Applied M-Commerce Analytics for Sales and Marketing

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Abstract: In this cutting-edge era, individuals and organizations are using the web to get information. Information that is important to make a business or an organization effective. Online business refers to the process of purchasing and selling items or services over the Internet. Web-based shopping is becoming progressively well-known due to speed and convenience for customers[1]Small businesses that are thinking about buying or selling on the web will discover a useful resource for help in distinguishing and choosing fitting web-based business options.[a]The retail E-commerce market keeps on benefiting from positive economic trends and sustained customer enthusiasm for online shopping. The growth of mobile devices and the leap of mobile phones in markets caught the attention of the consumers. Shopping is made possible through mobile allowing the consumers to shop anywhere, anytime directly from their fingertips and this emergence resulted to a revolution in the commercial environment known as m-commerce.[2]. [3]Using agile method development, the objectives of this study is to produce an Online Store for PC Masters. This system serves as a platform for online marketing, advertising and sales analysis using Business Intelligence and is used for planning and analysis. It served as a guide for decision-making and increase effectiveness and efficiency of PC Master's services

Keywords: business intelligence online store, online shopping, m-commerce, agile method

I. INTRODUCTION

The development of the web has made a new habit of the conventional way people shop. Clients will no longer wait for the opening hours or particular areas; it may become active virtually whenever and wherever to buy items and services. The Internet is generally the new medium for the communication and the trading of data which has moved toward becoming present in our everyday lives. The quantity of Internet users is continually expanding, which also necessary that web-based online purchasing is increasing rapidly [3].

Looking for item features, costs or audits, selecting items and services through web, setting the order, making payments, or any other implies which at that point taken after by delivery of the required items through web. This is the reasons why the buyers utilize on the web. And this is called the commerce to shopper e-commerce cycle movement. [4]

With the increased demands of the people around the world on using the e-commerce space, large companies like Amazon.com and Alibaba which are the top online go-to store are continuing to invade different part of the world with the mindset of continuing to understand customers in different ways and be able to evolve in the new way to reach more customers. [5]

Having the interest to conduct business online or using the internet can lead to finding sales and broadcast more products. Offering products online can help business to reach more new markets and can add up its sales and income gains. [6]

With the invention of wireless networks, the widespread use of mobile devices and the demand for fast services has become a main concern, then area of mobile commerce has also emerged. This emergence is causing another revolution in the commercial environment known as m-commerce.[7]

A new type of e-commerce transactions, through mobile devices using wireless telecommunications network which is mobile commerce also known as mobile e-commerce Mobile commerce enables a new mode of information exchange and purchases, [8]

However due to the expanded volume of information in the organization, the Business Intelligence has turned out to be necessary in all organization, whatever its size, is essential for decision making. For SMEs, it is a basic technique for development bolstered by the appropriate management tools. [8]

The main objectives of this research is to create an online store for PC master that can be view on different devices such as computer and mobile phones. Lastly to apply m-commerce analytics for their sales and marketing.

II. RELATED WORKS

The continuous growth year after year of the online shopping because of technology only means that today's consumers are looking for more convenience to conduct transactions. On the side of the businesses, this new way of conducting transactions are both a challenge and a great opportunity. [9] It opens a new way of the traditional shopping. Customers are can now purchase and receive services anytime without worrying the opening and closing hours of the shop and also wondering the locations of the store. [10]

The widespread use of the internet and technology also the increase of the amount of trade happening electronically using e-commerce today. [11]

E-commerce stands for electronic commerce and relates to exchanging merchandise and services through the electronic medium. It helps buyer preferences and customer markets creating electronic infrastructure for challenges of the future E-commerce has reformed business, changing the shape of competition with internet-commerce has been growing very fast because of a lot of advantages it's offering with the buying on the web because of the lower transaction and take a toll as compared to other sorts of shopping. Through online shopping, customers can purchase quicker, more options and can arrange item and services with the comparative least cost. [12]

