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TOPIC: IMPLEMENTATION OF MOBILE ORDER APPLICATION INTEGRATED WITH GLOBAL POSITIONING SYSTEM (GPS)

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This thesis was submitted in partial fulfilment of the requirements for and Bachelor of Science Degree in Computer Science, July 2015
Approval Form
The undersigned certify that they have supervised the student Danniel Zimunyas’ dissertation
Entitled Implementation of an android mobile order book application integrated with Global
Positioning System: Case of Bindura Delta beverage submitted in Partial fulfilment of the
requirements for the Bachelor of Computer Science Honours Degree of Bindura University of
Science Education.

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DEDICATION

Special dedication from the depths of my heart goes to my dear parents Aaron and Olivia for their never ending love and supporting me in all my efforts.
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In completing this under graduate project I have been fortunate to have help, support and encouragement from many people. I would like to acknowledge them for their cooperation.

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Finally, I would like to express my gratitude to all who have directly or indirectly guided me one way or another throughout all the stages of preparing this project.
ABSTRACT
The purpose of this project is to develop an android ordering system integrated with Global Positioning System (GPS) tracking system. It is a system that enables customers of delta beverage to place their orders via android mobile application at any time and any place. The reason to develop the system is due to the issues facing by beverage industry. These issues are such as poor communications between the sales personnel and customers resulting in high sales returns or short on fall on sales products to the customers, limited promotions and quality control of fast ordering management issues. Therefore, this system enhances the speed and standardization of taking the order from the delta customers and displays it to the sales personnel accordingly. Besides that the mobile application allows the sales representatives to pin point the trucks’ real location and provides a user friendly home page and effective advertising medium to new product of the delta beverage to their respective customers with cheaper cost at the same time boost up market share for the delta beverage and increase return on investment for the investor. The structured design methodology adopts a formal step-by-step approach to the system development life cycle that moves logically from one phase to the next without overlapping. The methodology used involved system analysis, system design, system development and system testing.
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CHAPTER 1: PROBLEM IDENTIFICATION

1.1 Introduction
Information communication technology skills are essential for effective and efficient practice in strategizing business processes in many organizations (Shankar, Bartlett et al., 2008). The term mobile business, most commonly referred to as m-business refers to the use of mobile and handheld Information Technology (IT) devices, such as Personal Digital Assistants (PDAs), mobile telephones, laptops and tablet PC technologies, in practicing business processes.
Consumers today have more shopping choices than ever before with traditional retail stores and various cable television shopping opportunities, as well as the Internet (Sekely & Blakney, 1994). As smartphones become more and more ubiquitous, and the boundary between work and leisure becomes more and more blurred, the expectations of devices and what they can do are higher than they have ever been. Users are tending to use their devices for all aspects of their lives: business, personal organization, leisure activities, communication, recording and much more and make less distinction between these different activities than before. This then arises the thought to use this new dimension in business and drive it to be used to improve the performance of business processes other than just for leisure.

1.2 Background of the study
The android mobile ordering system is one of the latest services most beverages in the modern world are adopting. With this method, products are ordered online through a mobile application and delivered to the customer. This is made possible through the use of electronic payment system. Customers pay with their delta credit cards, although credit card customers can be served even before they make payment either through cash or cheque. So, the system designed in this project will enable customers go online and place their orders.

Due to the great increase in the awareness of internet and the technologies associated with it, several opportunities are coming up on mobile applications. So many businesses and companies now venture into their business with ease because of the internet. One of such business that the internet introduced is an android mobile ordering system. In today’s age many beverages companies have chosen to focus on quick preparation and speedy delivery of...
orders. Until recently, most of this delivery orders were placed over the phone (telemarketing), but there are many disadvantages to this system. It is possible for anybody to order any goods via the mobile application and have the goods delivered at their doorsteps. The main advantage of this system is that it greatly simplifies the ordering process for both the customer and the delta sales representatives. The system also greatly lightens the load on the Delta Beverage end, as the entire process of taking orders is automated. Once an order is placed on the mobile application that will be designed, it is placed into the database and then retrieved, in pretty much real-time, by a desktop application on the delta beverage end. Within this application, all items in the order are displayed, along with their corresponding options and delivery details, in a concise and easy to read manner. This allows the delta sales personnel to quickly go through the orders as they are placed and dispatch the necessary items with minimal delay and confusion. The greatest advantage of this system is its flexibility.

1.3 Statement of the Problem
As industries are fast expanding, people are seeking for more ways to purchase products with much ease and still maintain cost effectiveness. The vendors need to purchase the products in order to sell to end users. The manual method of sales person going to their sales outlets to collect data about products demand is becoming obsolete and more tasking. Delta beverage products can be ordered through the internet on a mobile application. So there is need for a wide range of publicity and enabling direct order, processing and delivering of goods on sale through mobile ordering application systems. For this system, there will be a system administrator who will have the rights to enter the menu of available products with current prevailing prices.

1.4 Research objectives
1. To design and implement an android mobile order application.

2. To access the effectiveness and convenience of using a mobile based application system at delta beverage.

3. To design a system using GPS which can be integrated with android mobile order book to allow all sales personnel to pin point the truck real location.
1.5 Significance of the Study

In view of the rapid development of computer technology in almost all the fields of operation and its use in relation to information management, it has become important to look into the development of mobile ordering system for firms to meet up with demands of the customers. Therefore, the Delta beverage ordering and delivery system will help customers and management to:

1. Advertise available products in their company
2. Reduce the workload in the present system
3. Reduce time wasted in data processing (i.e. sales personnel collecting customer orders)
4. Keep accurate record on purchased order and delivery.

1.6 Definition of terms

Mobile application also called mobile app, it is a term used to describe internet applications that run on smartphones and other mobile devices. A mobile app may be a mobile website bookmarking utility, a mobile-based instant messaging client, g-mail for mobile, and many other applications (Techopedia, 2014).

(Mechael, 2009), defines mobile computing as computing activity associated with portable computing devices and their mobile use which may be connected to other devices through a multitude of different network technologies.

((GAID), 2010) defines information and communication technologies as tools that facilitate communication, processing and transmission of information and the sharing of knowledge by electronic means.

1.7 Research Questions

1. How will the implementation of a mobile order book application at bandura delta beverage improve the business processes delivery of its products to their respective customers?
2. How will the order book application system help in the reduction of delivery returns to the deport?
3. How will the sales representatives find the implemented system useful?
4. How will the customers find the implemented system valuable to them?

1.8 Justification of the study
Through the use of ICTs and mobile computing in business “the right information can be
provided to the right person at the right place and time in a secure electronic form to optimize
the quality and efficiency of customer care delivery, research, education and knowledge.

The customers are reliably informed and have with them all the information they need as far
as placing orders to delta is concerned at the palm of their hands.

1.9 Limitations of the study
Due to time and financial constraints, the software that is developed covers only the aspect of
delta products ordering. Sometimes internet may not be available due to some problems like
internet service providers having problems with their networks.

1.10 Scope of study
The study population will consist of delta beverage customers who would have registered for
the door step delivery at their respective routes as well as the sales representatives of Bindura
delta beverage.

