

CAPSTONE

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Chapter I

Introduction

The COVID-19 pandemic had brought so much change in our society. Handshakes, goodbye kisses, and hugs are things in the past. Today, we are already in the new normal wherein mandatory wearing of facemask and social distancing is highly encouraged. Classes in the classroom setting has been shut, and the labor sector has been minimized to mitigate the virus and decrease its spread. As a result, online classes and work from the home scheme have been exercised (Li and Lalani, 2020).

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To limit the spread of coronavirus disease 2019, commonly known as (COVID-19) in the Philippines, lockdowns, officially characterized as "community quarantine" by the government and varying strictness, were imposed in numerous parts of the country. The "enhanced community quarantine" (ECQ) is the strictest of such measures. Additionally, the island of Luzon in the Philippines was the first to implement this type of lockdown to battle the growing number of coronavirus cases as according to an IATF Resolution No.12 Series of 2020. Localities under an enhanced community quarantine (ECQ) are generally ordered to stay at home, with their residents restricted from traveling to other cities or barangays. Barangay governments can issue quarantine passes allowing residents to buy essential goods outside curfew hours and within the issuing barangays' jurisdiction (Esguerra, 2020).

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As people have embraced social distancing as a way to slow the spread of the pandemic, there has naturally been a drop-off in brick-and-mortar shopping. That would seem to mean there would likely be an increase in online shopping as people turn to ecommerce to purchase the items they might have otherwise purchased in person. According to Rakuten Intelligence, online order volume from full-assortment grocery merchants rose substantially from March 12, 2020, through March 15, 2020, compared with the same period a year earlier. Rakuten Intelligence tracks emailed customer receipts to collect and catalog item-level purchase details from a panel made up of millions of shoppers.

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Looking back at **the** past, online shopping in the Philippines was not been highly recognized in the early decades of the 21st century, not until the Multiply website brought e-commerce into the mainstream fore. "Multiply shopping" became such a huge part of the site, with more than 90 thousand merchants in 2011, that it eventually shifted to a full e-commerce website. At that time, the Philippines was **the** largest and fastest-growing market for Multiply. Fast forward to the present; e-commerce has grown and evolved in many ways. In 2015, there were already 44.2 million active Internet users and 47 million active Facebook accounts in the Philippines (Reyes,2016).

With the pandemic, it was revealed that 64% of Filipino internet users are spending more time on social media and with 23% indicating increased activity in their online shopping activity. Consumers are resorting more to online shopping amid pandemic restrictions, and entrepreneurs also have embraced the digital phenomenon for online shopping even more. E-commerce websites such as Lazada and Shopee are at the forefront of these online shopping platforms. Technology has already transformed online business transactions into an infinite marketplace **were** conducting business has become more convenient and efficient for both vendors and vendees. The COVID-19 pandemic has made this marketplace a more obvious necessity (Arreola,2020).

As localities in different parts of the country are placed under varying degrees of community quarantine to prevent more infections of the new coronavirus disease (COVID-19), peoples' access to food has been curtailed. To help ease the situation, many local governments are rediscovering the magic of mobile peddling, which, different LGU's took the initiative **to lessen** people's need to leave their homes to buy food. One of these steps is the launching of "mobile palengke". Through this, the city government is sending cargo trucks with market goods to sell around the city. The first to implement this kind of idea was the city government of Pasig City and was followed by other LGU's like Valenzuela City and Mindanao areas (Umali,2020).

Moreover, different marketplaces also have been greatly used online for purchasing foods and essential goods in the Philippines. In the food marketplace



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sector, Food Panda is widely known locally for its service that allows users to select from local restaurants and place orders via its mobile applications and its websites (Shona,2016). Using this app, people don't need to go outside to taste the food they love in their favorite restaurants. Instead, they can satisfy their cravings via takeout and delivery services. Meanwhile, when buying essential goods and needs, GrabMart offers on-demand everyday goods delivery service within Metro Manila areas. With these apps, people can shop for groceries, packaged food, healthcare products, beauty products, gifts, and many more via the Grab app and have them delivered to the customer within 30 minutes (Sison,2020).

In Tacloban City, buying foods and essential goods became a struggle and time-consuming during this pandemic. People's movement has been minimized, and going to the market has not been easy because of limited transportation. Shoppers must comply with the health safety protocol requirements like scanning personal QR codes at the entry point. Another is maintaining social distancing. Moreover, hopping from one store to another when buying some essential goods has also become a complete task for shoppers. With this problem, the proponents took the opportunity to develop a mobile application that can connect local market vendors and buyers. Having this will help the residents around Tacloban City to purchase essential goods online and will limit the need to go to Tacloban Public Market physically.

Project Context

The enormous growth of mobile usage has brought a lot of promising opportunities for the business industries. Mobile devices solidify new retail experience from bricks-and-mortar to the ease of click-to-order. More consumers rely on mobile to make purchases. It has become a powerful tool for retailers to increase sales, conversions, and loyalty as well as track and mine consumer data for targeted marketing. Mobile devices are all about convenience; consumers can do more than making a purchase. In fact, they have the capacity to compare prices, find retail locations, read reviews and ratings (Eckert, 2017).

The researchers conducted a descriptive survey through the use of google forms. In conducting the survey, the researchers used purposive sampling. The survey



was answered by 30 random buyers or shoppers residing in the city. Based on the result, 25 out of 30 answered that they usually shop or buy their essentials needs in the Tacloban Public Market (palengke). Along with this, most of them state that they usually buy food and essential goods every day and every week. Meanwhile, they state that buying these essential goods for their home is time-consuming and a tough job during this height of the pandemic, plus the problem in transportation becomes an additional for them. With this current situation, most of the respondents suggest having an online market app. Their reason is that with this app, the hassle given by going to market will be less, and they can ensure their safety at home against the virus. Furthermore, based on the result of the survey, the researchers propose a system, namely "TacMart: A Hybrid Online Market App for Tacloban City". It is a system that can be accessed through the web and at the same time can be used as an application in android phones. The application will enable local market vendors to sell their products online by registering through the app and creating a virtual store. Meanwhile, buyers can also order this product by using the app or web. After making an order, the product will be prepared by the seller, and a rider will pick it up. Within 30 mins, the rider will deliver this product/s to the buyer and receives the payment.

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Theoretical Framework

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists.

In making the proposed system, this study will be anchored on the theory of Radack (2009), which is the **System Development Life Cycle (SDLC)** theory, also referred to as the application development life-cycle, is a process for planning, creating, testing, and deploying an information system. The systems development life cycle concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both. There are



usually six stages in this cycle: requirement analysis, design, development and testing, implementation, documentation, and evaluation.

Phases of System Development Life Cycle

1 Planning—This is the first phase in the systems development process. It identifies whether or not there is a need for a new system to achieve a business's strategic objectives. This is a preliminary plan (or a feasibility study) for a company's business initiative to acquire the resources to build on an infrastructure to modify or improve a service. The company might be trying to meet or exceed expectations for their employees, customers, and stakeholders too. The purpose of this step is to find out the scope of the problem and determine solutions. Resources, costs, time, benefits, and other items should be considered at this stage.

Systems Analysis and Requirements -The second phase is where businesses will work on the source of their problem or the need for a change. In the event of a problem, possible solutions are submitted and analyzed to identify the best fit for the ultimate goal(s) of the project. This is where teams consider the functional requirements of the project or solution. It is also where system analysis takes place—or analyzing the needs of the end-users to ensure the new system can meet their expectations. Systems analysis is vital in determining what a business's needs are, as well as how they can be met, who will be responsible for individual pieces of the project, and what sort of timeline should be expected.

Systems Design -The third phase describes, in detail, the necessary specifications, features, and operations that will satisfy the functional requirements of the proposed system, which will be in place. This is the step for end-users to discuss and determine their specific business information needs for the proposed system. It's during this phase that they will consider the essential components (hardware and/or software), structure (networking capabilities), processing and procedures for the system to accomplish its objectives.



Development-The fourth phase is when the real work begins—in particular, when a programmer, network engineer and/or database developer are brought on to do the major work on the project. This work includes using a flow chart to ensure that the process of the system is properly organized. The development phase marks the end of the initial section of the process. Additionally, this phase signifies the start of production. The development stage is also characterized by installation and change. Focusing on training can be a huge benefit during this phase.

Integration and Testing-The fifth phase involve systems integration and system testing (of programs and procedures)—normally carried out by a Quality Assurance (QA) professional—to determine if the proposed design meets the initial set of business goals. Testing may be repeated, specifically to check for errors, bugs, and interoperability. This testing will be performed until the end-user finds it acceptable. Another part of this phase is verification and validation, both of which will help ensure the program's successful completion.

The implementation-The sixth phase is when the majority of the code for the program is written. Additionally, this phase involves the actual installation of the newly-developed system. This step puts the project into production by moving the data and components from the old system and placing them in the new system via a direct cutover. While this can be a risky (and complicated) move, the cutover typically happens during off-peak hours, thus minimizing the risk. Both system analysts and end-users should now see the realization of the project that has implemented changes.

Operations and Maintenance-The seventh and final phase involves maintenance and regular required updates. This step is when end users can fine-tune the system, if they wish, to boost performance, add new capabilities or meet additional user requirements.

This theory will guide the researcher in the study. It will serve as the basis for developing the proposed system. Furthermore, it will help the researchers in adhering to the set timeline and offers room for error correction.

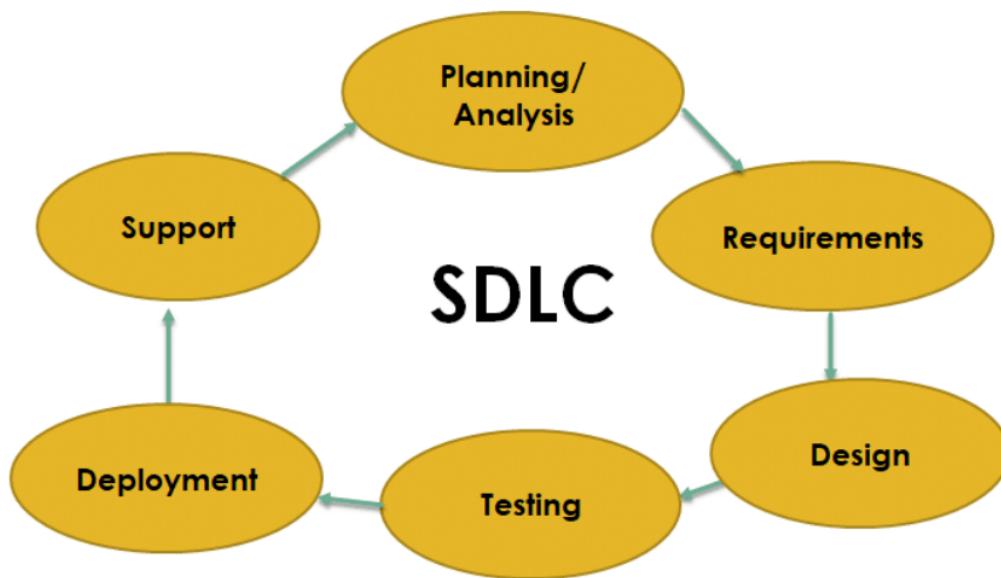


Figure 1.0: System Development Life Cycle

The researchers proposed system will need a set of information about the process and transaction. With this, the proponents will use the ⁵⁹ **Work System Theory** ²³ by Steven Alter (2013) as a supporting theory of the study, which defines that human participants and/or machines perform processes and activities using information, technology, and other resources to produce product/services for internal or external customers. Information systems, projects, and supply chains are all special cases of work systems. Also, this system is a working system, all of which processes and activities are devoted to processing information, which occurs through six types of activities, capturing, transmitting, storing, retrieving, manipulating, and displaying information.

Meanwhile, **Information Processing Theory** by G. Miller (2013) will be adapted the researcher as a supporting theory. In this theory, it is defined in the sense of the system's effectiveness; there is no hundred percent assurance that it will be



perfect. Thus, the concept of TOTE that is proposed by Miller, Galander, and Pribram (1960)⁶⁴ exists. In a TOTE (Test-Operate-Test-Exit) unit, a goal is tested to see if it has been achieved and if not, an operation is performed to achieve the goal; this cycle of test-operation is repeated until the goal is eventually achieved or abandoned. This implies that in making a system, it will not end by just finishing it, and there is a tendency of having some errors that cannot be found in the first use. There should be a cycle of testing the system and maintaining its effectiveness.