From buyers point, fo view e-commerce also offers a lot of advantages. Like the sorting time the customers can save, better decisions about finding the right products and services increased in buying different products and reduction of time on order conflict and solving the invoice. Furthermore, customers can now enjoy shopping 24 hours every day online. This is because e-commerce is open all year long and never stops the transactions even for a minute. [14]

However the growth of mobile devices and convenience of smartphones in recent years has attracted the attention of consumers. The fast paced growth of mobile shopping has placed mobile retailers at consumers' fingertips, and allowed mobile phone users to shop anywhere, anytime directly from their mobile devices without ever leaving their houses and offices. [15]

. This emergence is causing another revolution in the commercial environment. Mobile commerce makes business mobility a reality. [16]

Consumers become increasingly classy users of mobile phones in their shopping that alters the nature of marketing channels. Mobile Shopping enables the consumer actively engaged and further likely to make more purchases, access services, and transact business with their business by offering consumers the convenience and flexibility of mobile services anytime and anywhere. [17]

M-commerce is currently growing fast at a rate higher than E-commerce seen. [18]

The rise of m-commerce are definitely a recent phenomenon and therefore scientific studies about this subject are limited.

The advent of the M-commerce has brought a change in business intelligence. Be that as it may, it has also turned out to be a double-edged sword. The sheer volume of data that we can gather from M-commerce is such overwhelming. There is so much information that it is becoming unmanageable. [19]

In the present business world that is globally competitive, it is already certain that lot of information are need to be processed. It is essential for the business association to examine and comprehend the produced information for the performance of the association. Business Intelligence is a dynamic technique for extracting, transforming, managing and analyzing large data through a numerical model which gains data and learning. [20]

From a modern business-value point of view, corporations use Business Intelligence to decision-making capabilities for administrative processes and to ensure critical information is misused in a timely manner. [21]

To produce top decisions companies use Business Intelligence so as to cut costs and to categorize new business opportunities. Business intelligence is surplus to just corporate reporting and more than a set of a record. [22]

Business Intelligence is not just a technology or a methodology. It's a powerful new management approach that would convey knowledge, efficiency, optimal decisions and profit to an organization that uses it. [23]

Business Intelligence has increasingly become the foundation for achieving competitive advantage. The organization has to believe that they encompass the right information at the right time which is available to the right people. [24]

II. METHODOLOGY

This project uses Agile Software Development method to ensure that all user specification, development, and outcomes are met. The study includes different user, the owner, store staff and the customer. This research used a software evaluation following ISO25010 criteria and distributed to the users during the testing stage

AGILE DEVELOPMENT PROCESS

Fig 1: Agile Development Process

The Project Manager should attempt the project by stages and produce deliverables based on its standard frameworks improvement technique, wherever applicable, as takes after

Requirements – During this phase the project manager define the requirements for the iteration based on the system requirements, customer and stakeholder feedback. The project team carefully plan and analyze the requirements and specifications of the proposed system.

Development - Design and develop software based on defined requirements. During this phase the project manager closely monitor the development of the software to ensure that all the requirements are met.

Testing- During this phase the project team internal testing and documentation development. Every module of the system are tested and evaluated for errors. This is conducted by the actual users of the system to know their inputs. It also test the the integrity of the system.

Delivery - Integrate and deliver the working iteration into the production after completing the evaluation phase, all concerns raised are resolved. The system was assessed by the actual users of the system within a month of use. The purpose of this is to assess the performance of system and to discover more details on it works on the business operations. Trainings for the system user was also conducted.

Selection and Design

This phase focuses on the selection of the platform or framework where the proposed system will be created. This includes the programming language, database and other software required to make sure that the proposed system will meet the system requirements.