1.11 Chapter Summary
The introductory chapter has introduced the whole project and all the work in the following
chapters will be guided by the set aims and objectives. The aim and objectives have been
clearly outlined including the scope of this study and research methodology to be employee
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction
In order to fully understand what an ordering system is and what it offers as an I.T application in the business sector of Zimbabwe, it is worthwhile to understand some sources for the development of previous mobile online ordering systems that were designed in other places of the world, particularly focusing on beverages related ordering systems. The adoption of mobile technologies into companies frequently follows a technology driven approach without precise knowledge about the potential benefits that may be realised. Especially in larger organisations like Delta Beverages with complex business processes, a systematic procedure is required if a verifiable economic benefit is to be created by the use of mobile technologies. The identification of opportunities for cost reduction, as well as integrated I.T support for processes is increasingly coming to the fore, with technologies supporting mobility making an important contribution.

2.2 Early Development of Online ordering Systems
Self-service or self-ordering systems refer to the retail outlets taking orders from customers through applying various types of technologies such as internet and many others. The usage of the self-service or self-ordering technology is proven to benefit most of the investors.

Odesser-Torrepy (Odesser-Torpey, 2008) ordering systems started to be developed in the business sector in the 1960s and 1970s, and were typically written on a mainframe computer in the programming language based on FORTRAN scripts. Evolving from university businesses researches, they were limited to the applications developed by these research sites. Most of these ordering systems were not intended for commercial use. They incorporated the specific knowledge of the experts in business sector. The rise of the online ordering system were to help medium, small and large business operations to do single point decisions, and this was necessary to help them plan before starting to do anything on their businesses.

The mobile order systems can be used as an integrated ordering system for a specific business domain with the use of GPS tracking system. It can also provide decision support for all customers by allowing the sales personnel pinpoint of the trucks real time location. The main purpose for the rise of the mobile order system is to develop an order and delivery system for allowing all registered customers to send and receive information to provide
management decision makers (customers), and for dissemination of up-to-date delivery information in a readily accessible. By the help of the mobile order system, suppliers can produce high quality products for their market, Sharma et al 2013)

2.3 Challenges Faced In the Business Sector and Solutions Provided

Many business participants are facing problems of poor communications with their suppliers, due to various reasons that affect their day to day running of their daily sales activities. Saravanan R. (2010), (Journal of ICTs for business: Global Innovations and Experiences), says integration of new Information and Communication Technologies (ICTs) are rapidly transforming the business processes. But the major problem right now is the dissipation of information to customers on real time it has become difficult. ICT enabled systems are acting as a key agent for changing business situations and people’s lives by improving access to information and sharing of ideas.

Cassola et al (2013) points out that the demand for mobile applications into business sector is greater than ever before. The business domain infrastructure is evolving in a big way with the emergence of pluralistic IT actors and innovations to cater for the needs of the customers and the researcher wants to manage this by developing a mobile order system integrated with GPS tracking for pin pointing truck real time location. Door step delivery in the developed world has become more technologically advanced, and, as a result, the decisions that customers face are more complex (Peter Gillard, PC AI magazine, 1999). The decisions that customers face nowadays are becoming more and more complex and this is slowing down progress sometimes. The major problem is the dissipation of the relevant information on time and to the right person who knows what to do with the information given.

Bhatnagar (2006) mentioned that the problem is the form in which vital information that can be used by customers to help them in their business is kept. Gillard also states that printed notes rapidly become out of date and for these reasons they looked to a technology solution and ended up developing Paspak scripts system, an online request system designed to aid the customers at sales retailers in Tasmania in the delivery of business advices on how to perform appropriate procedures on their businesses. They used the methodology of the getting questions from customers who wished to start new businesses for different purposes, residing in different areas. Paspak was developed using a DOS based System shell called Crystal.
Gillard states that by 1997, they wanted to migrate to the Windows operating system, and searched for a product that would suit their need.

It has been widely recognised that mobile business is not just about the use of portable devices but also about doing business across contexts (Walker, 2009). Winter (2009) reconceptualised the nature of mobile business and addressed “mediated business through mobile technology” (p. 9). Pea and Maldonado (2009) used the term wireless interactive business devices or WIBD, an acronym created at International’s centre for Technology in Business to define technology that made it possible for investors to work at unique activities in ways that were previously impossible.

Peters (2007) viewed mobile business as a powerful component of the flexible business tool for interaction. In 2010, Brown summarized several definitions and terms and identified mobile business as “an extension of e-business” (Brown, 2010). Peters (2007) also stated that it was a subset of e-business, a step toward making the business process “just in time, just enough and just for me” (Peters, 2007, p. 12). Finally, Pea and Maldonado (2009) stated that mobile business incorporates “transformative innovations for business futures”.

Mobile commerce has unique technological attributes which provide positive pedagogical affordances. Pea and Maldonado (2008) summarized seven features of handheld device use within business community and beyond: “portability, small screen size, computing power (immediate starting up), diverse communication networks, a broad range of applications, data synchronization across computers and stylus input device” (p. 428). As Klopfer and Squire (2008) summarized, “portability, social interactivity, context, and individuality” (p. 95) are frequently cited affordances of mobile business. Specifically, portability is the most distinctive feature which distinguishes handheld devices from other emerging technologies, and this factor makes other technological attributes such as individuality and interactivity.

2.4 Relevant Theory to Subject Matter

Some advocates of mobile business have attempted to define and conceptualise mobile business in terms of devices and technologies; other advocates define and conceptualise it in terms of the mobility of business and in terms of the business partner’s experience of performing business with mobile devices.

The role of theory is, perhaps, a contested topic in a community that encompasses philosophical affiliations from empiricists to post structuralisms, each with different
expectations about the scope and legitimacy of their work. The mobile business community may nevertheless need the authority and credibility of some conceptual base.

(Katz, 2010), researched further looking at mobile business in a wider context, we have to recognise that mobile, personal and wireless devices are now radically transforming societal notions of discourse and knowledge and are responsible for new forms of art, employment, language, commerce, deprivation, and crime as well as business. With increased popular access to information anywhere, anytime the role of business as a whole perhaps especially formal business, is challenged and the relationships between society, business and technology are now more dynamic than ever. There are now a large number of case studies documenting trials and pilots in the public domain and have come up with some categories of mobile business.

Ambavkar et al (2013) states that mobile technologies also alter the nature of work (the driving force behind much business and most training), especially of knowledge work. Mobile technologies alter the balances between training and performance support especially for many knowledge workers. This means that ‘mobile’ is not merely a new adjective qualifying the timeless concept alongside the ‘mobile work force’ and the connected society. One can also focus on the nature of mobility in order to explore the nature of mobile business. For each individual, the nature of ‘mobility’ has a variety of connotations and these will colour conceptualisations of mobile business. It may mean doing business for example ordering or making a request to the supplier whilst traveling, driving, sitting, or walking; it may be paper-free business.

Greater savings are a main motive in drawing consumers online (Chaing and Dholakia, 2003), and ultimately easing pressure (Strauss, 2013). In addition Palmer (2007) recognises that using voucher websites is something that can easily be done, looking at many different deals, whilst browsing and shopping online. In contrast this cannot be done on the high street, they have to be printed out and taken in, meaning consumers have to be efficient and organised in their purchasing. However, the increase in smartphones has provided an opportunity for companies where there was a gap in the market. Voucher cloud have released an app, which, using GPS locates the nearest deals and discounts, this includes money off in retailers such as New Look, Top shop or H&M (Winch, 2013).