In reality, there is no such thing as a perfect system. Researchers must evaluate the developed system and should be ready with whatever the results may be. The proponents must always be open-minded in terms of errors. Repeating the process and implementing other techniques will be the best way to improve the system and attain the end goal's expectations.

The researchers will use different theories in order for them to create a mobile app that will help local market vendors and buyers sell and purchase products online. These theories will stand as a foundation of the study being undertaken.

Conceptual Framework

To be guided in the study, the researcher created a schematic diagram to understand how a particular variable in a study connects. Thus, it identifies the variables required in the research investigation.⁴⁷ This serves as a researcher's map in pursuing the investigation.⁴⁷

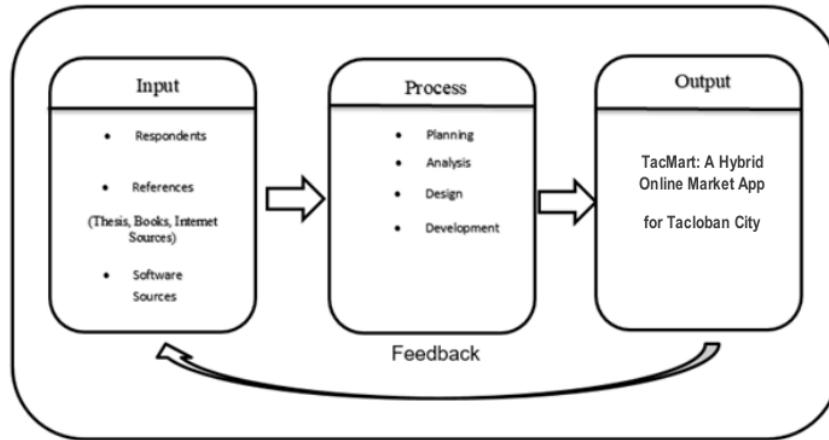


Figure 2.0: Schematic diagram of TacMart: A Hybrid Online Market App for Tacloban City

The figure above shows how the researchers will come up with the developed hybrid online market app. The input indicates the tools needed to gather the data for the research being conducted. After that, in the process phase, this data will be analyzed and be used for the development of the system. The output will be the TacMart: A Hybrid Online Market App for Tacloban City. If the output still meets errors, the researcher will look into the inputs so that they will be processed again for correction.

Objectives of the Study

This study aims to develop an online market app for Tacloban City. Specifically, this study aims to develop a hybrid app that can be accessed through the web and, at the same time, can be used as an android app. The following are its objectives:

1. Create a system that will enable local market vendors to sell their products online.
2. Design an app that will enable buyers to purchase foods and essential needs online.



3. Develop a system where shoppers can rate and put reviews on purchased items.
4. Apply a geolocation technology to determine the nearest rider to market,
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5. Comply with the developed software based on ISO/IEC 25010:2011 -
Systems and software engineering – Systems Quality Requirements and
Evaluation (SQuaRE) – System and Software Quality Models.

Scope and Limitation of the Study

This study will mainly focus on the development of a hybrid application that will help local market vendors to sell their products online and enable buyers to make purchases. The application will showcase product costs, ratings, and reviews to the user. Specifically, the system is a hybrid application that can be used on desktop and android phones. The developed system will only be limited to Tacloban City.



Chapter II

Review of Related Literature

In today's information age that we are living in, high-speed changes in information technology and communication technologies have become common in every field of our lives. The instruments and tools that we use in our daily lives are renewed almost daily. In this chapter are reviews of related literature and works that provide more understanding for the proponents of the study.

Related Literature

⁵³ Online shopping is a process during which consumers buy goods, services, and then on directly from a seller over the net without the employment of an intermediary provider. Shoppers can access web retailers from the comfort of their own homes and shop while seated ahead of a computer. Online stores are typically open 24 hours on a daily basis, and lots of consumers have access to the net both at work and reception. As a result, shopping online is kind of convenient for them (SUNITHA & Gnanadhas, 2014).

Ecommerce and online shopping are growing in popularity as more people use the web, higher educational levels, changing lifestyles, and also the country's economic process goes up in demand for e-commerce strategies and solutions. The flexibility of the shopping experience, moreover because of the ascension of transaction facilities, is increasing opportunities for the remaining market categories. The capacity to perform safe purchasing transactions via the net, combined with virtually rapid verification and validation of Mastercard transactions, is the most important advantage of e-commerce (Vashishtha & Kumar, 2016).

¹³ According to (Muhammad & Jongtae, 2018), highly influencing factors for the IS-CB online shopping model included perceived value (PV), perceived risk (PR), social factors (SF), perceived simple use (PEOU), perceived usefulness (PU), online



shopping intention, trust, online shopping experience, actual online shopping purchases, entertainment gratification (EG), website irritation (WI), information (ND). This research has significant theoretical and practical ramifications. Positive attitudes and purchase intents can be fostered through PV and trust in online shopping.⁶⁶ Websites that are well-designed generate more trust and lower WI. Similarly, online buying sites with improved ID, ND, and VD reduce WI while increasing trust.¹³

It's all about content. A website must appropriately represent who you are as a small business. You don't want potential leads leaving your site because they can't locate information about your company or its items (Caluza, 2020).

E-commerce has the potential to displace conventional in-person shopping. It is widely assumed that information and communication technology have a significant impact on modern society, altering how and where we work, shop, and, in general, how we spend our lives. In their study, they utilize a survey instrument to evaluate the relationship between Internet and e-shopping experience level and customers' frequency of online purchase while taking sex into account as a passive factor (Opreana, 2013).

(Woodford, 2021) stated that while few can compete with large firms such as Amazon or eBay, anybody can create an internet store and begin selling within minutes. Small local businesses, which have long been threatened by the development of large retailers such as Wal-Mart and Tesco, have found fresh life by operating online and selling their items through mail orders. He also studied how E-commerce has challenged many conventional company practices. People naturally spend less in physical business when they go to internet buying sites throughout the Christmas season. Existing firms with foresight, such as Wal-Mart, have attempted to mitigate the danger by grabbing the opportunity: "bricks and clicks" (having physical stores and a flawlessly connected internet) is now widely seen as the way to go.⁴⁰ Shoppers have grown similarly astute, and they are proficient at checking things in physical stores before purchasing them online or at using websites to identify local branches of businesses where they may inspect and purchase the goods they desire.



With the internet and technology being used by increasing numbers to buy items, the confidence level can improve. Online shopping goes well beyond offline buying since customers don't have to queue at shopping centers, greater variation is available, low costs are available, and more comparisons are available. There are several elements influencing online purchasing, however, most individuals in Finland opt to ignore prices at the cost of other factors such as comfort (Agyapong, 2017).

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As researched by (Hernandez et al., 2011), the socioeconomic characteristics of experienced e-shoppers – such as gender, income, and age – do indeed moderate the effect of their perceptions of online shopping behavior. In contrast to the majority of existing IT research, they believe that the current development of the online environment, as well as the experience gained by individuals from previous e-purchases, can mitigate or even negate the effect of these characteristics.

Online customers should take the initiative to protect their personal information. They should also examine popular sites not only in terms of promotions such as sales, items offered, and discounts but also in terms of the sites' integrity. E-commerce must conduct extensive research in order to improve their security for the protection of their customers, as well as to increase their laws and policies in order to increase their sales, customers and for them to be prioritized by the public. This will also make the customer feel safe in this type of commerce (Cagaoan et al., 2014).

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Technology has shortened distances between continents, countries, cities, and people. People living in different parts of the world now have similar tastes, perceptions, styles, and accessibility. Online shopping has opened the doors of globalization as it allows consumers to buy products from anywhere around the world (Akhlaq & Ahmed, 2014). As online shopping became a regular part of people's lives, optimization of e-commerce stores is crucial in order to provide the experience expected by website visitors (potential customers). The positive experience might result in higher revenues; the negative one might result in permanent loss of customers (Bucko, 2018).

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As the eloquent statement (Nagra & Gopal 2013) says, because the internet and the other communications media are not fully reflected in the Indian context, the globe is rapidly declining into one universal society. Whilst the internet has understood the influence of rich and rapidly developing countries, India is still unaware and is striving to deal with technological advances. The battle for the retail sector was repainted by the internet, and retailers' norms change quite quickly. Every area of Indian society has been touched by Western culture. Life is quickly growing not just in the metro but in the cities as well. The number of nuclear couples is growing, and both husband and wife work, so sometimes they have fewer times to go to the market to buy.

Social networking is one of the most actively engaging web-based activities in the Philippines dedicated to assisting start-ups in taking the first steps in the direction of the company. The good effects of e-commerce for aspiring business people were recognized (Almaden & Sombilon, 2020). It reduced the anguish and the negative thought caused by this pandemic and enhanced sales abilities by increasing revenue and productivity during quarantine. The study found that 65.69 percent of Cebu City's online sellers used and suggested Facebook as the most successful social networking site for new businesses and reached a large number of individuals from a wide variety of backgrounds effortlessly and promptly. Social networking is one of the most actively engaging web-based activities in the Philippines dedicated to assisting start-ups in taking the first steps in the direction of the company. The good effects of e-commerce for aspiring business people were recognized (Almaden & Sombilon, 2020). It reduced the anguish and the negative thought caused by this pandemic and enhanced sales abilities by increasing revenue and productivity during quarantine. The study found that 65.69 percent of Cebu City's online sellers used and suggested Facebook as the most successful social networking site for new businesses and reached a large number of individuals from a wide variety of backgrounds effortlessly and promptly.



While the Philippines still has traditional trade, e-commerce has penetrated the country significantly with storms. In a country like the Philippines, if you are a business owner, digital technology will be useful, as most consumers are knowledgeable about the internet. In the last ten years, other Asian countries have surpassed the number of Internet users in the Philippines. The Philippines are one of the largest people on the internet worldwide, spending an average of 10 hours on the web at least. It says a great deal about online consumers' appetite, and a large number of them play video games and search for trends in fashion and makeup. (Martha Jean Sanchez, 2020)

Related Systems

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Amazon.com, Inc. is an American multinational technology company based in Seattle, Washington, which focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence (amazon.com).

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Alibaba Group was established in 1999 by 18 people led by Jack Ma, a former English teacher from Hangzhou, China. From the outset, the company's founders shared a belief that the internet would level the playing field by enabling small enterprises to leverage innovation and technology to grow and compete more effectively in the domestic and global economies. Since launching its first website helping small Chinese exporters, manufacturers, and entrepreneurs to sell internationally, Alibaba Group has grown into a global leader in online and mobile commerce. Today the company and its related companies operate leading wholesale and retail online marketplaces as well as businesses in cloud computing, digital media and entertainment, innovation initiatives, and others (alibabagroup.com).

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Shopee, a free mobile app that allows customers to shop and sell, recently joined the growing e-commerce industry in the country. The platform, which is initially tailor-fitted for Southeast Asia, combines the authenticity of a customer-to-customer marketplace with payment support that is more convenient to users. In 2016, Shopee launched an initiative called "Shopee University", a series of workshops and tutorials to aid local entrepreneurs and businesses in setting up their online businesses in the Philippines (Shopee, 2015).

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⁵ **Lazada Group** is a Singaporean multinational technology company that focuses mainly on e-commerce. Founded by Maximilian Bittner with the backing of Rocket Internet in 2012, it is currently owned by the Alibaba Group after its acquisition in 2016.²⁵ Founded in 2012, Lazada Group is Southeast Asia's leading eCommerce platform. With a presence in six countries – Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam – it connects this vast and diverse region through our technology, logistics, and payments capabilities. Today, it has the largest selection of brands and sellers, and by 2030, we aim to serve 300 million customers (Lazada, 2012).