This phase is directly under the supervision of the programmer. The proposed system will be designed and created using PHP web programming language along with AngularJS concepts. PHP is one of the available programming languages that can be used for developing client/ server applications. PHP can be easily integrated with the HTML tags to create dynamic pages and developed a fully functional web-based system. The combination of client side and server side scripting makes the interactivity features of the system more user-friendly and efficient. PHP is capable of handling various types of data thru the implementation of RDBMS such as MariaDB or formerly known as MySQL and the PHP can be easily connected to MySQL. These two main core tools are available from XAMPP, a free and open source cross-platform web server solution stack package development tool.

The design of the database will be based according to the formulated processes of the proposed system. This includes all the repositories of data that will be inserted/ stored within the web-based 5 registration system. And thru the use of the database, data analytics can be included for future references. The AngularJS concepts give the programmer an easy way to integrate the processes in developing a dynamic web application. It is a full-featured JavaScript framework that works to simplify the coding procedures, create a single page web apps, and support the Model View Controller (MVC) programming structure. The design phase begins with the creation of the different modules needed for the system, test and evaluate the modules for some adjustments, and integrate the different modules to complete the system and check again for some necessary adjustments. This phase will entail at least 3 months to complete the major tasks or operations up on the approval of the proposal.

TABLE 1.   PROJECT PHASE

Project Phase	Deliverables
1. Planning Letter of Acceptance Project Charter Memorandum of Agreement	Letter of Acceptance Project Charter Memorandum of Agreement
2. Requirement Analysis	Project Work Plan Signed Project Work Plan Project Development Team Time Table Milestone
3. Designing	Use Case Database/Files Interface Design Acceptance Test Plan
4. Building	Program Prototype User Requirements Validation Tested Partial System for Pilot Testing
5. Testing	Tested System System Specification Trained Users Acceptance Certificate

Table1. Project Phase

Fig. 2. Online store System Architecture

Related Plans

Listed below are the rundown of other plans which will be taking on during the period of the project as stated by this project plan:

Quality Assurance Plan

This is organized before the project is put on the execution. This is reviewed, approved and authorized by the PC Master's San Pablo City.

Features to be tested

System functionality and performance, system quality and business requirements are the features that are tested. The given requirements and the following features should be tested and meet. There should be a record of every test cases performed in the final analysis. The list of features below is not organized according to the ordered system process.

IV. Result and Discussion

In this section, the outcome of the study is presented. PC Master's Online Store system figure presents the system architecture in web and mobile platform. The web module contains registration/ accounts management, Homepage, Review, Sale, History, product management.
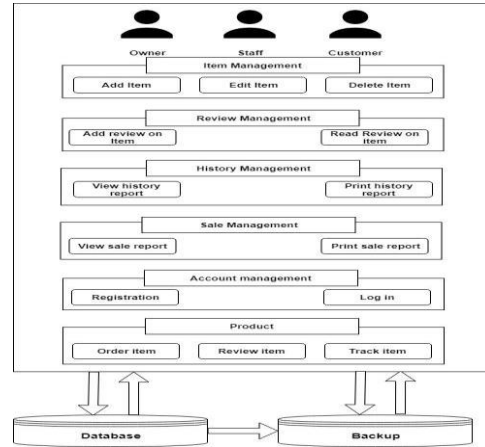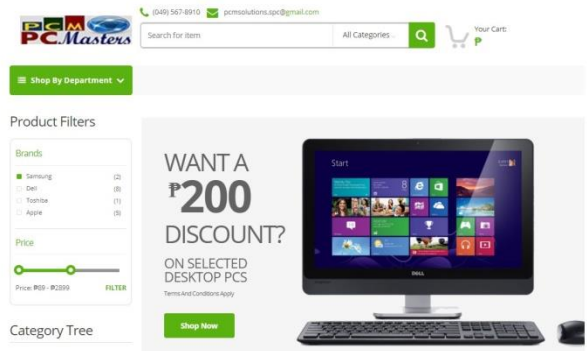
HOMEPAGE

Fig.3. Homepage

PC Master Online Store homepage offers many distinct advantages. When you visit a store, you most likely have to settle for whatever price the vendor has placed on a particular item. Not so with online shopping – you have the ability to compare prices from hundreds of different vendors. The customer can easily browse through dozens of different items to find the best price. You can do the same at a mall, but it would take about an hour or longer. It can save time and effort on the part of the customer.