Online giants such as Amazon, with huge warehouses sell a massive array of products. These are often at lower costs, due to fewer overheads such as renting stores on every high street.
and employing staff in every store; causing economic pressure as well as consumer pressure (McLaren, 2012). In fact, high street stores employ 2.6 times more staff per £1 million than internet retailers (Sacco, 2014). This obvious benefit is an attractive prospect. Consumers can look, for example, at books in stores, and then purchase them, cheaper online, with the option of next day delivery, arriving as soon as possible. Many bookstores consider Amazon the major threat on their industry (Bosman, 2012)

Fitzsimmons (2014) contradicts other findings (Capgemini, 2013), suggesting the online/offline growth was steady until the end of November, where the high street was the biggest beneficiary. Strauss (2013) predicted 17.5 million would leave some Christmas shopping until the last minute, hoping to get Christmas Eve bargains. Eccles and Williams (2013) identified how high street stores such as Gap, Debenhams and House of Fraser tried to fight the online growth; by starting their January sales early, which did appear to attract consumers. The UK have emulated Americas Black Friday concept, where traditionally huge discounts are offered at organisations including John Lewis, Asda and Toys R Us (BBC News, 2013). Although this concept is offered both in store and online, many consumers took advantage comparing and choosing for prices.

Barnes (2013) questions the reasoning why online shopping has become so popular. Many authors (Chaing and Dholakia, 2003, Monsuwé et al., 2004 and Poulter, 2013) believe one of the key reasons is convenience. Shopping online via mobile applications offers pronounced convenience, regarding driving time, car parking, the weather, queues, product reviews and recommendations and limited inventory, all of which consumers detest on the high street (Chaing and Dholakia, 2003). Krupnik (2013) agrees retail stores simply cannot compete on inventory selection. Online retailers can have a product in stock somewhere else in the world and still get it delivered in days, whereas a store must have it on shelves there and then to ensure a purchase is made.

The community of practice cohering around mobile business may feel the need for a theory of mobile business (although in a postmodern era, the role of theory as an informing construct is under threat). Such a theory may be problematic since mobile business is inherently a 'noisy' phenomenon where context is everything. E-business has certainly gained credibility from the work of many outstanding authors. Finding similar beacons for mobile business may be more challenging and proponents of mobile business are still struggling to find a literature and rhetoric distinct from conventional 'tethered' e-business.
Mobile business is a dynamic field for innovative new services that move customer care away from public service delivery and have gained much attention recently, not only as part of consumer-oriented products and applications but also as a tool to augment business strategies and to support organisational processes (Michele L Gribbins., 2013).

Mobile application software’s and its services have proved to be versatile tools for collecting data at the point of action, potentially resulting in more accountable management of business information. Using mobile order book and applying principles of mobile computing, sales for the delta beverage can be significantly improved. Mobile computing is a generic term describing the ability to use the technology to wirelessly connect and use centrally located information and/or application software through the application of small, portable and wireless computing and communication devices (press, 2007).

Such devices come in a plethora of sizes and shapes, have widely varying computational ability and may be connected to other devices through a multitude of different network technologies. They may range from general-purpose laptop computers to specialised devices for data organisation and may be stand-alone intermittently connected or continuously connected using wireless networks (Mechael, 2009). The mobile computing tools such as wireless laptops, mobile phones and tablet computers provides easier mobility than more localised devices.

Mobile computing is the discipline for creating an information management platform which is free from partial and temporal constraints. Freedom from these constraints it allows its user to access and process desired information from anywhere in space using mobile computing platforms, information flows through wireless channels (Mechel, 2009).

The processing units (client in client/server paradigm) are free from temporal and partial constraints. That is a processing unit (client) is free to move about in the space while being connected to the server. This temporal and spatial freedom provides a powerful facility allowing users to reach the data site (site where the desired data is stored) and the processing site (the geographical location where a processing must be performed) from anywhere (Mechel, 2009).

Mobile communications through applications in business can help provide customers care more quickly and cheaply in many cases. From the demand perspective, mobile phones can make it easier and more convenient not only to find relevant information quickly but also to
capture data and engage in interactive services, such as online communication with customers. In order for the researcher to deliver a working system, must gather enough information from various clients ranging from small or medium to large scale (Information Communication Technology for Development, 2013)

The functional and structural properties of mobile phones make them attractive to the business sector in low and middle income countries. The phones most notable feature is its capacity to communicate and transfer information within both literate and illiterate populations. Its relatively low start-up cost and flexible payments plans have put the technology into the hands of significant proportion of the public community (Mechel, 2009)

For many years the mobile was excluded from the discourse on the digital divide and from e-business in developed and developing countries now, however interests in its potential is growing as wireless networks expand throughout low and middle income countries and hands sets become more sophisticated and affordable (Mechel, 2009)

In particular, the use of mobile phones has been noted in the promoting of various business processes (Mirza & Norris, 2007). So far short message services (SMS) texting has probably been the most prominent mode of delivery perhaps, according to some research, because texting is already an integral part of mobile usage culture (Gombachika and Monawe, 2011) or as specific applications that can be downloaded to a mobile device. It is within this notion that the author wants to implement a mobile order book application to be used in data collection for various customer demands by Delta Beverage Company in Zimbabwe.

A recent study estimates that mobile business reduces data collection costs by approximately 24%, costs of surveying for customer needs 25% giving the example of new products delivery to various customers (Telenor Group, 2012)

The discipline of m-business has been gaining ground as mobile device penetration rates grow rapidly, increasingly prompted by plunging hardware and usage costs, as developing world consumes adopts this accessible communication technology (Chathoth, Paddy, Boostrom, Boostrom and Louw, 2008). So with such statistics the author believes that if mobile computing is used in data collections for various requests from clients by Delta, surely their sales incomes will grow rapidly.

One of the main goals of using mobile technology in the business sector is to improve the quality and access to customer care. Because so many different factors can contribute to these
aspects of customer care, a wide variety of m-business interventions have arisen to address them (Qiang, Yamamichi, Hausman, Altman, & Miller, 2012).

The main technologies carrying m-business information are GSM, GPRS, 3G, and 4G-LTE mobile telephone networks, Wi-Fi and WiMAX computer-based technologies and Bluetooth for short range communications. These technologies operate on hardware networks that include mobile phones, mobile computers (including netbooks, tablets, and personal digital assistants), pagers, digital cameras, and remote sensors.

These software platforms are just as diverse, from open source operating systems like Linux, Google’s Android, and Nokia’s Symbian to proprietary ones like Apple’s iOS and Microsoft’s Windows Mobile. Overlaid with these operating systems are ways of capturing and processing data such as image recognition, text recognition, and text-to-speech conversion (Qiang et al., 2012). On all these foundations sit the millions of applications that have been developed for mobile devices, most of them accessible to the general public through online application stores of the world’s people were using the internet, ranging from 5.3% in Africa to 14.0% in Asia to 23.8% in Latin America and 73.4% in North America. One more dramatically, the number of global mobile phone subscribers has grown to over 3.4 billion, approximately half of the world’s population, with the greatest growth in Asia, the Middle East, and Africa (Mechel, 2009).

According to the international Telecommunication Union (ITU) by Dec 2011, Zimbabwe had about 1.4 million (12% of the population) accessing the internet. The country continues to increase its access to the World Wide Web through numerous fibre optic links linking the country to the rest of the world through international links such as the SEACOMM cable in the Indian ocean. The mobile phone communications rate was estimated at 78.5% by the postal and telecommunications Regulatory Authority of Zimbabwe by March 2012. Possible.

Above all, this mobility enables ubiquitous business in formal and informal settings by decreasing “the dependence on fixed locations for work and business and consequently change the way we work” (Peters, 2007).