⁵ **Foodpanda** is a mobile food delivery marketplace owned by Berlin-based company Delivery Hero SE and operates in about 50 countries. It is mostly active in the Asia Pacific, Bulgaria, and Romania. It is headquartered in Berlin, Germany.³⁸ Foodpanda allows users to conveniently discover food around their neighborhood and directly order their favorite meals online or via mobile. In the Philippines, foodpanda was launched in June 2014 and has grown to over 1,000 partner restaurants nationwide (Foodpanda, 2014).

⁴ **GrabFood** is a food delivery service that connects local food businesses to people. When you place an order with GrabFood, we receive it and assign a GrabFood delivery partner to pick up the order from the restaurant to bring it to you (GrabFood, 2012).

³⁴ **NinjaVan** is a reliable and innovative last-mile delivery. With a focus on e-commerce, NinjaVan provides businesses with innovative technology-based solutions to optimize their logistics and achieve their business needs. Launched in 2014, it is Southeast Asia's fastest-growing last-mile logistics company (parcelsapp.com, n.d.).

WhizBox is a delivery service provider based in Tacloban City. With a team of highly-trained delivery riders whose aim is to provide customers the convenience of shopping and delivering their orders/requests right at their doorstep (WhizBox, 2018).

From a broader perspective, this e-commerce and food-commerce application had already been widely used prior to the pandemic. We are familiar with their business practices and the manner in which they deliver their product. They provide their customers with a diverse range of services and products. However, in the



proposed system, we are concentrating on developing a hybrid app that will cater to both wet and dry markets, such as Tacloban Public Market, in order to maximize efficiency. The verification process for its users will be distinct from that of the previously mentioned related system. Furthermore, the proposed system will be of great assistance in addressing the problem that shoppers face when purchasing foods and other necessities at the Tacloban Public Market.



Chapter III

Technical Background

This chapter discussed the overview of the current system and the proposed system together with its hardware, software, and the people are involved in the proposed system.

Current Method

Tacloban City Public Market is a place wherein most household essentials like food and groceries can be found. This is where most city residents buy or shop for their household needs due to low cost and fresh products. When buying household needs, shoppers usually carry a list of items they are going to buy, and they hop from one stall to another to look for the products they're looking for.

During the pandemic, people's movement has been minimized, and going to the market has not been easy. Shoppers must comply with the city health safety protocol like scanning personal QR codes at the entry point of the market. Another is maintaining a social distance from one person to another person.

Proposed System

With the help of technology, things can be made easier and faster. Innovating the current process will help shoppers in Tacloban Public Market to save time and effort when buying essential needs like foods and groceries. The proponents proposed to develop a system entitled TacMart: An Online Market App for Tacloban City. This a hybrid app that can be accessed through the web and at the same time can be used as an application on android phones. The application will enable local market vendors to sell their products online by registering through the app and creating a virtual store. The registration part in this system is somewhat unique from other online shopping systems or applications, such that during the registration process, the buyer must obtain a verification code coming from the Tacloban Public Market administration or



from their respective Barangay council. This is to avoid fake accounts "bogus" buyers within the system.

Buyers can use the web or app version of this system when making an order of essential goods. After making an order, the product will be prepared by the seller, and a rider will pick it up. Within 30 mins, the rider will deliver this product/s to the buyer and receives the payment. Moreover, this system will be utilizing geolocation technology in determining the user's location during the delivery process of an order.

¹¹ Geolocation provides the location of a device but is generally used in a variety of applications to help locate human users. Geolocation works through a pre-built GPS in a device that propagates the device's longitudinal and latitudinal coordinates. The coordinates are identified on a map to provide a complete address that usually includes a country, city, town/colony, building name, and street address. Besides GPS, geolocation also may be identified through an Internet Protocol (IP) address, media access control (MAC) address, radio frequency (RF) systems, Exchangeable Image File Format (EXIF) data and other wireless positioning systems.

Software

The following are the specific software in making the proposed system.

Software	Description
HTML 5 (Hypertext Markup Language)	Allows the developer of the system to create and structure sections, paragraphs, headings, links, and blockquotes for web pages and applications. ⁵¹
Bootstrap 4	A CSS Framework for developing responsive and mobile-first websites.
JavaScript 1.8	A dynamic computer programming language that allows the developer of the proposed system to implement complex features on web pages.



PHP version 7.0 (Hypertext Preprocessor) 30	A widely-used open-source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
Brackets 1.14.2	Serves as a source code editor with a primary focus on web development. 19
JAVA SE v.12	A powerful general-purpose programming language. It is used to develop desktop and mobile applications, big data processing, embedded systems, and so on. Java runs on 3 billion devices worldwide, which makes Java one of the most popular programming languages for mobile applications. 19
Android Studio v.3.5	The official Integrated Development Environment (IDE) for Android app development, based on IntelliJ IDEA. On top of IntelliJ's powerful code editor and developer tools, Android Studio offers even more features that enhance productivity when building Android apps. The proponents will be using this IDE in building the native mobile application for finding boarding houses. 18



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MySQL	A structured query language based in an open-source relational database management system. The application is used for a wide range of purposes, including data warehousing, e-commerce, and logging applications. It can be used to store anything from a single record of information to an entire inventory of available products for an online store.
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Table 1.0: Software Requirements for the Proposed System



Hardware

The following are the hardware involved in the proposed system.

Hardware	Description
Android Device	Devices where the proposed system will be implemented must have the following feature. <ul style="list-style-type: none">• Android OS supported smartphone.• Android phone with at least 1 GB RAM.• Android phone with at least 4 GB ROM.
PC/Desktop	The system can also be access through a browser in a desktop computer with any operating system (Windows or Mac).

Table 2.0: Hardware Requirements for the Proposed System

Peopleware

Peopleware refers to the users of the proposed system. In this case, the proposed system is intended to be used by:

Customers- primary customers of the proposed system are residents who live within the city's downtown area. They have the capability to purchase products in the app.



Sellers- are the people who will sell products in the app. For them to be a seller, they must be first a registered vendor in the Tacloban Public Market and possesses legal documents such us BIR, DTI, and Permit to operate.

Rider/Delivery Man- In order to deliver the product from the seller to the customers, riders fill out the role as a bridge between the two. Riders will be the ones who will pick up the items from the sellers and transport them to the customer in a safe and timely manner. To be a rider in the app, a person must possess a driver's license and a vehicle such as a motorbike.

Admin- The admin in the proposed system has the capability to check the credentials of the seller based on the existing records present in the Tacloban Public Market Office. Moreover, the admin will be trained MIS personnel from the said office.



Chapter IV

Methodology

This chapter deals with the discussion of the Requirement Analysis that includes Performance Requirements, Safety Requirements, and Security Requirements. Additionally, this chapter will also present System Design, System Development Life Cycle, charts, and diagrams.

Requirements Analysis⁴

Requirement analysis is the process of defining the expectations of the users for an application that is to be built or modified. It involves all the tasks that are conducted to identify the needs of different stakeholders. Therefore, requirements analysis means to analyze, document, validate and manage software or system requirements (ReQtest,2018).

The proposed system TacMart: A Hybrid Online Market App for Tacloban City is basically an innovation in the traditional method of buying and selling goods in the Tacloban Public Market. This is a system that can be accessed through the web and at the same time can be used as an application in android phones. The application will enable local market vendors to sell their products online by having a virtual store. Meanwhile, buyers can also order this product by using the app or web. Moreover, the system will be embedded with a machine learning algorithm, namely K-Nearest Neighbor and Content-based Filtering Algorithm. In order to use TacMart: An Online Market App for Tacloban City, a browser and internet are needed when accessing it via web. Meanwhile, an Android mobile phone that has at least an android 4.4 OS version with 1GB RAM and 4 GB ROM is needed when using the app.



Performance Requirements

<i>Responsiveness</i>	When the system is accessed via the web, the system can adjust the screen where the system was accessed, whether a desktop, laptop or phone browser.
<i>Accessibility</i>	The application will require an internet connection whenever they use the application.
<i>Accuracy</i>	The system can perform a real-time response such as order status, uploading of products on the seller side, and ordering an item on the buyer side. The system will undergo alpha and beta testing to check if this module is all working and bug-free.

Table 3.0: Performance Requirements

Safety Requirements

<i>Software Error</i>	Before the implementation, the web and application of the system must be free of syntax and logical errors.
-----------------------	---

Table 4.0: Safety Requirements



Security Requirements

<i>Using username and password</i>	When a user registers for an account, they are asked to create a unique ³⁶ username and password. In order to gain access, users must prove to the website or app that they are who they say they are. The username and password are enough to confirm the user's identity, which will allow the system to authorize the user.
<i>Hash Function</i>	This is a security feature that provides guaranteed security of the database. If an intruder accesses the system, he or she will not be able to get the sensitive data of the users because of the hash function, which will encrypt the data in the system. This security feature will be applied when users are logging in to their accounts. The hash function provides security for the user's accounts by encrypting them in the system.

Table 5.0: Security Requirements



System Design

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The System Development Life Cycle (SDLC) is a process followed for a software project within a software organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific software. The life cycle defines a methodology for improving the quality of software and the overall development process.

In the development of the system, the proponents implemented the Agile methodology, wherein a project is managed by breaking it up into several stages. It involves constant collaboration with stakeholders, continuous improvement, and iteration at every stage. The Agile methodology begins with clients describing how the end product will be used and what problem it will solve. This clarifies the customer's expectations for the proponents of the system. Once the work begins, the proponents of the system follow a cycle through a process of planning, executing, and evaluating — which might just change the final deliverable to fit the customer's needs better. Continuous collaboration is key, both among proponents and with project stakeholders, to make fully informed decisions.

To be specific, the proponents use the Scrum framework during the development of the system. Scrum is an Agile project management framework used primarily for software development projects with the goal of delivering new software capability every 2-4 weeks. It is one of the approaches that influenced the Agile Manifesto, which articulates a set of values and principles to guide decisions on how to develop higher-quality software faster.

3

The scrum framework is defined by team roles, events (ceremonies), and scrum artifacts. Scrum teams are typically composed of members and have no team leader to delegate tasks or decide how a problem is solved. The team as a unit decides how to address issues and solve problems. Each member of the scrum team is an integral part of the solution and is expected to carry a product from inception to completion. There are three key roles in a scrum team:(1) product owner, which is the project's



⁵⁶ key stakeholder, (2) scrum master who serves as a servant leader to the product owner, development team, and organization, (3) the development team which is a self-organizing and a cross-functional group armed with all of the skills to deliver shippable increments at the completion of each sprint.

Additionally, in order to deliver a potentially shippable item to the product owner, the scrum team must follow scrum events or ceremonies. First, the **Sprint** where it is a time-boxed period during which specific work is completed and made ready for review. Sprints are usually 2-4 weeks long but can be as short as one week. Second, **Sprint Planning** consists of team meetings that determine which product backlog items will be delivered and how the work will be achieved. Third, **the daily stand-up**, in which a short communication meeting is being done, and each team member quickly and transparently covers progress since the last stand-up, planned work before the next meeting, and any impediments that may be blocking their progress. Fourth, **Sprint Review** serves as the "show-and-tell" or demonstration event for the team to present the work completed during the sprint. The product owner checks the work against pre-defined acceptance criteria and either accepts or rejects the work. The stakeholders or clients give feedback to ensure that the delivered increment met the business need. Fifth, **Scrum retrospective** where there is a final team meeting in the sprint to determine what went well, what didn't go well, and how the team can improve in the next sprint. Attended by the team and the scrum master, the retrospective is an important opportunity for the team to focus on its overall performance and identify strategies for continuous improvement on its processes.

³⁹ Moreover, scrum artifacts provide key information that the scrum team and the stakeholders need to be aware of for understanding the product under development, the activities being planned, and the activities are done in the project. The scrum artifacts comprise product backlog, sprint backlog, and increment. The product backlog is the single most important document that outlines every requirement for a system, project, or product. The product backlog can be thought of as a to-do list consisting of work items, each of which produces a deliverable with business value. Backlog items are ordered in terms of business value by the product owner. Meanwhile, a sprint backlog is the specific list of items taken from the product backlog



which are to be completed in a sprint. Lastly, the increment is the sum of all product backlog items that have been completed since the last software release. While it is up to the product owner to decide on when an increment is released, it is the team's responsibility to make sure everything that is included in an increment is ready to be released.

