ACE: M-COMMERCE SOLUTION USING IBM APPLICATION FRAMEWORK

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ABSTRACT

The mobile users increase day by day, so through m-Commerce, business and the market place becomes bigger for a wide range of goods and services. This study aimed to develop an Auto Cart Express application that will help the stakeholder to promote their business and offer products through the web. This study utilized the descriptive and developmental type of research along with the Rapid Application Development Life Cycle methods and the IBM Application Framework. These method and framework were used to describe, evaluate and analyze the existing system; and developed system respectively. The study shows that the results of the software evaluation earned a rating of 4.29 with an interpretation of Very Acceptable among respondents. These results indicated that the developed system was very useful in delivering quality services to the customers and at the same time, it can be used to promote different types of businesses online with a differentiating benefit of recommending hot items. This feature was highly appreciated by venture capitalist.

KEYWORDS: m-commerce, technology, mobile application

1. INTRODUCTION

M-commerce (mobile commerce) is the purchasing and offering of products and services through wireless handheld gadgets, for example, cell phone and personal digital assistants (PDAs). It gives a few favorable circumstances, for example, (1) Cover wide distance: Mobile is the main innovation which presently turned out to be fundamental for any individual in social and business life than PCs. It is easy to achieve clients through m-Commerce; (2) Consumer deals : As more clients utilize m-Commerce, there are more organizations that utilize m-Commerce site to contact them by giving diverse and better arrangements in contrast with their competitor; (3) Savings : Companies attempt to reach to the consumers straightforwardly through m-Commerce; and (4) Easy to utilize .

The center of mobile commerce rotates around the idea of getting clients, providers, and workers no matter where they are. It is something like conveying the correct data to the ideal area at the ideal period. The

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adaptability of mobile commerce was created possible through merging of the Web, enterprise applications, and wireless innovation.

North America, where individuals have a tendency to have a PC-driven perspective of the Internet, has fallen behind in utilizations of portable innovation. However, organizations here have begun to understand that they may miss business openings on the off chance that they don’t get a share of the present mobile commerce market, and they are endeavoring to get up to speed. Cell administrators, for example, Sprint PCS and Verizon now offer clients remote access to news, the climate, sports, and money related data. Also, Motorola reported that they would work on versatile trade ventures. It shows that the worldwide eagerness intended for remote advance as is quickly integrating on portable trade [3]

Moreover, in the m-commerce environment, clients as well as applications should manage through a variety of gadgets (telephones, handhelds, and telematics) that keep on shrinking in size and weight. While this accomplishes high gadget compactness, the ease of use of the gadgets can endure. Mouse and keyboards are being replaced with buttons and keypads. Smaller screens can be harder to read. Gadgets can be hard to use with just a single hand. Changing environmental conditions (brightness, noise levels, weather) can likewise influence the utilization of cell phones. Difficulty utilizing gadgets can convert into wasted time, mistakes, and client disappointment [4].

Today, the business advantage of understanding and enhancing the ease of use of remote Web interfaces—conveyed through cell phones, for example, mobile phones and PDAs—by purchasers is tremendous. The IBM Application Framework for e-business is a method of accomplishing business change and an establishment system for creating and developing e-business procedures and applications [5]. Additionally, the framework gives the environment support for business application advancement and deployment, and integrates e-business applications to make complete e-business solutions. The Framework platform is measured and empowered customers to begin with the services that address prompt issues, then to add to that as the e-business solution develops [6]. In this connection, this study developed a mobile commerce Auto Cart Express (ACE) application that can help stakeholders promote their business and offer products through the web and mobile. Specifically, it evaluated the software which was used to deliver quality services to the customers.
2. RELATED WORKS

As technology evolves, more applications are developed, and preferences increase for m-commerce. Nowadays, the online client cannot be ignored. In light of the simplicity and accommodation of web based requesting an ever increasing number of people are putting their requests online as opposed to calling them in.

This study relates to the IBM Application Framework for e-business as shown in Figure 1. This framework, as indicated by IBM, is capable, for reaching the set of open standards, services, and products that address the needs of e-business applications. The objective of the framework is to empower organizations, small and large, to rapidly and effectively construct and deploy a wide range of robust, secure, versatile, manageable, interoperable, and compact e-business applications [7]. The structure is composed of (a) Development Tools and Components; (b) Web Application Servers; and (c) Security and System Management.

![Figure 1. E-business Application Framework](image)

**Development Tools and Components (Build).** This is the primary component of the framework which manages the devices utilized in building the e-business application [8]. The quickest approach to develop an e-business function take place towards Web-empowering the current function. When there is an application which allows browsing the lists of product, take into consideration displaying it in the Internet and let the clients search it on a browser. As time come up to include highlights, you will be able to extend the read-only catalog to a shopping basket application through incorporating it using the request entry and stock administration functions.