ADMIN DASHBOARD

Fig. 4. Admin dashboard

Admin dashboard, this is where the owner and staff upload, edit and delete items. It gives convenience for the staff and owner to market their products. They can easily track their item inventory. It is also available that online consumers can track the order, delivery status and tracking of shipping. Another feature of the system is the sales report, messages from their customer and a graph that will show their store income. It can also give accurate sales report. It is a big help for the owner especially in their assessment of the store progress.
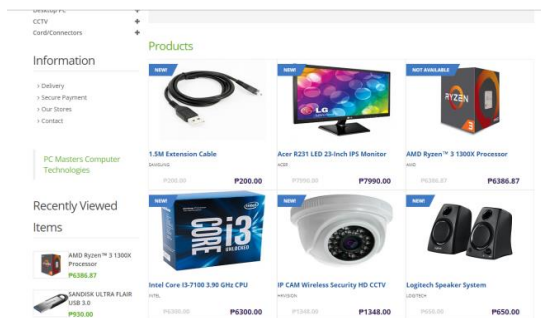
PRODUCT GALLERY

Fig.5. Product Gallery

PC Master Online stores do not have space limits and wide variety of products can be displayed on websites. Customers can browse and purchase items from the comfort of their own home or workplace. PC Master Online Store made shopping easier and convenient for the customer through the internet. Transactions can be easily canceled also.

Long queues are over, customers do not need to wait for long lines to purchase and to pay for the products. They can shop from their home or workplace and do not have to spend time traveling. The customers can also look for the products that are required by entering the keywords or using search engines.

PRODUCT DESCRIPTION

Fig. 6. Product Description

Product descriptions can provide additional benefits aside from drawing customers. You can go beyond existing marketing campaign to a whole new set of consumers who may never heard of the company or products or thought to shop online. Sometimes customizing your product descriptions is all that is needed to help your product pages show up in searches naturally. When you invest in unique descriptions for all the products you sell, you can match the tone to your own store brand. Customers experience a seamless voice from your home page through category landing pages right down to each product. You'll be more likely to build rapport with customers, which can create a point of differentiation for your store and support greater shopper loyalty.

BUSINESS ANALYTICS

Fig.7. Business Analytics

With the use of Business analytics sales report can be displayed in a nice graphical manner. This has been done to ensure that the admin will get a clear view of all the key aspects of his sales. This includes new visitors, total sales daily monthly and yearly. This data served as a guide for decision making

After developing the system, the project team led by the project manager let the client evaluate the system. They used the ISO 25010 as guide in how the system performs based on their needs. The project team let 10 persons evaluate the program including the client's staff and other persons not connected to the client just to have a balanced answer. The following are the result

TABLE 2. FUNCTIONALITY

Functionality	Weighted Mean	Interpretation
• Generates correct program outputs	4.5	Very Good
• Provides safe keeping of data	4.6	Very Good
• Provides accurate report	4.4	Very Good
• The software available all the function required for its execution	4.5	Very Good
Mean	4.5	Very Good

Table 2. Functionality

The table show the general response of the user in terms of functionality. The program generate the correct output gets a mean of 4.5 which is very good, safe keeping of data 4.6 which also very good. Accurate Report 4.4 and software available in all functions required for its execution got 4.5 which is also very good. In total it has 4.5 Functionality

TABLE 3. MAINTAINABILITY

Maintainability	Weighted Mean	Interpretation
• Easy to find Failure when it occurs	4.5	Very Good
• It easy to modify and adapt	4.4	Very Good
• Changes are easy to test	4.4	Very Good
Mean	4.4	Very Good

Table 3. Maintainability

The table show that the general responses of the general user in terms of Maintainability. Easy to find Failure when it occurs got a mean of 4.5 which is VERY GOOD, It easy to modify and adapt got 4.4 which also VERY GOOD and Changes are easy to test got 4.4 which also VERY GOOD In total it has 4.4 Mean-VERY GOOD Rating.