(Gay, Rieger and Bennington, 2009) developed the “mobility hierarchy,” including four levels of objectives that encourage the use of mobile computers in business settings. This hierarchy presents the contrasting attributes of mobile devices. The focus of “productivity” (level 1) is content intensive, whereas the focus of collaboration and communication (level 4) is communication intensive. Level 1 aims at individual business,
and level 4 aims collaborative business by multiple users. Level 2 and 3 fall into the “middle range applications, such as personal tour guides, computer aided instruction, database activity, mobile libraries, and electronic mail.”

At this hierarchy indicates, mobile technology has two comparable attributes. Scheduling and calendar applications are useful to increase an individual’s organisational skills and self-regulative (or self-directed) business ability, whereas, real time chat and data sharing applications support communication, collaboration, and knowledge construction. This shows that consumers can consume and create information both “collectively and individually” (Koole, 2009).

Mobile business applications are distinguished from earlier information and communication systems by focusing on three characteristics: functionality, portability, and system performance and user support (McCormack, 2010).

In South Africa there’s liquor delivering application Drizzly, works like man on-demand services in which the customer downloads an app, puts in their credit card information and places the order. Drizzly delivery drivers are employees of the liquor stores. These employees get Drizzly-issued i-phones where they can keep track of inventory, see orders coming in and most importantly verify ID at the door. The company charges a delivery fee and most consumers tip the drivers. (SA press, 2007)

2.5 Why android Application and Not Any other Mobile Applications

Based on the current statistics denotes that Zimbabwe is Google’s Android country, well at least in terms of device and OS market share. According to figures from Stat Counter, for the 12 months ended September 2014 series 40 devices are still the most widely used with just under 34% of the market.

Android operating systems is still in first place in with a 53.9% hold of the mobile OS market. This is an increase from previous figures on Android use. Looking at most of the local device distributors the strong presence of new android ready devices explains this.

Distributors like Econet have been pushing Samsung, Hauwei and Zte devices with various credit facilities and local brands like GTel and Astro are also adding to the android total. Other operating system figures include Blackberry (5.4%), iOS (3.04%) and windows (1.37%). Despite its decline global relevance 46.98% of Zimbabweans use Nokia followed by “unknown devices (the numerous Chinese brand imports) with 22.31%. Samsung is used by
15.54%, RIM (Blackberry) 5.49% and apple has 3.06% market share. With such a distribution the question for application developers and start-ups is why start off with android? The figures can definitely shows that any app that is Android only excludes so many potential users.

The growth trajectory for android operating system use locally, though impressive, shows that it still has a long way to go before being the undisputed market leader or at least addressing most of the Smartphone use market, (stat counter 2015)

Figure 1: smartphone use market

2.6 Conclusion

The scale of the internet has pushed shopping boundaries, and the literature also acknowledges consumers do not focus on a single particular shopping channel including the internet, supermarkets. Therefore the forces driving consumer choice must be identified (Chaing & Dholakia, 2003) for the high street to be the most attractive shopping choice and spring back from the potential death it is facing (Barnes, 2013). Although it may be argued consumers are most driven by convenience, and therefore will shop using whichever method is most convenient or accessible at a given time (Portas, 2011).
The internet is more influential on consumers shopping habits and “new consumers are exercised by time”, with complex personal lives, vast experiences, and high demands, as well as being IT enabled (Baker, 2003, p. 34). It will always be successful at selling items that are standardised and do not have to be viewed (Monsuwé et al., 2004).
CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction
This chapter focuses on elaborating how the research was carried out (methodology), how data for the research project was collected, describes the qualitative and quantitative techniques used (questionnaires and interviews). The researcher will indicate how he implemented the mobile order book application. The chapter also takes an in depth review of the design process of the whole project giving step outline of the design procedures as they were implemented in coming up with the desired system.

Research methodology has many research dimensions and methods. The scope of research methodology is wider than research method. Methodology is the underlying principles and rules that govern a system method, on the other hand it is a systematic procedure for a set of activities.

3.2 Software Development Cycle
A waterfall model under the software development life cycle (SDLC) is the methodology used to produce the delta mobile application ordering system. In a waterfall model, each phase must be completed before the next phase can begin and there no overlapping in the phase’s. The advantage of waterfall development is that it allows for departmentalization and control. Development moves from concept, through design, implementation, testing, installation, troubleshooting and ends up at operation and maintenance. Each phase of development proceeds in strict order and also it is very simple to understand and use.

3.3 System design
The system design describes technical approaches details of the approach used to get to the solution and the implementation. The main objective of this project was to design and implement an android mobile ordering application that helps customers to order and sales personnel to pin point truck real location using Global Positioning System (GPS).

The system was used by two groups of user’s, sales personnel and delta customers in order to determine their perception towards the use of delta android ordering application on their mobile phones. The process involved sampling from the target population and then visiting each of the recipient users within the sample space to carry out an investigation.
The procedure used was as follows:

1. Randomly choose participants (sales personnel and customers) by using simple random sampling.

2. Concertizing the participants (sales personnel and customers) about the scope of the study and the relevant information about the mobile application and how it aids the ordering process.

3. Installation and configuration of the mobile ordering application program on the participants’ android mobile phones.

4. Engaging the sales personnel and customers in the whole ordering process and trying making them understand all the application what it can do which is of help in reducing the unnecessary time and errors in performing orders.

6. Administering of questionnaires.

7. Collecting of the questionnaires form the participants and performing the data analysis.

3.4 Population and Sampling frame

In this research, the target population was the delta customers registered for door step delivery and delta workers (sales personnel). The term population refers to a group of individuals from which samples are taken on which a research will be based, and in this case the population will be made up of delta clients and sales personnel of delta. A sample is defined as a finite part of a statistical population whose properties are studied to gain information about the whole population (Webster, 1985). The purpose of sampling is to draw conclusions about populations this is because taking a sample is obviously economical than taking the whole population. A sample is therefore expected to mirror the population from which it comes although a sampling error can occur.

There are two types of sampling errors which must be guarded against, and these are sampling bias, which is a tendency to favour the selection of units that have particular characteristics, and errors which are due to chance. Choosing a sample is done through a sampling strategy which is a plan set forth to be sure that the sample used in a research study represents the population from which a sample is drawn.
Table 3.0 : Research population

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta sales personnel</td>
<td>10</td>
</tr>
<tr>
<td>Delta customers</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

3.5 Experimental Design

The experiment was conducted on one group. Customers were randomly assigned to the group. The group was seeking door step delivery services at delta beverage Bindura. The researcher opted for experimental design due to the fact that the research was centred on a platform that had to be used first and then results and conclusions deduced from experiences with the system from users and system evaluators. The already existing situation of not having a mobile order book application was used as the control for the research.

3.6 Research Design

The research employed survey method, which is generally believed to give much strength in Population validity and reliability. The researcher employed a cross sectional survey in which only one route was used to represent the whole of the delivering routes. The techniques used by the researcher made it easy to collect data and also the methods enabled the researcher to gather the relevant data whilst in close contact with the respondents.

Functional requirements

These are statements of services the system should provide, how the system should react to particular inputs and how the system should behave in particular situations:

- System should be able to register all interested customers.
- System should allow the system administrator to manage customer accounts.
- System should allow the sales personnel to retrieve information about the customers instantaneously.
- System should allow customers to view her account.
- System should allow the customers to view their orders related queries.
- System should allow sales personnel to create reports on the number of customers who make orders between certain dates, number of deceased customers and number of orders between certain dates.
Non-functional requirements

- Performance requirements
- Accessibility requirements
- Availability requirements
- Security requirements
- Scalability requirements
- Deployment requirements

3.8 Development of the system

The detail below will show how the system worked.