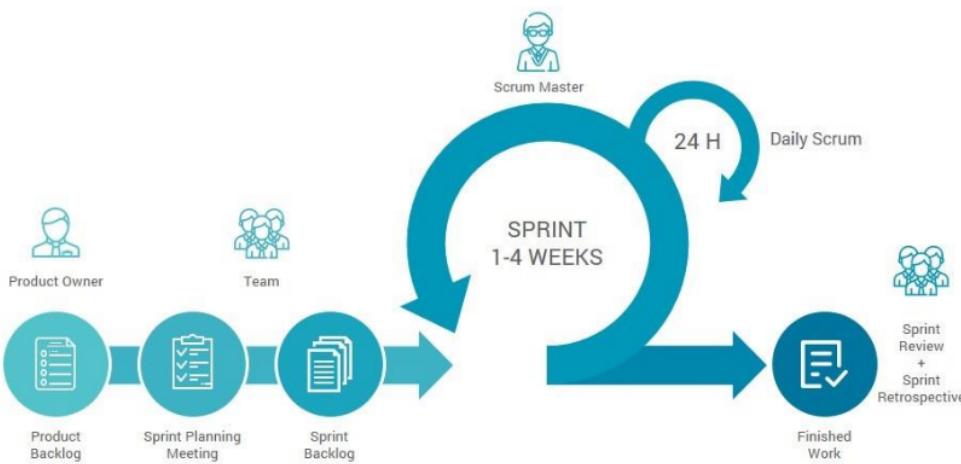


Figure 3.0: The Scrum framework model

Test Plan

The proponents develop a Hybrid Online Market App for Tacloban City to make the selling and buying of goods faster, easier, and more convenient. The interface of the system is designed to be simple and can be easily understood by the user. The purpose of this test is to help the researchers determine the effort needed to validate the quality of the application under test.
50



Test Plan	Objectives	What to Test
Usability Testing	To identify the areas where people struggle when they are using the application and recognize user's recommendations for improvement.	The uploading of products by sellers and making an order in the app by the buyers.
Interface Testing	To develop a user-friendly hybrid app that can be accessed through the web and can be used also as application.	The interface of the web and android app of the system if it meets the user expectation.

Table 6.0: Test Plan

Security Plan

The proponents made a security measure so that the users of the proposed system can use applications with efficiency and reliability.

Security Plan	Objectives	What to Test
Data Exposure	To protect the information of individual users, this also ensures data reliability.	Information of the users that will be displayed in a hybrid application will be limited.



Table 7.0: Security Plan

Maintenance Plan

The purpose of this plan ⁵⁷ is to modify and update software application after ⁶⁸ delivery. The researcher will always make time to correct faults and improve performance in the proposed system. Moreover, the researcher will do an adjustment and fixing in the system if it doesn't fit the requirements needed.

Maintenance Plan	Objectives	What to Test
System Setting Update	To have an accessible way of scanning through the system's source code in case of updates of the system in the future without destructing the origin of the codes.	Update of the user interface.
Software quality assurance	To have a manageable way of accessing the system source codes and modules in case a bug or error occurs.	Testing the different modules of the web-based and android application of the system.
Software optimization	To be able to adopt new technologies that can help in improving system UI and UX	Testing the different user interfaces.

Table 8.0: Maintenance Plan



LEYTE NORMAL UNIVERSITY
College of Arts & Sciences
IT & Computer Education
2
Tacloban City

Gantt Chart of Activities: TacMart: A Hybrid Online Market App for Tacloban City

Table 9.0: Gantt Chart October – November activities

Letter	Activities	No. of Days	October (2020)												November (2020)																	
			Week 3					Week 4				Week 1			Week 2				Week 3			Week 4										
			19	20	21	22	23	26	27	28	29	30	31	1	2	3	4	5	6	9	10	11	12	13	14	16	17	18	19	20	23	24
A	Brainstorming	3	3 DAYS																													
B	Title Proposal	5						5 DAYS																								
C	Approved Title	10										3 DAYS							7 DAYS													
D	Requirements Gathering	8																				8 DAYS										
E.1	Project Context	4																				4 DAYS										

Table 9.1: Gantt Chart December – January (2021) activities

Table 9.2: Gantt Chart February (2021) – March (2021) activities

Table 9.3: Gantt Chart April (2021) – May (2021) activities

Letter	Activities	No. of Days	April (2020)												May (2021)																													
			Week 1			Week 2			Week 3			Week 4			Week 1			Week 2			Week 3			Week 4																				
			5	6	7	8	9	12	13	14	15	16	17	19	20	21	22	23	26	27	28	29	30	31	1	2	3	4	5	8	9	10	11	12	15	16	17	18	19	22	23	24	25	26
I	Development of the System	75	11 DAYS																																									
K2	Revision of Chapter 6	7	6 DAYS																																									
L	System Consultation and Evaluation	14	14 DAYS																																									
M	Finalized Documents	7													7 DAYS																													



Pert Chart

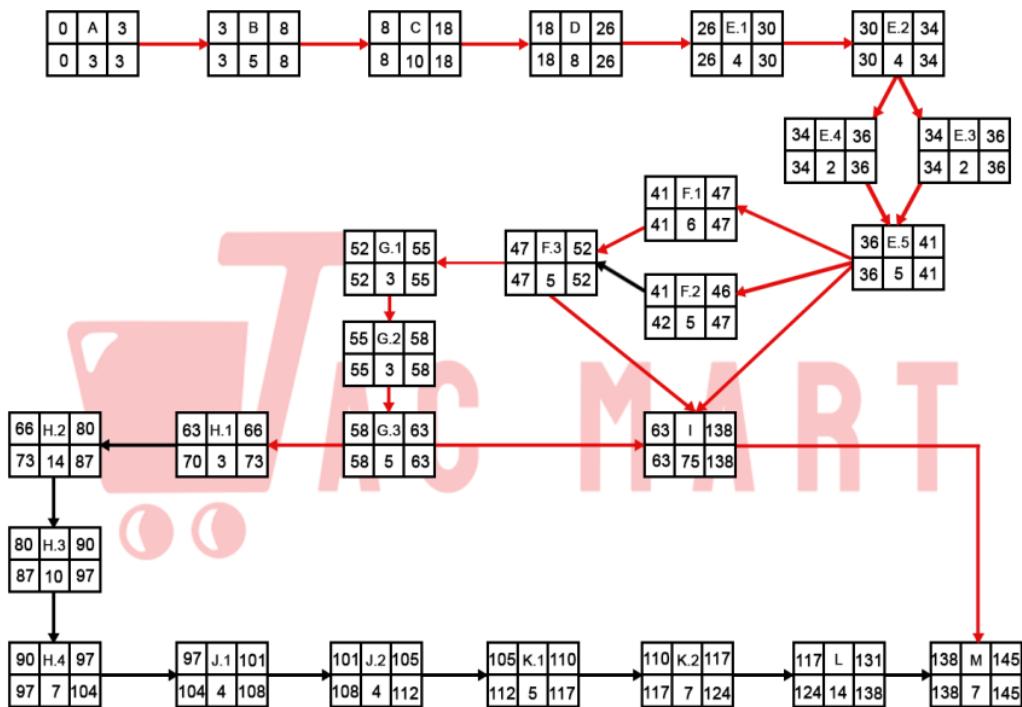


Figure 4.0: PERT Chart of the Proposed System

Critical Path:

65
A, B, C, D, E, F.1, F.3, G, M

Legend:

- ES – Early Start
- EF – Early Finish
- LS – Late Finish
- LF – Late Finish

ES	ACTIVITY	EF
LS	DURATION (DAYS)	LF



Project Activity List: TacMart: A Hybrid Online Market App for Tacloban City

Table 10: Project Activity List of the Proposed System

Activity No.	Activities	Number of Days	Predecessor/s
A	Brainstorming	3	-
B	Title Proposal	5	A
C	Approved Title	10	B
D	Requirements Gathering	8	C
E.1	Project Context	4	D
E.2	Framework of the Study	4	E.1
E.3	Objectives of the Study	2	E.2
E.4	Scope and Limitation of the Study	2	E.2
E.5	Revision of Chapter 1	5	E.3, E.4
F.1	Related Literature	6	E.5
F.2	Related Systems	5	E.5
F.3	Revision of Chapter 2	5	F.1, F.2
G.1	Current System	3	F.3
G.2	Proposed System	3	G.1
G.3	Revision of Chapter 3	5	G.2
H.1	Requirement Analysis	3	G.3
H.2	System Design	14	H.1
H.3	System Evaluation Procedure	10	H.2
H.4	Revision of Chapter 4	7	H.3
I	Development of the System	75	E.5, F.3, G.3
J.1	Results and Discussions	4	H.4
J.2	Revision of Chapter 5	4	J.1
K.1	Conclusion and Recommendation	5	J.1
K.2	Revision of Chapter 6	7	K.1
L	System Consultation and Evaluation	14	K.2
M	Finalized Documents	7	I, L



Context Diagram

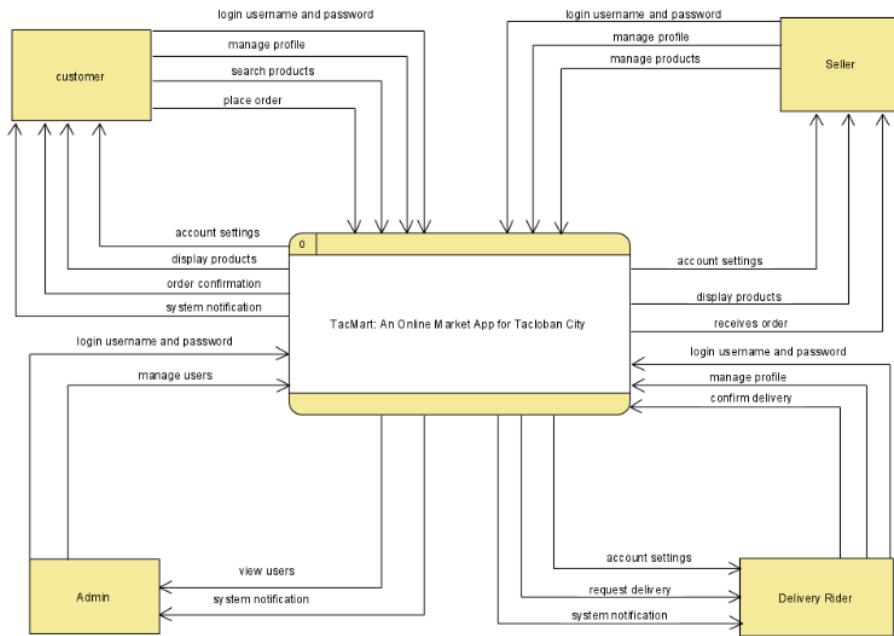


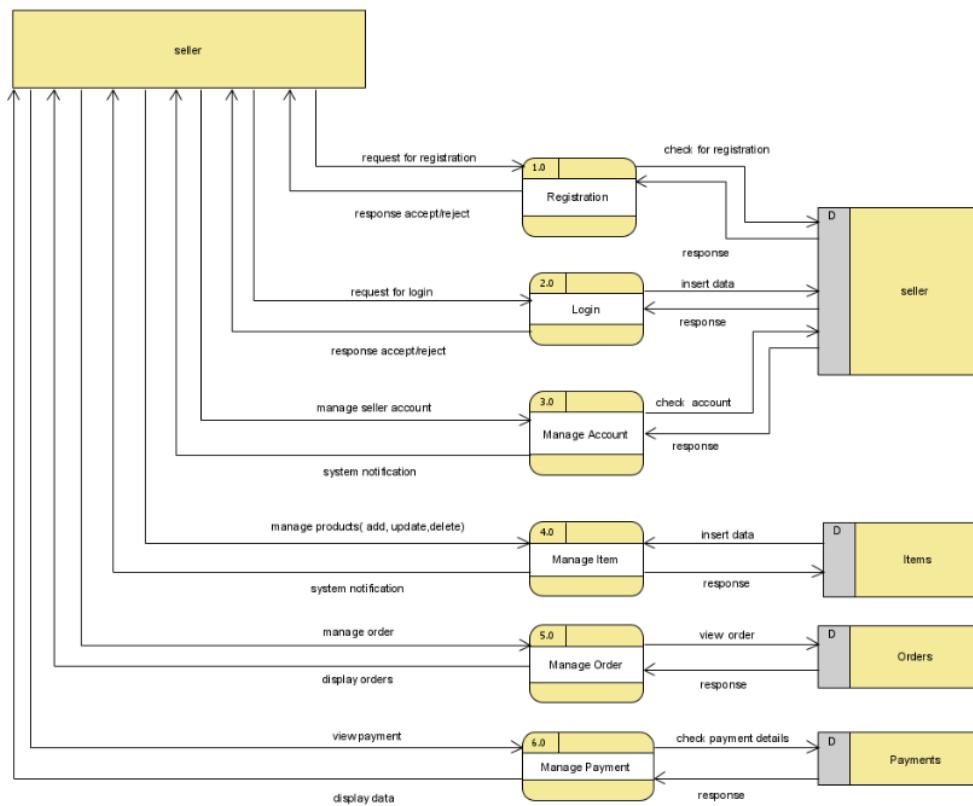
Figure 5.0: Context Diagram of the Proposed System