TABLE 4 PORTABILITY

Portability	Weighted Mean	Interpretation
• Its easy to adapt to other environment	4.5	Very Good
• Its easy to install with other environment	4.7	Very Good
• It is easy to use to replace to replace another program	4.5	Very Good
Mean	4.6	Very Good

Table 4. Portability

The table show that the general responses of the general user in terms of Portability. It's easy to adapt to other environment got a mean of 4.5 which is VERY GOOD

It's easy to install with other environment got 4.7 which also VERYGOOD and It is easy to use to replace to replace another program got 4.5 which also VERY GOOD In total it has 4.6 Mean- VERY GOOD Rating.

TABLE 6. RELIABILITY

Reliability	Weighted Mean	Interpretation
• Can the system handle encountered errors	4.4	Very Good
• The software informs user concerning invalid data entry	4.7	Very Good
• The software is capable of recovering of data if event of failure	4.4	Very Good
Mean	4.5	Very Good

Table 6. Realibility

The table show that the general responses of the general user in terms of functionality. The programs Can handled encountered errors gets a mean of 4.4 which is VERY GOOD, The software informs user concerning invalid data gets4.7 which also VERY GOOD and the software is capable of recovering of data if event of failure got 4.4 which also VERY GOOD. In total it has 4.5 Mean- VERY GOOD Rating.

TABLE 7. USABILITY

Usability	Weighted Mean	Interpretation
• Can be understood, learned, used and appear attractive to the user.	4.5	Very Good
• Provides on-screen prompts and messages that are clear and helpful to learn program creation and testing	4.4	Very Good
• Provides relevant instructional guide	4.4	Very Good
• Its easy to learn how to use	4.5	Very Good
Mean	4.4	Very Good

Table 7. Usability

The table show that the general responses of the general user in terms of usability. The programs Can be understood, learned, used and appear attractive to the user gets a mean of 4.5 which is VERY GOOD, Provides on-screen prompts and messages that are clear and helpful to learn program creation and testing gets 4.7 which also VERY GOOD and Provides relevant instructional guide got 4.4 which also VERY GOOD also Its easy to learn how to use go t4.5 In total it has 4.54 Mean- VERY GOOD Rating. Table 7 General user Response base.

TABLE 8.   EFFICIENCY

Efficiency	Weighted Mean	Interpretation
• The software respond time is appropriate	4.5	Very Good
• The software execution time is appropriate	4.5	Very Good
• The resources used are appropriate	4.4	Very Good
Mean	4.4	Very Good

Table 8. Efficiency

The table show that the general responses of the general user in terms of Efficiency. The software respond time is appropriate got a mean of 4.5 which is VERY GOOD, The software execution time is appropriate got 4.5 which also VERY GOOD and the resources used are appropriate got 4.4 which also VERY GOOD In total it has 4.4 Mean- VERY GOOD Rating.

CONCLUSION

Any entrepreneurs never find it easier to access market in many ways but technology today has broken all this ways because online business or e-commerce is open for anyone with services and products to offer to any potential customers on the internet.

Selling online can remove the need for expensive retail premises and customer-facing staff. It allows investing in better marketing and customer experience using the e-commerce site. Furthermore, online store gives a lot of perks. It gives access to the customers 24 hours a day, 7 days a week. It also improved client services through greater flexibility, less paper waste and opportunities to manage the business from anywhere at any time. However, online shopping involves risks and cautions are needed.

BI has become a vital aspect for any company due to the increased volume of data. An effective, integrated business intelligence solution can enhance business performance by driving better decision-making over the organization. With the correct business intelligence system, the company can choose when to reorder stock at the perfect time so you won't run out on exactly what you need, based on an analysis of seasonal marketing trends

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