3.8.1 Description of what happens in the mobile order system

The sales personnel logs into their account and registers new customers who needs the service. After that the customer is then able to enter into the system for their next visit. The customer is then created an account so that s/he can be able to use the mobile application. The customer will then log in into their application account and view their orders and available delta products in their stock. The delta sales personnel will also log in into their mobile application account and view orders pertaining to each customer ID. The delta sales personnel can also create reports about the number of customers who prefer for the delta door step delivery service.

3.8.2 Database design

A data model is a conceptual representation of the data structures that are required by a database. The first step in designing a database is to develop an Entity-Relation Diagram (ERD). The ERD serves as a blue print from which a relational database maybe deduced. Figure 2 shows the ERD for android ordering application. Once a user login using his/her password and account number now can view products list from delta beverage where the product has many attributes e.g. product ID, product name, quantity, amount etc. If the customer wants to order the product can add the product to the shopping basket and confirm the order by paying using delta accounts. A user can be a customer with many attributes like mobile number, user ID, address, name etc. Customer can alter changes to the list of ordered list products once the order have not yet dispatched.
Database design

Figure 2 Entity Relationship diagram
3.8.3 Data flow diagram

Below is a data flow diagram which shows how the mobile order book application was used. The steps are clearly shown in the diagram below.

![Data flow diagram](image)

Figure 3 Data flow diagram
3.9 Use case diagrams
Use-case modelling is a technique used to describe the functional requirements of a system. It makes it easier to show the functional requirements in an abstract way that can easily be understood even by the stakeholders of the system, therefore acting more like a communicating tool between the stakeholders and the developers.

3.10 Requirements specification

System users
- Sales personnel
- Customers

Table 3.1: keys to use cases

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Depiction</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="symbol.png" alt="User" /></td>
<td>User</td>
</tr>
<tr>
<td><img src="symbol.png" alt="Case uses" /></td>
<td>Case uses</td>
</tr>
<tr>
<td><img src="symbol.png" alt="System demarcation" /></td>
<td>System demarcation</td>
</tr>
<tr>
<td><img src="symbol.png" alt="Direction of flow" /></td>
<td>Direction of flow</td>
</tr>
</tbody>
</table>
Figure 3.2: Sales Person use case

Customer use case
Figure 3.2: Sales Personnel use case
Figure 3.2: login page. Here the user can sign in using user name and password. The highlight of the available products will be available with only a tap on the mobile screen.

Figure 3.3: mobile order application home page
Sales personnel can view products, customer list, account details, orders and can create new user on the users’ admin menu. Sales representative as an administrator can add or delete products that are not in the delta stock and can also add new customers into the system.

Figure 3.4: list of products. Sales representatives can add a list of available products to the system so that customers can view them.

Figure 3.4 list of registered customer
Figure 3.5: list of customer delta accounts.

The system enlists all registered delta customers with their unique accounts numbers and available amounts valued to their accounts balance.

Figure 3.6: home page for tracking trucks' location

Sales personnel can track the delta truck by entering the truck ID and date. By clicking on the go button, GPS home page is displayed and the current truck location is shown as points.

3.9 Data Collection Procedure

There are various instruments that can be used to collect data. The most popular ones being questionnaires, face-to-face interviews, telephone interviews, direct observation. In selecting the tools to use, Robson (2001:189) states the following rule of thumb:

- To find out what people do in public use direct observation.
- To find out what they do in private use interviews or questionnaires.
- To find out what they think, feel and believe use interviews, questionnaire or attitude scales.

The researcher used interviews and questionnaires as data gathering instruments both primary and secondary data were used. Data will also be analysed using percentages. This measures the proportion that a given category constitutes to the whole elements in the group.
3.11 Data Collection Instruments

For research to be carried out effectively there are instruments or tools used to collect the data. Questionnaires and interviews were used in this research in order to collect data. Delta workers and the customers completed questionnaires and sent them back and interviews were conducted with delta customers and sales personnel as well. The research utilized primary sources of data. The primary data was collected specifically for this research project being undertaken whereas secondary data was originally collected for some other purpose but was of relevance to this work.

3.11.1 Questionnaires

The data collection instrument that was used was a questionnaire which sort reviews of the respondents in the following areas:

- The use of the mobile order book application.
- Functionality of the application.

A questionnaire is a document containing questions to solicit information for appropriate analysis. Questionnaires present information in writing to respondents who in turn provide Written responses in form of one word, few words or ticks. The researcher will use the Experimental groups to fill in the questionnaire. The questionnaire was of a reasonable length. The questionnaire appeared to contain information that was interesting both to the interviewer and respondents. They contained no superfluous questions, nor any which are not practical and did not omit any item of importance. The wording was found to be simple and unambiguous and questions were arranged in the proper order. The layout of the form makes the task of recording the answers easy and facilitates editing and coding.

3.11.2 Interviews

Semi structured interviews were undertaken with representatives from bindura delta beverage Sales department (sales personnel) as well as from delta customers. The sales personnel provided the researcher with in depth and comprehensive information about the situation of how they perform their sales to various clients especially the door step delivery in general. The researcher used qualitative methodology skills to sum up all the data obtained during these interviews about the system usage and acceptance. The interviews were constituted of both open ended questions as well as closed ended questions. Open ended questions enabled the researcher to get a very good idea of the variety of ideas and feelings people had over the application. It enabled the respondents to think and talk for long and show their feelings and
views more fully. Closed ended questions were used for asking and for receiving answers about fixed facts. They did not require speculation and they tended to produce short answers. I asked different questions in the interviews and most of the questions were obtained from the questionnaires. Researcher conducted individual and group interviews and this helped in coming up with authentic and reliable results.

3.11.3 Secondary Data
The secondary data sources that the researcher utilized included written documents such as Delta Sales invoices reports, newspapers and magazines and other relevant documents. The following were advantages the researcher potentially enjoyed as a result of the use of secondary data. There was some realization of enormous savings on resources such as time and money due to the use of secondary data. The method provided for the use unobtrusive measure since the data had already been collected. So the researcher was given the secondary data by the delta sales personnel and this included the number of customers who prefer door step delivery before the implementation of the mobile order system.

The reports the researcher was given showed the following:

i. How many new customers have made calls or visiting in person asking for orders at a certain period of time for example a month?

ii. How many of those new customers are coming frequently so that they may be categorized as loyal customers.

iii. The rate at which customers returns back to the delta beverage.

The data that was utilized, which had already been collected made it feasible to undertake longitudinal studies as well as comparable research. The analysis that employed the use of secondary data which lead to unforeseen discoveries that could not have been made by the use of primary sources only.

3.12 System development tools
3.12.1 JavaScript
JavaScript is a scripting language produced by Netscape for use within HTML Web pages. JavaScript is loosely based on Java and it is built into all the major modern browsers. JavaScript is a lightweight, interpreted programming language with object-oriented capabilities that allows you to build interactivity into otherwise static HTML pages. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers. JavaScript was used for client side validation of the system.
3.12.2 SQL Server
Microsoft SQL Server is a relational database management system developed by Microsoft. As a database, it is a software product whose primary function is to store and retrieve data as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet). There are at least a dozen different editions of Microsoft SQL Server aimed at different audiences and for workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users. Its primary query languages are T-SQL and ANSI SQL.