Data Flow Diagram

Seller Functionalities

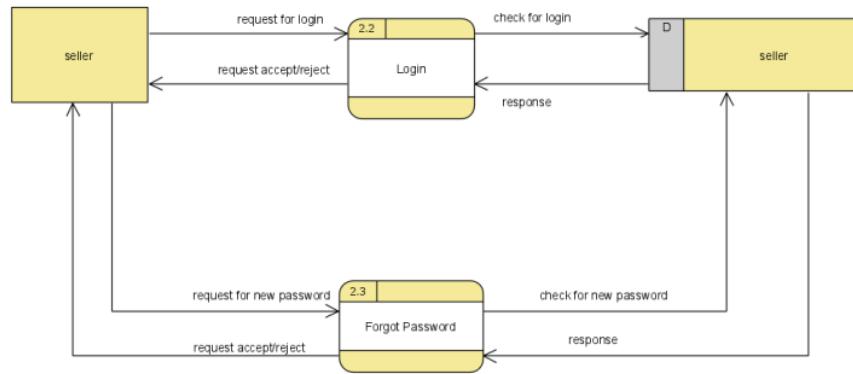
Level 1



Level 1 Process 1: Seller Functionalities



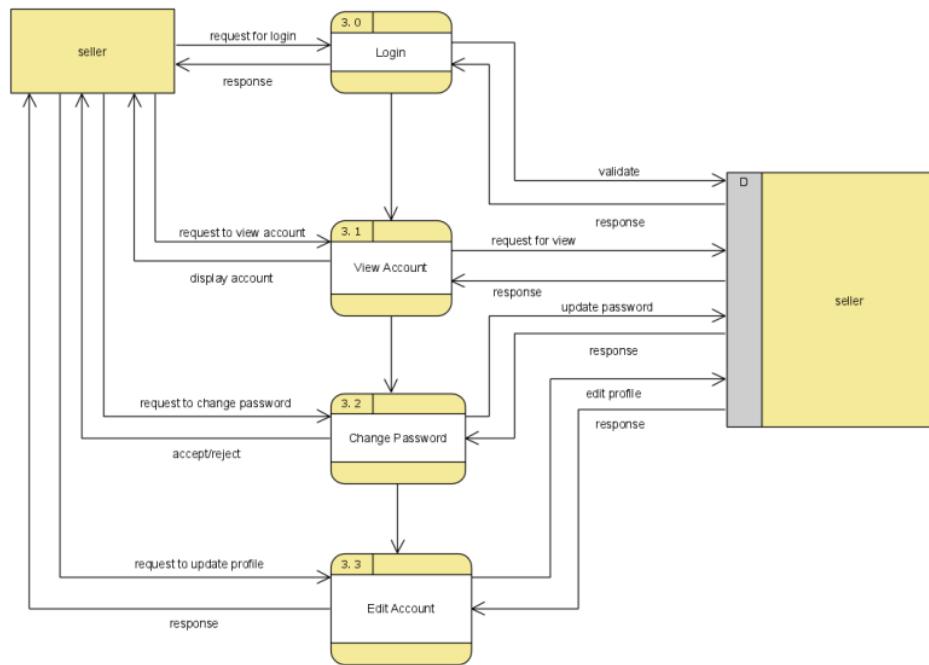
33
Level 2 Process 2



Level 2 Process 2: Seller Functionalities



Level 2 Process 3

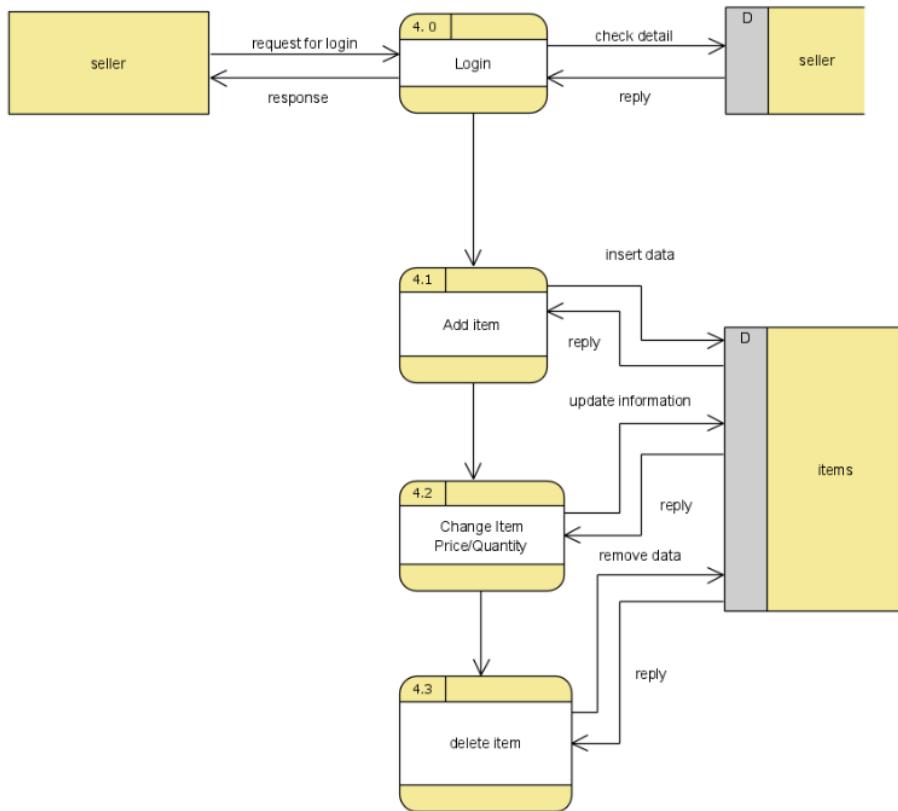


Level 2 Process 3: Seller Functionalities



33

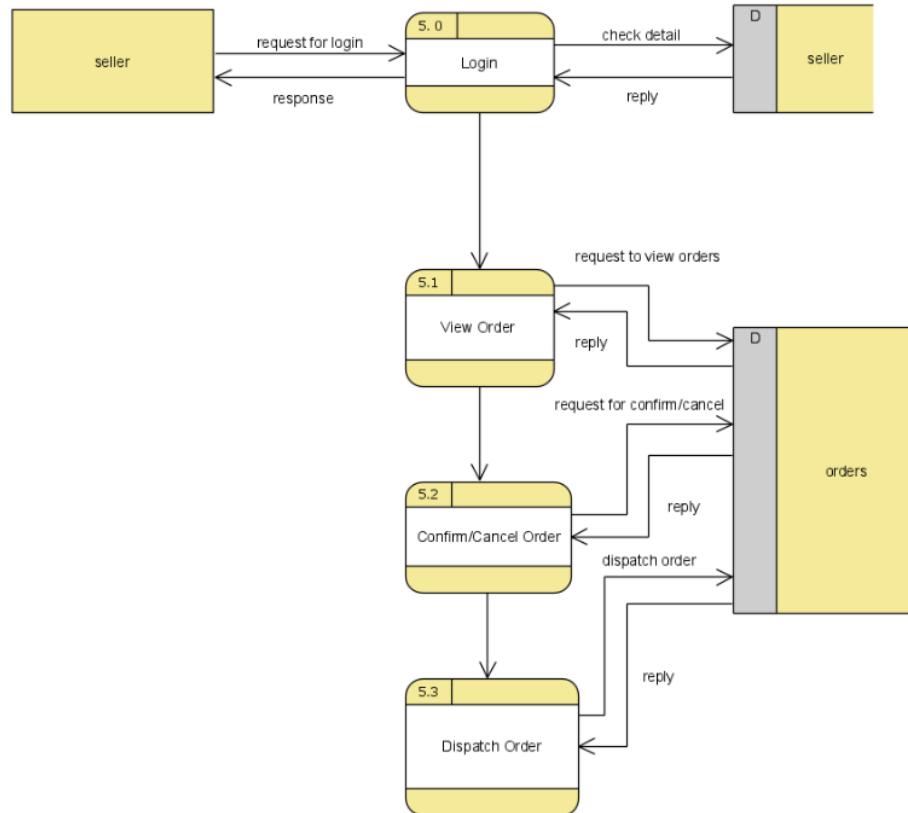
Level 2 Process 4



Level 2 Process 4: Seller Functionalities



33
Level 2 Process 5

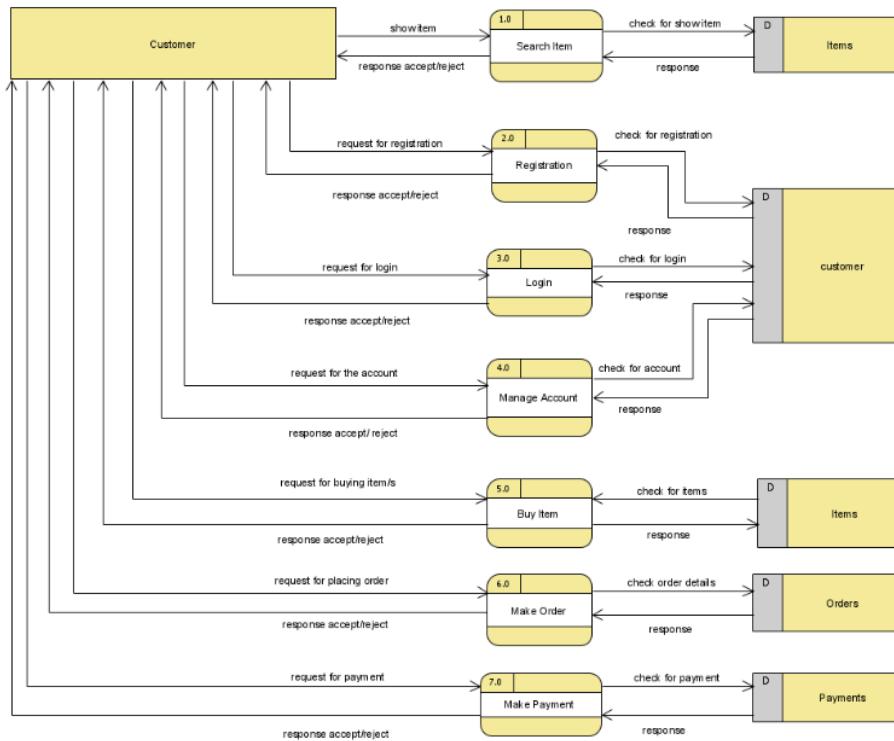


Level 2 Process 5: Seller Functionalities



Customer Functionalities

Level 1

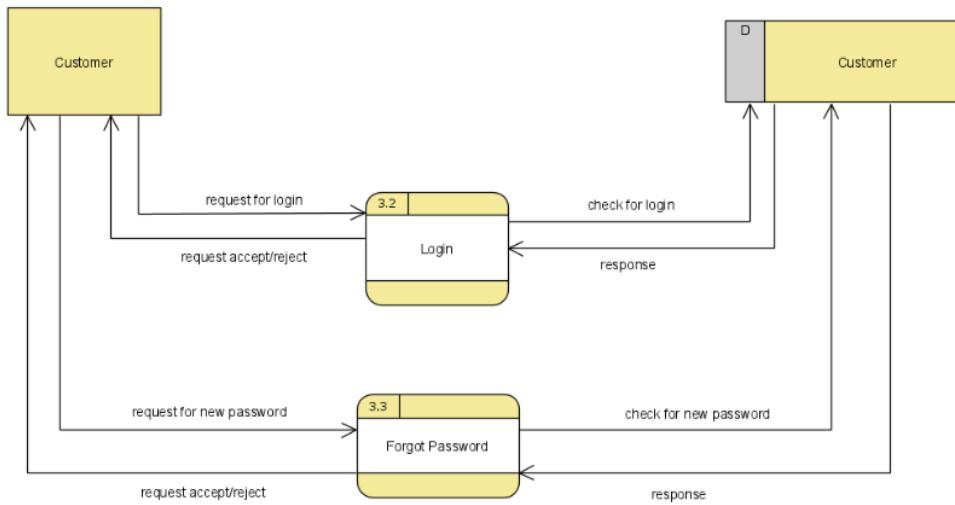


Level 1: Customer Functionalities



33

Level 2 Process 3

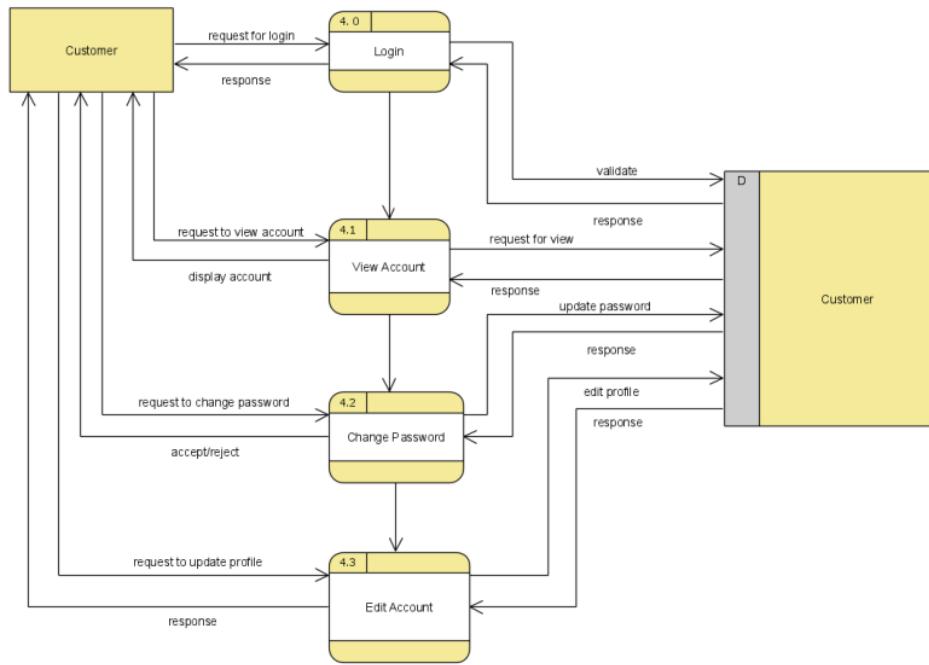


Level 2 Process 3: Customer Functionalities



33

Level 2 Process 4

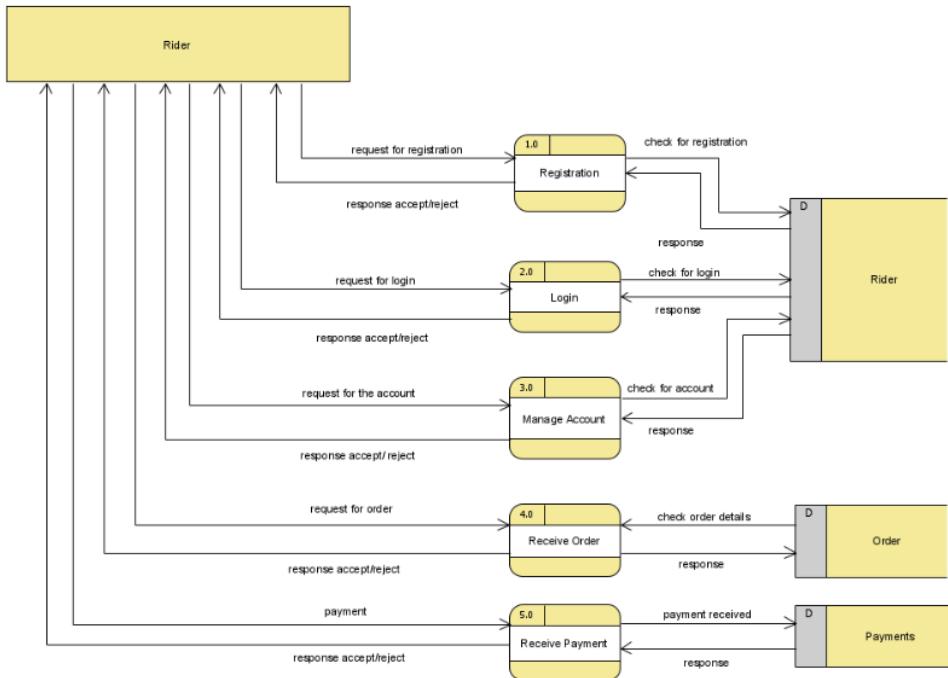


Level 2 Process 4: Customer Functionalities



Delivery Rider Functionalities

Level 1

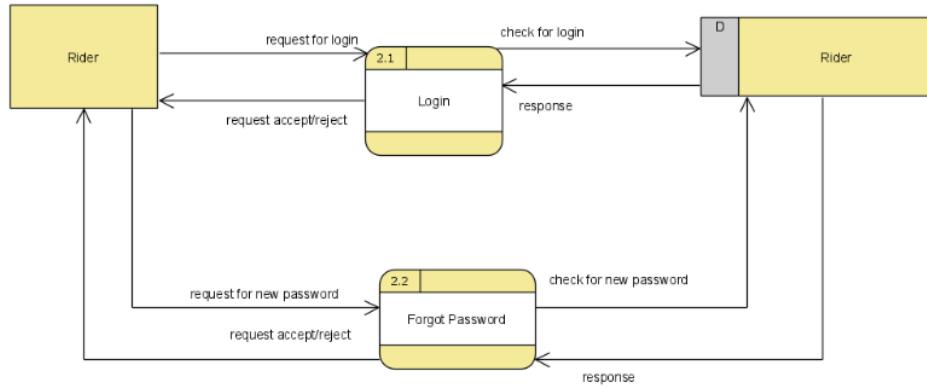


Level 1: Delivery Rider Functionalities