For example, in “JLearn: An instructional environment for Java program composition integrating test-driven development and life-cycle management for software quality assurance”, development tools like Eclipse and JXPro platform, provides a software suite that integrates source editors, compilers, error analyzer, unit testing and life-cycle management tools to afford advanced software development and project management within the IDE (Hernandez, Niguidula, Caballero, et al., 2010) [9]. Moreover, research shows that development of complex multiple toolsets for software development and management results to high quality software systems requiring
specialist software engineers to bring many aspects of software development together to create top software systems titles. There is a need to simplify this process, not only for ease of development but to bring out the best ideas of outside customers to software development domain to exceed customer satisfaction (Hernandez, Niguidula, Sicat, & Lavina, 2010) [10]. Another development tools that can be used is Java, which is widely used object-oriented programming languages nowadays and it has dominated the industry [11].

**Application Server Software (Run).** This part allows you to manage applications inside the Internet server and control critical procedures, for example, database connection pooling and transaction control [12]. The data picked up from running the application be able to utilize to make future enhancements. Via precisely looking at the information gathered by e-business application, you will be able to speed up the superior comprehension whatever the clients need as well as manage the improvement of e-business application.

**Secure Network and Management Software (Manage).** This component perceives exactly how it controls load sizes, security, and administration [13]. The Internet application will be able to utilize the Lightweight Directory Access Protocol index to ensure that exclusively approved clients to access secured assets. Utilize a firewall to shield the mission-basic frameworks from irregular outside assaults. A firewall will likewise permit access to the required assets and be able to manage outbound associations thus customers will know how to be constrained from getting to particular goals and conventions. In addition, a standout amongst the most ordinarily utilized procedures in shielding information from the hands of the enemies is using cryptography [14].

Thus, this framework guides the researcher in building an m-commerce solution that will help the small businesses promote their products in mobile-based application.

3. METHODOLOGY

Research Design

In order for the researcher to develop an organized plan of study to accomplish its stated objective, a detailed outline on how the project took place was established to serve as the guideline for this undertaking.

This study utilized the descriptive-developmental type of research. Descriptive research as the type of research used to obtain information concerning the current status of a certain event. In order to acquire all pertinent information, several survey method were utilized. Such acquired data shall be treated statistically to analyze and evaluate the current condition of the system. Hence, descriptive type of research was employed because the study involves gathering, organizing, tabulating, interpreting and presenting data that were obtained from the respondents to describe the current existing system.

The developmental type of research was used to address the problem, and indicated how the system resolved the current issues on hand. This method is an orderly utilize and practical application of findings and can determine the theories of a technical description toward the development of framework design, testing,
assessment or improvement of functions to meet specific requirements of the beneficiary [15]. The descriptive type of research design utilized by the researcher was matched with a software development type of tool dubbed as Rapid Application Development that served as a guide in the creation of the software.

These two approaches are deemed appropriate and absolutely suitable for the development of the project on hand as both of these research designs complement one another. Descriptive research describes, evaluates and analyzes the existing current system and in addition it provided information on the desired functions and features of the stakeholders, while the developmental type of research was administered in order to develop an improved system in accordance with the requested requirements both functional and non-functional.

This study utilized the Rapid Application Development (RAD), as shown in Figure 2, as it limits advancement time while amplifying progress. RAD permits advancement to be precisely and immediately measured. [16]. Likewise, this study applied the IBM application Framework to rapidly and effectively construct and deploy a wide range of manageable application.

![Figure 2. Rapid Application Development Life Cycle used by researcher (Image courtesy of https://www.tutorialspoint.com/sdlc/sdlc_rad_model.htm)](Image)

Figure 2 presents the RAD life cycle. The advancement procedure started with the improvement of preparatory information prototypes and small business models including the assistance of organized systems. From that point onward, the necessities were assessed as well as the utilization of prototyping to refine the information and process models. These platforms rehashed a few circumstances and the last framework was a blend of business prerequisites and specialized outline articulation.
Business modeling. This research developed an application so that the functional and non-functional prerequisites of the business using framework can be realized.

Data modeling. This research came up with the design that includes the interface, data modeling and detailed design for the system that was interactive for the user.

Process Modeling. In this research, the categories were designed and administered for inserting, modifying, removing, or saving the data object in accordance to a process.

Application Generation. In this research, the system was completed and it was developed based on the requirements of the end-users by utilizing development tools in converting procedure and data models into actual prototypes.