3.12.3 Android SDK
The Android SDK (software development kit) is a set of development tools used to develop applications for Android platform. The Android SDK includes the following:

- Required libraries
- Debugger
- An emulator

Android is a great platform to develop for particularly as a first-time developer. It is probably one of the most developer-friendly platforms out there, and as a result, it boasts a thriving developer community. It is all because Android is, as Google puts it, an open ecosystem. That means the source code is available to the general public. Developers are free to access whatever sections of the Android code they might need for their application, through the Android Software Development Kit.

3.12.4 ASP.net
Active Server Page.NET is a server-side Web application framework designed for Web development to produce dynamic Web pages. It was developed by Microsoft to allow programmers to build dynamic web sites, web applications and web services. It was used to develop the web platform as well. Its advantage is that ASP.NET is not limited to script languages, it allows you to make use of .NET languages like C#, J#, VB and others. It allows developers to build very compelling applications by making use of Visual Studio, the development tool provided by Microsoft. ASP.NET is purely server-side technology. It is built on a common language runtime that can be used on any Windows server to host powerful ASP.NET web sites and technologies.
3.12.5 C sharp programming language

C# is a modern, general-purpose, object-oriented programming language developed by Microsoft and approved by Ecma and ISO. C# was developed during the development of .Net Framework. C# is designed for Common Language Infrastructure (CLI), which consists of the executable code and runtime environment that allows use of various high-level languages to be used on different computer platforms and architectures. C sharp was used to develop the web platform.

3.12.6 Java

Java is a high-level programming language originally developed by Sun Microsystems and released in 1995. Java runs on a variety of platforms, such as Windows, Mac OS, and the various versions of UNIX. Java was used to develop the mobile application.

3.12.7 Google Maps API

According to its website, the Google Maps API is “a free service that lets you embed Google Maps in your freely accessible web pages or mobile apps” The API serves as a way of allowing developers to quickly access information provided by Google without having to manually go to the site and deal with the user interface.

3.12.8 Internet Information Services (IIS)

IIS is a set of Internet based services for Windows machines. Originally supplied as part of the Option Pack for Windows NT, they were subsequently integrated with Windows 2000 and Windows Server 2003). The current (Windows 2003) version is IIS 6.0 and includes servers for FTP (a software standard for transferring computer files between machines with widely different operating systems), SMTP (Simple Mail Transfer Protocol, is the de facto standard for email transmission across the Internet) and HTTP/HTTPS (is the secure version of HTTP, the communication protocol of the World Wide Web).

3.13 Chapter Summary

Each and every aspect of the design of the project showing how each outcome of the project was produced was discussed in this chapter. The chapter was focused at the design of the system using JavaScript, ASP.Net, Android SDK, C Sharp and Java describing the use of each in detail and how they are related in coming up with this functional system. All the...
aspects that were mentioned earlier on in the scope of the project were covered in order to fulfill the aim and objectives of this project. The results will be displayed in chapter four.
CHAPTER 4: DATA PRESENTATION ANALYSIS AND INTERPRETATION

4.1 Introduction
In this part of the literature, the researcher will focus on the presentation, analysis and interpretation of data obtained. This analysis will aid the researcher in concluding on whether the mobile order application system had an impact on communication at Delta beverage. 30 customers and 10 sales personnel from Delta participated in the data collection procedure.

4.2 Questionnaire Results Presentation and Analysis
This section is dedicated to the analysis of the main data gathering tool which was utilised by the author, questionnaires. This covers the system’s performance and gives a guide to what the clients will get out of the system. It also highlights the system’s capabilities to all the stakeholders. The response rate results are tabulated below showing the quantity of questionnaires responded as illustrated in table 4.1 below of the thirty and ten questionnaires sent to Delta customers and sales personnel respectively.

<table>
<thead>
<tr>
<th>TARGET GROUP</th>
<th>QUESTIONNAIRES DISTRIBUTED</th>
<th>RESPONSES RECEIVED</th>
<th>RESPONSE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta sales personnel</td>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Customers</td>
<td>30</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2.1: Mobile phone availability distribution
The research has been designed such that, mobile order and tracking system will use the mobile phone as a primary source of communication mechanism. Firstly in this section the researcher provides information about data of how many customers actually had Android OS based mobile phones which can be used in the system.
### Table 1.2 Customer in possession of mobile phones

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>i do not own any phone</td>
<td>7</td>
<td>23.3</td>
<td>23.3</td>
<td>23.3</td>
</tr>
<tr>
<td>i have phone supports android applications</td>
<td>17</td>
<td>56.7</td>
<td>56.7</td>
<td>80.0</td>
</tr>
<tr>
<td>i do have phone but do not support android applications</td>
<td>5</td>
<td>16.7</td>
<td>16.7</td>
<td>96.7</td>
</tr>
<tr>
<td>other</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4.2 Frequency of customers having mobile phones
Figure 4.1 frequency of having mobile phones

It was noted that of the 30 customers who responded, the majority of them had android OS based mobile phones. A total 80.64% indicated they were in possession of android mobile phones. Of this 80.64%, 61.29% indicated that they do not have android based OS phones while 19.35% stated that they do not owns any phone. 3.23% indicated reasons other those previously stated. It should be noted that the higher percentage of customers had android OS based mobile phones. This was essential because it showed the feasibility of implementing a mobile order application.

4.2.3 Delta sales personnel questionnaire response and analysis

This section is dedicated to the analysis of the delta sales personnel questionnaires results. Each question is treated separately and an analysis table with graphical presentation are done.

**Question 1:** Do you think the android mobile order system application is useful to the situation at the beverage company.

**Table 2.3:** Usefulness of system at the delta beverage
These results reflect that there was a positive improvement on the delta services to its respective clients as the application made it easy to get in touch with all its customers using an effective method at lower cost.

**Question 3: Did the system improve data collection and recording at the delta beverage**

This was an important question as it revealed whether the system improved data handling at the Delta beverage company which makes it easy to manage information of client.

**Table 3.4 improvement in data collection and recoding at the beverage**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid yes</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As shown in **table 4.4** and also illustrated in **figure 4.2** a larger portion of the respondents saw an improvement in data collection and recording at the delta beverage which they attributed to the proper use of the application.
Figure 4.2: results on improvement in data collection and recording at the delta beverage.

Question 4: Did the application make it easy to get in contact with your customers

In this question, 80% of the respondents were of that idea that the application made it easy whilst 20% said that the application did not make it easy to contact customers. The results are summarized in table 4.5 below

Table 4.5 Easy to get in contact with your customers using the application

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid yes</td>
<td>8</td>
<td>80.0</td>
<td>80.0</td>
<td>80.0</td>
</tr>
<tr>
<td>no</td>
<td>2</td>
<td>20.0</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The results revealed that the mobile order application improves communication between the sales representatives and the delta customers as they were using the system to retrieve orders and send orders only by a single tap on the mobile application.
Figure: 4.3 Results on how easy the system helps in getting contact with your customers using the mobile order application

Question 5: Do you think if the system is used correctly over a period of time, it can help in lowering sales returns or short on fall of products to be supplied to the customers?

The responses to this question proved that the respondents thought that if the system will be used in Zimbabwe over a period of time, it will have a positive impact on sales returns or minimise the shortage of products on delivery by the truck. The results to this question are shown in table 4.6 and figure below.

Table 4.6: Can the system help in lowering sales returns to the depot or short on fall of the products on demand in the marketing field in Zimbabwe?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>yes</td>
<td>7</td>
<td>70.0</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>3</td>
<td>30.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Figure 4.4: Can the system help in lowering sales returns to the depot or short on fall of the products on demand in the marketing field in Zimbabwe.