33

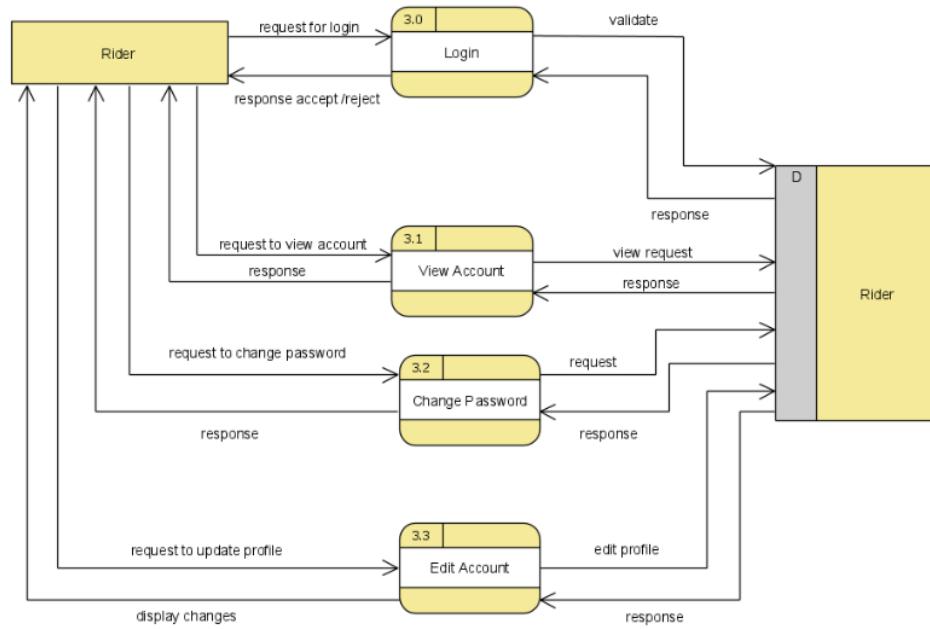
Level 2 Process 2



Level 2 Process 2: Delivery Rider Functionalities



33
Level 2 Process 3

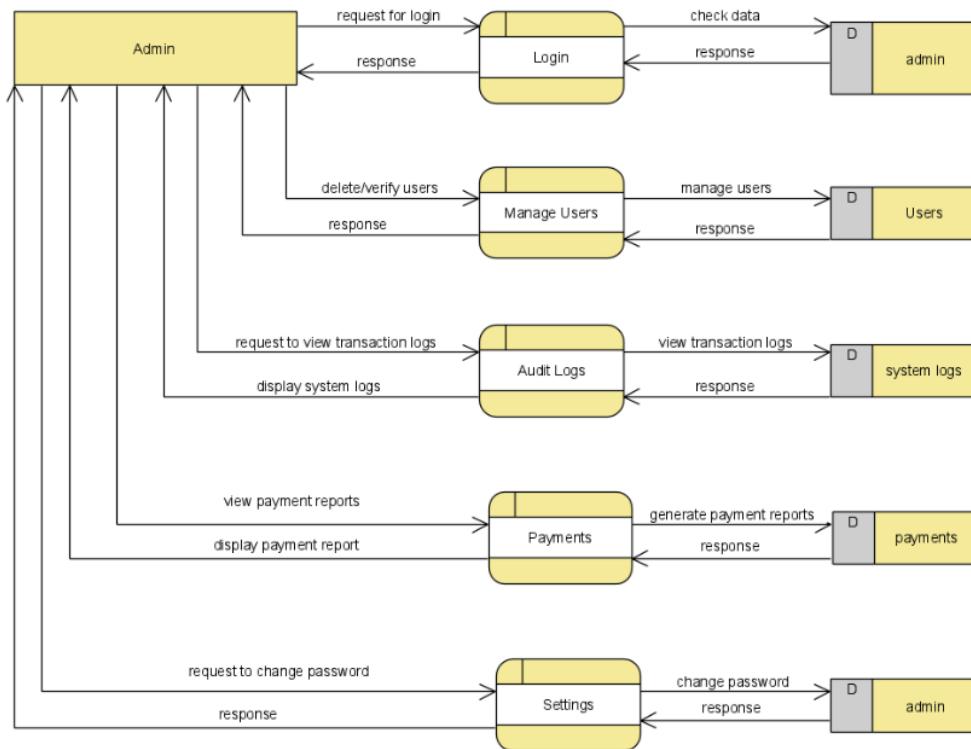


Level 2 Process 3: Delivery Rider Functionalities



Admin Functionalities

Level 1

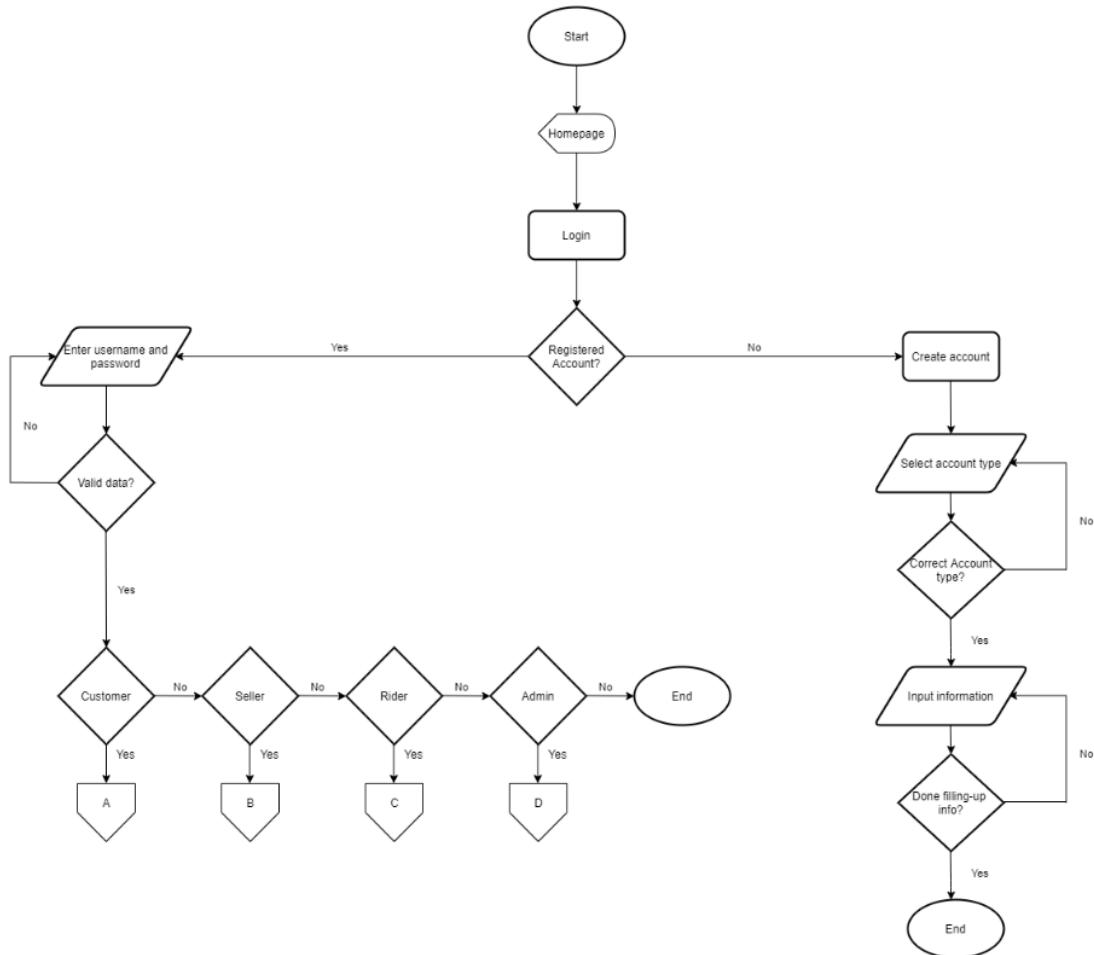


Level 1: Admin Functionalities



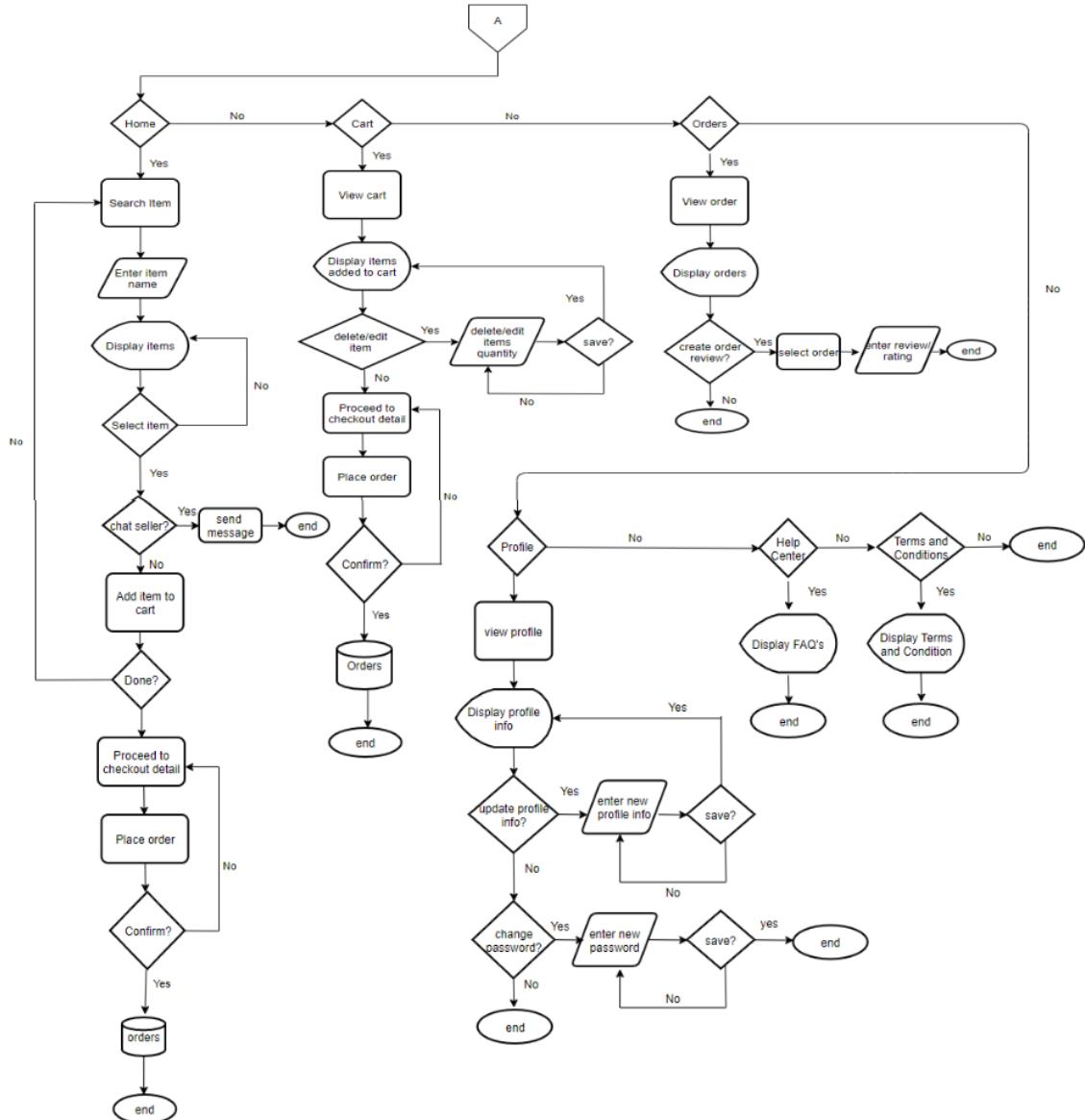
System Flowchart

Main Interface



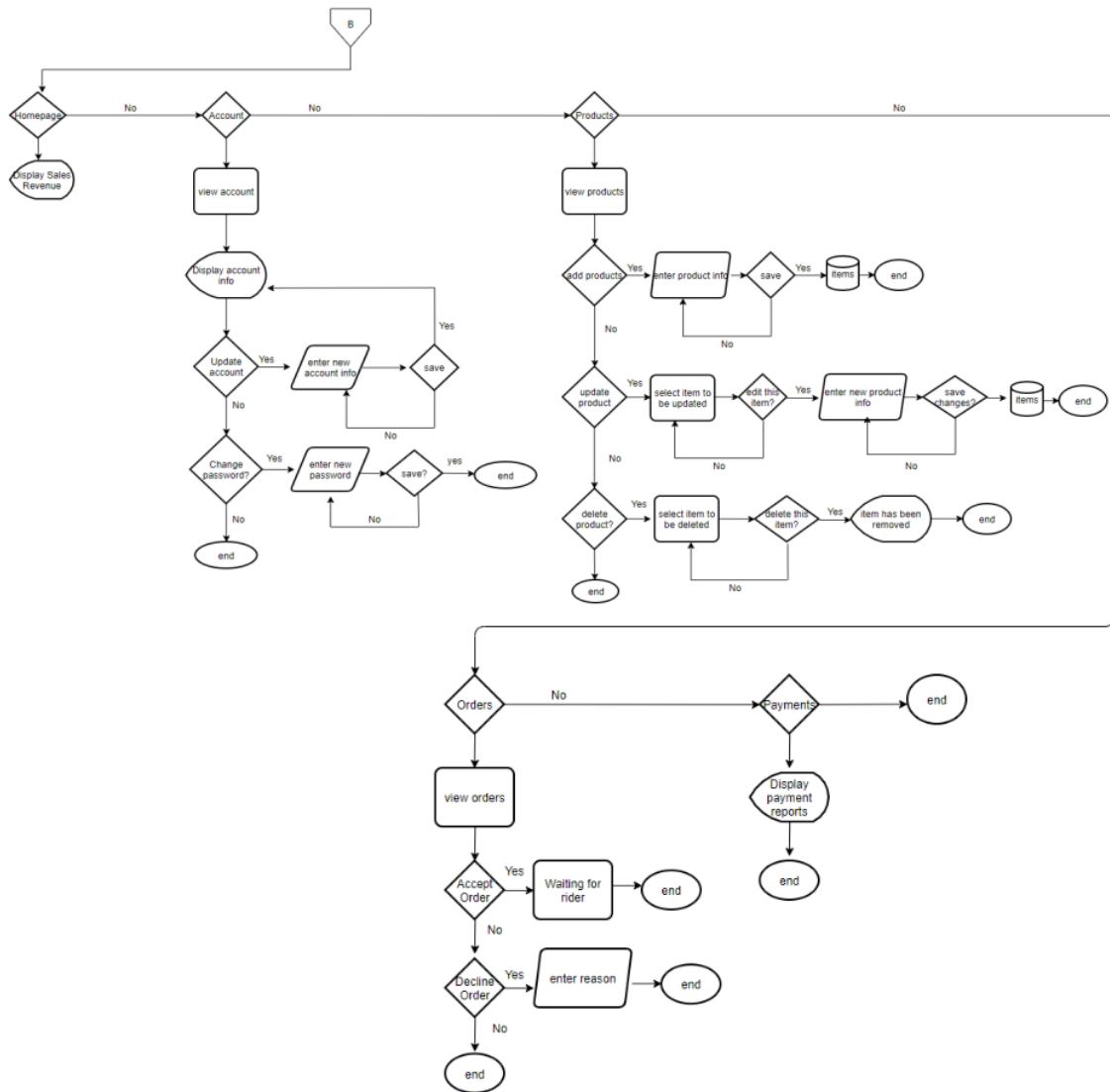


Customer Interface



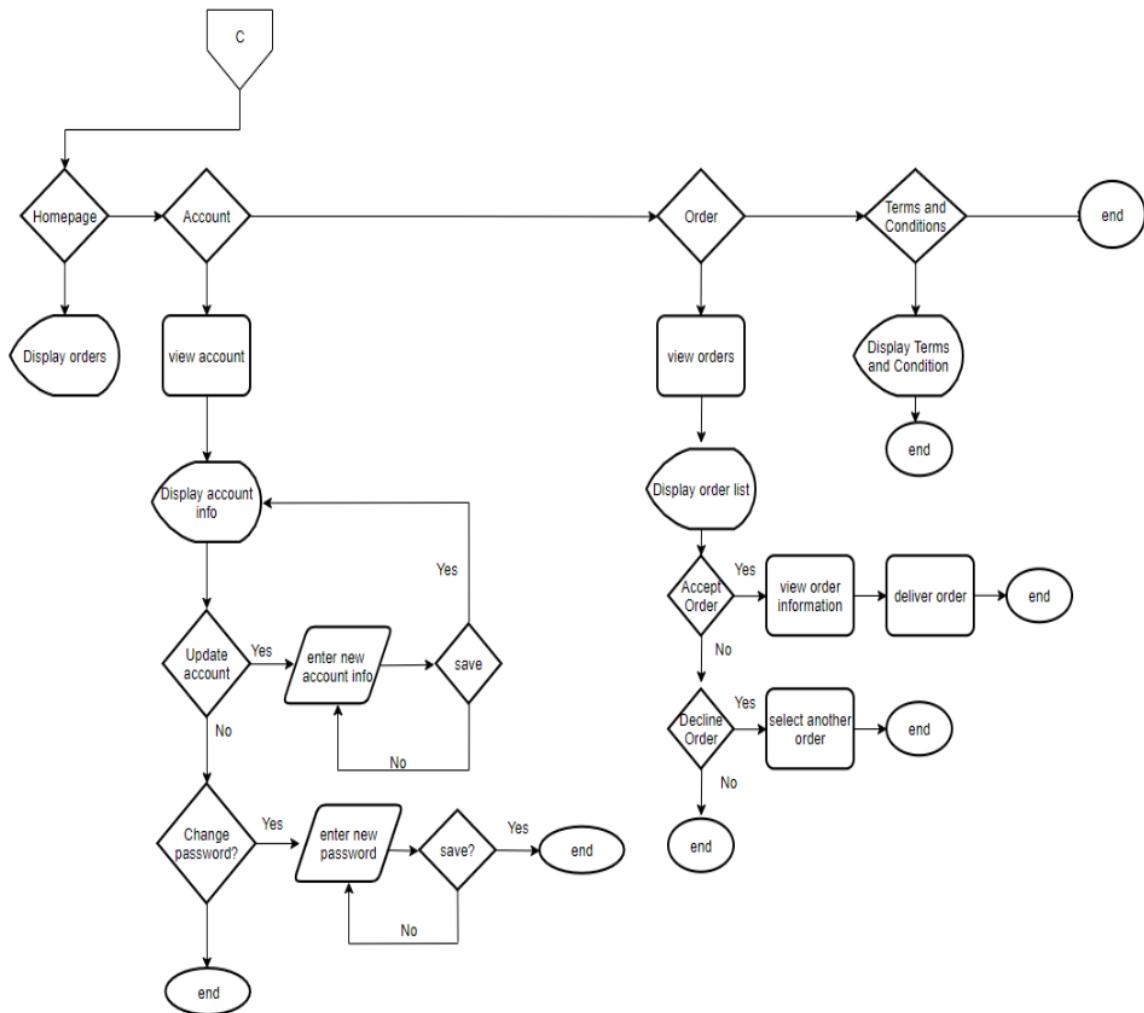


Seller Interface



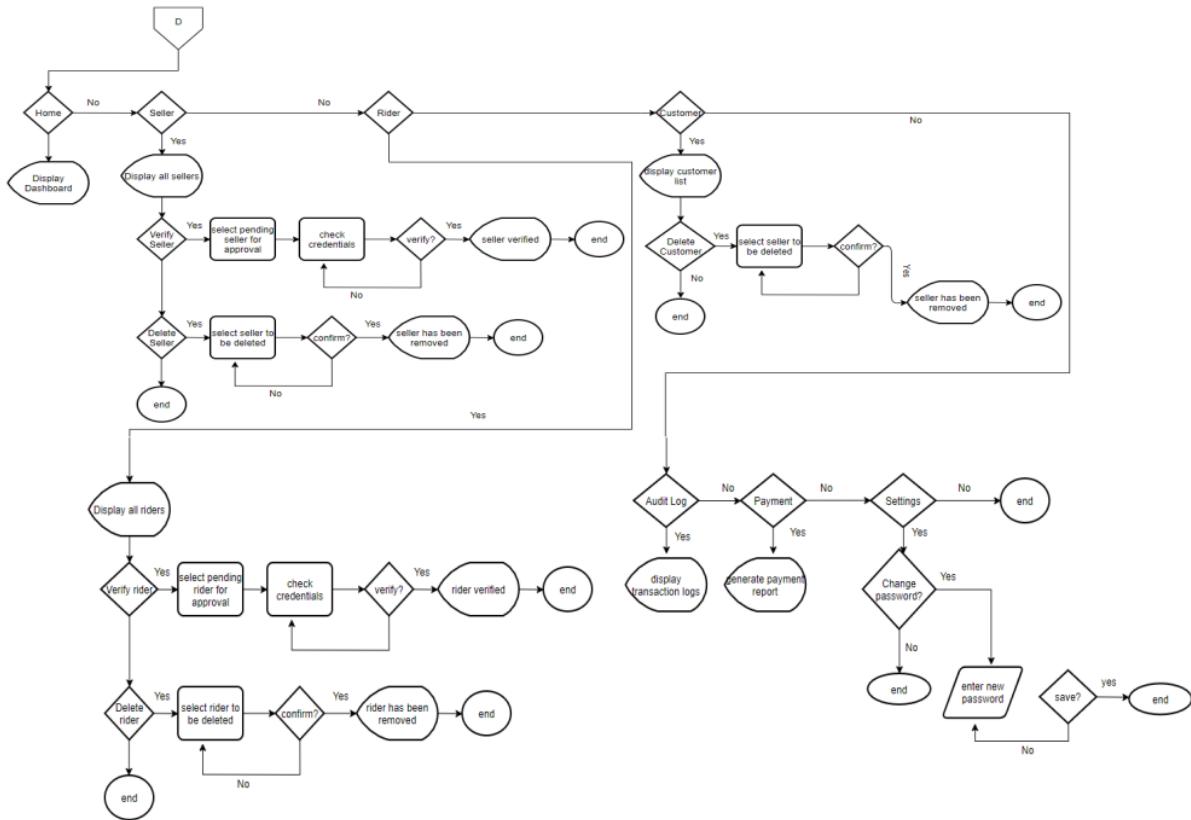


Rider Interface





Admin Interface





Entity Relationship Diagram

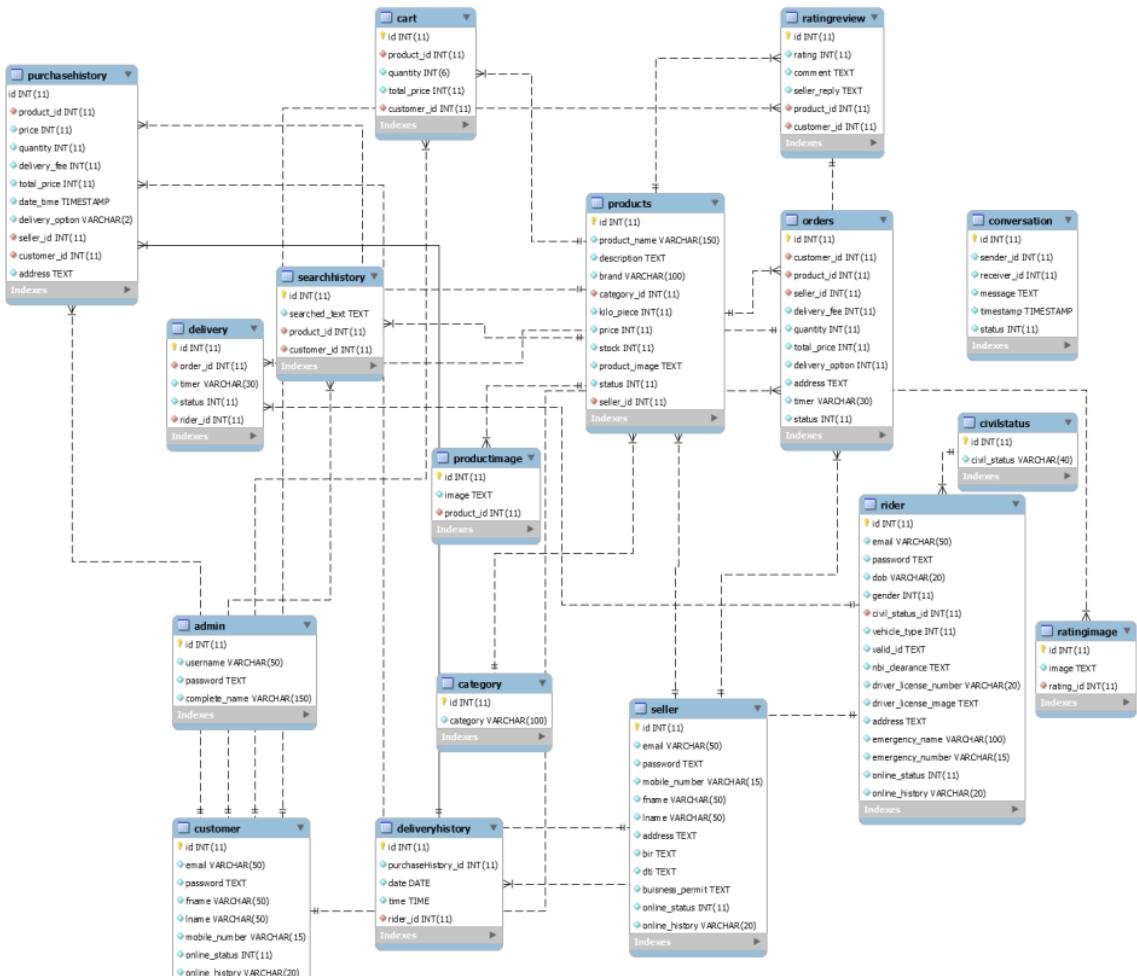


Figure 6.0: Entity Relationship Diagram of the Proposed System



Database Schema

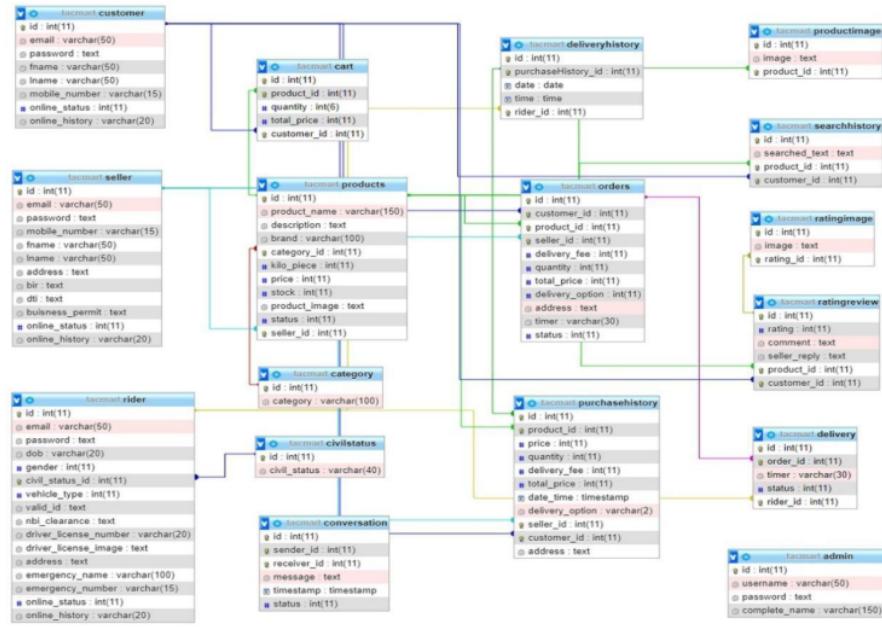


Figure 7.0: Database design of the Proposed System



Program Considerations

The proposed system is a hybrid application. The following consideration must be taken note of when using the system:

