information systems that included loss in the revenue due to not selling empty seats or rooms, they managed ways to get some value from latecomers at deep discounts.

A good information system in practice can ensure that the operation is able to run efficiently with clear focus on customers. By incorporating better and better technology systems, we can reach out to demands of more customers and also strengthen vital features like security, avoiding delays, reducing the cost of travel. The scope of improvement is virtually endless and the companies will have to keep on evolving in order to survive in the future as well. This research has helped the group understand the efficiency and effectiveness of the CRM in the Airline industry and how it helps develop information systems to carry out the required criteria to meet GDS standards.

Limitation

The previous researchers failed to perform primary data gathering such as surveys. Therefore our group members each researched on two literature reviews on airlines to have a shared amount of input on the research. Aviation is a very broad topic; therefore the research had to be selective with the information gathering to compile this research.
The Tropic employees that participated in the survey activity may have not input complete honesty, because they may have felt that telling the truth might compromise their jobs. This can be a limitation because we have accessed the effectiveness of the information system used by Tropic Air and they do not want a negative comment of the company.

Contributions

Our research can contribute to future researchers to gather primary data on the Zenith system and its accuracy on performing customer based transactions in the airline industry. Having primary data makes the research more credible as primary users of the system enhance the statistics and the effectiveness of information systems. This research has accessed the CRM systems profoundly validating the proficient value of information systems to help the airline industry. As an airline industry, Tropic Air has successfully implemented the CRM system as Zenith to carry out customer service related activities to enhance and promote customer satisfaction.

Recommendations

For future recommendations we decided on the following:

Compared with other local airlines- this will help the research to be further credible with statistics.
Make in depth research with understanding the system and how it should be more effective in the airline industry. Implement faster internet connection, which will help the airline carry out duties faster and maximize customer service.

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Appendix

Purpose

This research is required for the CMPS3012 MIS course at University of Belize. This questionnaire asks for information about yourself and how often you use the Zenith System. The data gathered will be analyzed to determine the success of Zenith at Tropic Air to meet GDS criteria.

Please answer each question based on your use of Moodle. 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 is no right or wrong answers. Please tick the boxes to mark your answers.

1. Background Information	Answers:
Please indicate your gender:	Male Female
Please indicate your age	<25 25-35 36-45 46-55 >55
Please indicate what year you are currently in at University of Belize	1st Year 2nd Year 3rd Year 4th Year
Please indicate your working experience	<5 5-10 11-15 >15

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

2. Information Quality	Disagree ----------Agree
IQ1: The Moodle system provides information that is exactly what you need	1 2 3 4 5 6 7

IQ2: The Moodle system provides information you need at the right time	**1 2 3 4 5 6 7**
IQ3: The Moodle system provides information that is relevant to your class	**1 2 3 4 5 6 7**
IQ4: The Moodle system provides sufficient information	**1 2 3 4 5 6 7**
IQ5: The Moodle system provides information that is easy to understand	**1 2 3 4 5 6 7**
IQ6: The Moodle system provides up-to-date information	**1 2 3 4 5 6 7**
IQ7: The Moodle system provides sufficient information	**1 2 3 4 5 6 7**
3. System Quality	**Disagree ----------Agree**
SQ1: The Moodle system is easy to use	**1 2 3 4 5 6 7**
SQ2: The Moodle system is user-friendly	**1 2 3 4 5 6 7**
SQ3: The Moodle system provides interactive features between users and the system	**1 2 3 4 5 6 7**
4. Complementary Technology Quality	**Disagree ----------Agree**
CTQ1: The computer (desktop, laptop, mobile device) you normally use to access Moodle is adequate	**1 2 3 4 5 6 7**
CTQ2: The computer (desktop, laptop, mobile device) you normally use to access Moodle has a fast and reliable internet connection	**1 2 3 4 5 6 7**
5. Service Quality	**Disagree ----------Agree**
SV1: The support staff keep the Moodle system software up to date	**1 2 3 4 5 6 7**
SV2: When users have a problem the Moodle system support staff show a sincere interest in solving it	**1 2 3 4 5 6 7**

SV3: The Moodle system support staff respond promptly when users have a problem	**1 2 3 4 5 6 7**
SV4: The Moodle system support staff tell users exactly when services will be performed	**1 2 3 4 5 6 7**
6. User Satisfaction	**Disagree ----------Agree**
US1: Most of the users have a positive attitude of Moodle. the Moodle system function.	**1 2 3 4 5 6 7**
US2: You think that the utility of the Moodle system is high.	**1 2 3 4 5 6 7**
US3: The Moodle system has met your expectations.	**1 2 3 4 5 6 7**
US4: You are satisfied with the Moodle system.	**1 2 3 4 5 6 7**
7. Use	**Never ----------Often**
U1: Your frequency of use of the Moodle system is high	**1 2 3 4 5 6 7**
U2: You depend upon the Moodle system	**1 2 3 4 5 6 7**
U3: You were able to complete a task using Moodle even when there was no one around to tell you what to do	**1 2 3 4 5 6 7**
U4: You have the knowledge necessary to use the Moodle system	**1 2 3 4 5 6 7**
8. Perceived Net Benefits	**Never ----------Often**
NB1: The Moodle system helps you improve your academic performance	**1 2 3 4 5 6 7**
NB2: The Moodle system helps students save costs	**1 2 3 4 5 6 7**
NB3: The Moodle system helps you achieve your academic goals	**1 2 3 4 5 6 7**

NB4: Using the Moodle system improves assessment and teaching	**1 2 3 4 5 6 7**
NB5: Using the Moodle system at school increases your academic productivity	**1 2 3 4 5 6 7**
NB6: Overall, using Moodle enhances student performance	**1 2 3 4 5 6 7**

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

Thank you for your participation.