Question 7: How do you rate the application?

On rating the application, it can be seen that most respondents liked the application as half of them said its excellent, 20% said its very good and the final 30% said its good. None of them gave it a poor rating showing that the development was a success. The results are shown in Table 4.6 and Figure 4.4

Table 4.7 application rating

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid good</td>
<td>3</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>very good</td>
<td>2</td>
<td>20.0</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>excellent</td>
<td>5</td>
<td>50.0</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.5: application rating

4.2.3 Delta customer Questionnaire response and analysis

This section is dedicated to the analysis and presentation of the response to the delta customer’s questionnaire.

Question 2: Did the use of the system improve your ordering process?

It was realised that the system has a positive improvement on ordering various products from delta. This is tabulated in table 4.8 below and Figure 4.6 also shows the same results.

Table 4.8 system’s positive improvement on ordering various products from delta

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid yes</td>
<td>24</td>
<td>80.0</td>
<td>80.0</td>
<td>80.0</td>
</tr>
<tr>
<td>no</td>
<td>6</td>
<td>20.0</td>
<td>20.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.6: systems' positive improvement on ordering various products from delta beverage

Question 4: Was the system effective in improving communication with the sales personnel when in need.

The system proved to be effective in improving the communication between the delta sales personnel and customers as 80 % of the sample population(24 customers) gives a thumps up on how the system improves communication between the counterparts as compared to 20% of the whole sampled population(6 customers).

Table 4.9: system effectiveness in improving communication with delta sales personnel

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>disagree</td>
<td>3</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>not sure</td>
<td>4</td>
<td>13.3</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>agree</td>
<td>8</td>
<td>26.7</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>strongly agree</td>
<td>15</td>
<td>50.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Question 5: Do you think if the system is used correctly over a period of time, it can help in increasing your sales mark-ups for all delta clients?

The responses to this question proved that the respondents realised the importance of the system so that if the system will be used in Zimbabwe business sector over a period of time, it will have a positive impact in increasing various sales mark-ups of delta products by digitalising the ordering procedure since there will be improved interaction between the sales personnel management and delta.

Table 4.10: System can help in increasing your sales mark-ups or turnover on sold delta products?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid yes</td>
<td>22</td>
<td>73.3</td>
<td>73.3</td>
<td>73.3</td>
</tr>
<tr>
<td>no</td>
<td>8</td>
<td>26.7</td>
<td>26.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Figure 4.8: shows the results on how the system can help in increasing your sales mark-ups or turnover on sold delta products

Question 9: How would you rate the application?

As reflected by the results in table 4.11 below, the application was highly rated by the delta customers which is a thump of rule to digitise ordering procedures at delta and also shows that the application’s functionality was up to work so it will help in services speed-ups.

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>poor</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>good</td>
<td>7</td>
<td>23.3</td>
<td>23.3</td>
<td>26.7</td>
</tr>
<tr>
<td>very good</td>
<td>8</td>
<td>26.7</td>
<td>26.7</td>
<td>53.3</td>
</tr>
<tr>
<td>excellent</td>
<td>14</td>
<td>46.7</td>
<td>46.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
4.3 Interviews Findings
The researcher also performed interviews with selected individuals from the sales department as well as customers. The findings the researcher came up with after the interview with 6 delta sales personnel was that the system really played a significant role in minimising errors and reducing the guess working in delivering delta products to various clients.

The interview with customers also helped the researcher to evaluate the effectiveness of the system. The researcher deduced that the system really helped in allowing customers to communicate effectively in real time in performing their orders and various queries.

The researcher using qualitative analytical skills came up with the conclusion that to a greater extent the system was effective and helpful in the ordering and tracking of truck location for any statistical reasons by the sales personnel.

4.4 Secondary data results
Statistics of sales delivery returns (orders) to the depot from January to May 2015.
Table 4.12  statistics on sales returns to the depot

<table>
<thead>
<tr>
<th>month</th>
<th>Number of sales returns(orders) 0 to the depot from delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>79</td>
</tr>
<tr>
<td>February</td>
<td>57</td>
</tr>
<tr>
<td>March</td>
<td>32</td>
</tr>
<tr>
<td>April</td>
<td>15</td>
</tr>
<tr>
<td>May</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 4.10: Statistics on Sales returns to the depot

Basing on the results shown from the graph the number of sales returns to the depot was very high from January to march before the implementation of the mobile order application at delta beverage bandura. But from the month of April and May the graph showed great decrease in number of requested orders returned to the depot from delivery to various clients.

On the other hand the factors that triggered sales returns back to the depot could be that in the month of April it was Easter holidays where the demand for delta products will be very high but in the month of May i safely conclude that the mobile order application system helped a lot in reducing delivery returns to the depot.
Computational time

CPU time (or process time) is the amount of time for which a central processing unit (CPU) was used for processing instructions of a computer program or operating system, as opposed to, for example, waiting for input/output (I/O) operations or entering low-power (idle) mode.

\[
\text{Computational time} = \frac{\text{average period of background task with no load}}{\text{Average period of background task with some load}} \times 100
\]

Computational time to receive orders from various customers is shown in the table below

**Table 4 system time response in receiving orders.**

<table>
<thead>
<tr>
<th>Month</th>
<th>Time taken to receive orders from customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>940ms</td>
</tr>
<tr>
<td>May</td>
<td>970ms</td>
</tr>
</tbody>
</table>

From the table above the computational time which was taken for receiving orders from the mobile order application system were 940ms in the month of April and 970ms in the month of May which shows that the computational time was fast and this leads to fast system response.

4.5 Summary of Research Findings

All the important data and information about the system as it came out in the research has been presented in the vivid pictorial way of graphs, tables and diagrams. The system results show that the system was performing as anticipated and met the requirements of the project aim thereby fulfilling the objectives. The next chapter looks at the summary of research, findings and recommendations. The summary highlights the main aims of the study, conclusions are the findings of the study and recommendations are suggestions for solving the problems identified.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter will outline the conclusions drawn from the project as well as the recommendations of the implementation and smooth running of the android mobile order book system at delta beverage Bindura. The conclusion will append the work of this project by just comparing the outcome of this project that is the system and compare with the aim and objectives of this project to check whether they were met. These will give an insight to all stakeholders on what could be expected out of this system and also areas that may need further attention to make the system more efficient and for future development which were beyond the scope of this project.

5.2 Aims and Objectives Realization
The aim of the project was to develop an android mobile order book application using principles of user centred design so as to accommodate all stakeholders to be used at delta beverage for ordering various products and also to be used to pin point truck in real location by the sales personnel. It facilitated communication between customers registered at bandura delta beverage and the sales personnel.

The researcher implemented the mobile application and it was also tested to the customers and the sales personnel (users) where the majority of the end users liked the system as they were familiarising with it. The set objectives were achieved satisfactorily to a larger extent and these objectives were to:

- Develop a mobile order book application to assist in reducing the percentage rate of sales returns to the depot from delivery.
- Information flow between customers and sales personnel was improved as shown by improved markets on delta products.
- Sales representatives were able pin point delivery truck in real location for auditing purposes.

5.3 Challenges
The most common challenge faced was that at times different Internet Service Providers (ISP) can have their network down and therefore the customers as well as the delta sales
personnel could not access the application as the application uses internet to function but this did not affect the functionality of the system since not all ISPs could go down at the same time.