Testing and Turnover. When the codes were already written, a test was made. In this phase, all components of the system were tested. The system was tested by 50 users which incorporate the store employees, selected customers and software developers. Once the application was properly integrated, it was installed to different stores according to installation and deployment plan as well-defined in the business modelling phase.

Sources of Data

In order to meet the main objective of the study, the data was carefully acquired and the sources make of utmost importance. Research managed the information that were essential to be acquired and broke it down so as to effectively address the objectives. Data indeed served as the backbone of this project. There were two main sources of data, the primary and the secondary.

The primary source of data involved the event or subject the researcher has chosen for the study. The people who were direct observers and participants in the events were chosen because of their active participation in the development of m-Commerce Auto Cart Express application.

The secondary sources of data on the other hand were data which has already been collected in written form. All pertinent scholastic materials such as internet articles, books and journal were carefully evaluated in terms of relevance and reliability prior to its usage and citations [17].
Instrumentation and Data Collection

The researcher utilized different data gathering instruments and techniques necessary to achieve the stated objectives. The researcher employed an established systematic data gathering procedure to ensure essential and accurate requirements are obtained in order to develop the system.

In this study, the developer employed questionnaires, structured interviews, observation and comprehensive document analysis to complete the study.

Structured Interview.

This is sometimes called as the standardized interview, involves the organization of an interview scheduled by an interviewer. The purpose of which is for all interviewees to be given exactly the very same set of questions.

An appointed formal conversation was conducted by the researcher to obtain reliable and valid information which is considered to be an essential element in the development of the system. The researchers clarified questions pertinent to the study as deemed necessary during the course of interview in order to elicit proper responses. Questions were presented in a manner of order of significance and introductory and concluding remarks were done so as to reduce the anxiety of the respondents that would potentially deviate the direction of the interview.

Internet Research.

This was utilized to accumulate data and study a specific subject utilizing resources published on the web. The researchers utilized this type of gathering information online and the traditional way pertinent to the study.

4. RESULTS AND DISCUSSION

The mobile commerce ACE application systems were utilized by the customer. The application was accessed using a PC and mobile devices. This application was designed to create business transaction specifically in ordering products. The application contains three modules, (1) Home, (2) Products, and (3) about.

![Figure 3. Homepage](image-url)
Figure 3 shows the home page, the front-facing website. This shows the products delivered by the establishment and as well as other information. In the homepage, the user will be able to see information such as contact details, the location of the establishment, how to get there, products offered, registration and log-in of the system.

![Home Page](image)

**Figure 4. Product Module**

Figure 4 displays different products for ordering. The customer can select from the product categories and then select check product and add to cart.

![Product Module](image)

**Figure 5. Order Module**

Figure 5 allows the admin to approve Customer

After the installation, the system was evaluated using the survey questionnaire which is ISO 9126 as an international standard for software evaluation. There were fifty (50) identified respondents which comprised of ten (10) store Employees, 30 customers and 10 software developers.
Table 1. Summary of Software Evaluation Results

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mean</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>4.33</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Reliability</td>
<td>4.27</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Usability</td>
<td>4.33</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Efficiency</td>
<td>4.25</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Maintainability</td>
<td>4.30</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Portability</td>
<td>4.27</td>
<td>Very Acceptable</td>
</tr>
<tr>
<td>Weighted Mean</td>
<td>4.29</td>
<td>Very Acceptable</td>
</tr>
</tbody>
</table>

In summary, the software evaluation indicates a strong awareness among the respondents that the application is very functional (4.33), reliable (4.27), usable (4.33), efficient (4.25), maintainable (4.30) and portable (4.27). Therefore, the software evaluation received an overall rating of 4.29 with an interpretation of Very Acceptable. These results indicated that the application can be used to promote business online.

5. CONCLUSION

This research aimed to: (a) develop a system which can help stakeholder promote their business and offer products through the mobile. This research also has additional features including (a) Recommended Products: A bar that would demonstrate the most-recommended items which would depend upon the quantity of times an item have been ordered by any clients. (b) Recent History Display the client’s available examines things in the history tab. However, this research has also some recommendations including (a) Payment Options: Add diverse instalment choices, for example, PayPal. (b) Shipping Options: Add distinctive sorts of delivery choices: standard dispatching, and speed up transportation. Subsequently, this application is exceptionally helpful and can be improved by including more capacities and adjusted illustrations.

Therefore, the use of mobile commerce ACE applications will be advantageous to business operations. This can be utilized to promote business online. It likewise offered personalized, localized and generally purpose-
appropriate services. Thus, developing a mobile app and encouraging it among the users is therefore extremely useful to promote the business.

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