Another challenge faced was that some customers in the sample size did not have android Phones therefore the researcher had to look for a sponsor to get the phones to be used by the Customers during the course of the research. The waterfall model was the best model for this research because the requirements were well understood hence the waterfall model was ideal for this research.

5.4 Recommendations
This sub section gives some recommendations to the system administrators, system users and all other individuals who will participate either in the use of the system as to how best the system can be used. The following recommendations are not exhaustive but just help in utilising the developed system and some of them will be useful in further improving the system. Though the system has been made to be user friendly and as easy as possible, it is known that for any meaningful computer based information management to be integrated into any organization, proper training and orientation has to be given both to the staff and management. Proper training should be given to the data entry staff on how to handle the computer hardware especially during backup processes. In particular, electronic storage media are usually sensitive to change in temperature or pressure and as such, data can be lost very easily. The staff should also be highlighted on the need and advantage of the system and how it will equally assist them in their various field of work. They should also be informed of the cost of maintaining this new system so that they will handle it with all carefulness.

Training materials should not be presented in formal way but with procedures like policies and form etc., they should be circulated to the personnel. This will at the end generate appreciation and needed interest to operate the system.

The development of the System and Database Maintenance Plan is of paramount importance however it could not be covered in this project but will be left out for further study. System diagnostic tools such as user support, helpdesk, problem management, configuration management which could not be covered because of time constraints will also be dealt with in the future works.
The use of online chats where there will be direct and instantaneous contact with the sales personnel was also realised to be of interest as it serves on critical conditions however it could not be accommodated in this project so will be dealt with in the future.

5.5 Conclusions
The conclusion that can be drawn from this work is that the project was a success to a larger extent as it managed to fulfil all of its objectives and the aim that is the system was designed and developed as per the set goals. The system which was made can also be adjusted and be used in other business sectors such as the management of products from the manufacturing process until the product is delivered to reciprocal clients.
6.0 REFERENCES


5.6APPENDICES

5.6.1 Questionnaire for Sales Representatives

Dear Sir/Madam

I am an undergraduate student at Bindura University of Science Education currently doing Computer Science. I am undertaking a research project to develop an android mobile Order book application system. I am carrying out a survey on the effectiveness of the system on collecting various orders from customers. To this end I kindly request to conduct an interview with you in order to complete the following short questionnaire which should not take longer than 5 minutes of your time. If it is not possible to meet the questionnaire it can be completed using the following ways:

i) I can conduct a telephone interview

ii) You can complete the questionnaire and I come to collect if from you.

iii) You can complete the questionnaire and send it by email.

Your participation in this survey is entirely voluntary. Please do not enter your name or contact details on the questionnaire. It remains anonymous. Information provided by you remains confidential and will be reported in summary format only.

If you have any queries or comments regarding this survey, you are welcome to use the following contacts:

Danniel Zimunya (Researcher): Cell 0773 607 765, Email:dannielzimunya3@gmail.com

Mr H Chikwiriro (Supervisor) cell: 07125245500

Yours sincerely

Chief

Application Usability and Effectiveness Evaluation Questionnaire (Delta Sales Representatives)

Tick or check where appropriate.

1. Do you think the mobile order application is useful in the situation of ordering at the delta beverage?

Yes [ ] No [ ]
2. Do you see the importance of having such a system at Bindura delta beverage?

Yes ☐  No ☐

For questions 3 to 6 the answers are rated from 1 to 5 to show the level at which you disagree or agree with the statement. 1 means you strongly disagree, 2 means you disagree, 3 means you are unsure, 4 means you agree and 5 means you strongly agree.

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Was the system user friendly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Did the system improve data collection and recording of products on demand in the field</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Was the system helpful in the retrieval of customer information and records</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Did you find the application resourceful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Do you think if the mobile order book application system is used correctly over a period of time, it can help in improving delta products sales by delivering only the requested orders and reduces products returns to the depot?

Yes ☐  No ☐

8. Would you recommend the system to other delta beverage companies in Zimbabwe?

Yes ☐  No ☐
For questions 9 to 11 the answers are rated from 1 to 5 to show the level at which you disagree or agree with the statement. 1 means you strongly disagree, 2 means you disagree, 3 means you are unsure, 4 means you agree and 5 means you strongly agree.

9. Would you want to communicate with your customers using
   i. Mobile order application
   ii. Telephone
   iii. Fax
   iv. Letters
   v. Any other (specify)………………………………………………………………………

11. What major short comings do you see in implementing the system in the whole organizations of beverages
   i. Literacy levels
   ii. Availability of compatible phones
   iii. internet and availability
   iv. Any other (specify)…………………………………………………………………………

For questions 12 and 13 the answers are rated from 1 to 4 to show the level at which you Rate the statement.

12. How would you rate the application?
13. How would you rate the cost effectiveness of using the application in service delivery?
5.6.2 Questionnaire for delta customers

My name is Danniel Zimunya a final year BSc (Hons) Computer Science student at Bindura University of Science Education (BUSE). I am doing my research on “developing an android mobile order application: case study of Bindura delta beverage”. May you kindly assist by faithfully responding to the following questions to help in coming up with results for my research. This questionnaire seeks to find out how the mobile application was useful in ordering various products. The information given will be treated as confidential and used for academic purposes ONLY.

You can respond to the following questions by ticking in the appropriate box that best represents your opinion and use the space provided to give all the relevant information.

Application usability and Effectiveness Evaluation Questionnaire (Customer)

Tick or check where appropriate.

1. Do you think the mobile order application is useful in the situation of ordering at the delta beverage

   Yes ☐  No ☐

2. Did the use of the system improve your sales mark-ups?

   Yes ☐  No ☐
For questions 3 to 6 the answers are rated from 1 to 5 to show the level at which you disagree or agree with the statement. 1 means you strongly disagree, 2 means you disagree, 3 means you are unsure, 4 mean you agree and 5 mean you strongly agree.

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Was the system user friendly?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Was the system effective in improving your communications with the sales personnel when in need?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Was the system helpful in the retrieval of products in stock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Did you find the application resourceful?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Did the application save your time in visiting or calling the sales personnel when pursuing an order?

Yes □ No □

8. Did you see the importance of having such a system at the delta beverage Bindura?

Yes □ No □

9. Do you think the system will improve service in delivering of ordered products in the commercial Sector as a whole if implemented in other delta beverages in Zimbabwe?

Yes □ No □

Can you briefly explain below (specify)

............................................................................................................................................................................................
............................................................................................................................................................................................
For questions 10 and 11 the answers are rated from 1 to 5 to show the level at which you disagree or agree with the statement. 1 means you strongly disagree, 2 means you disagree, 3 means you are unsure, 4 means you agree and 5 means you strongly agree.

10. Would you want to communicate with your customers using
   i. Mobile order application
   ii. Telephone
   iii. Fax
   iv. Letters
   V. Any other

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
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<td></td>
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<tr>
<td>ii.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. What major shortcomings do you see in implementing the system in the whole organizations of beverages
   i. Literacy levels
   ii. Availability of compatible phones
   iii. Internet and availability
   iv. Any other (specify)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td></td>
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<tr>
<td>ii.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For questions 12 and 15 the answers are rated from 1 to 4 to show the level at which you rate the statement. The rating increases from 1 up to 4. 1 means poor, 2 means good, 3 means very good and 4 means excellent.

12. How would you rate the application?
13. How would you rate the cost effectiveness of using the application in service delivery?
14. How would you rate the internet coverage in the area you stay?
15. Did you find the question and answer section in the application helpful?

Comments……………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………