- For the shoppers to use the system, they must first install the android app on their phone. They can get through the Google Play store. Installing the system will require their permission to use their location, camera, contacts, etc.
- When using a web-based of the proposed system, the system will ask the users permission to access his or her location only. This process will detect the user's location and is useful in making an order and delivery.
- During the registration process of the shoppers, they will be required to obtain a registration code from their respective Barangay Council or MASA. This process is a must. Without this, they cannot use the system.
- The admin of the system is a personnel Tacloban Public Market Office. During the implementation of the system, he or she will undergo training on how to use the system. Different interfaces and their functionalities will be introduced to the trained personnel so that he or she has full control of the admin panel or admin side of the system.
- In the implementation phase of the system, if the shopper or seller does not know a certain process. For example, for sellers, on how to add a new product or for shoppers like making an order, the users can simply go to the Help page of the system were in. This interface contains the FAQs and instructions when using the system.

Program Tools

In developing the processing system, the following technologies and programs will be used:

Web Application

Program Tools

Web Application



- HTML 5 (Hypertext Markup Language) allows the developer of the system 49 to create and structure sections, paragraphs, headings, links, and blockquotes for web pages and applications.
- Bootstrap 4 is CSS Framework for developing responsive and mobile-first websites.
- JavaScript 1.8 is a dynamic computer programming language that allows the developer of the proposed system to implement complex features on web pages.
- PHP version 7.0 (Hypertext Preprocessor) 30 is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
- Brackets 1.14.2 serves as a source code editor with a primary focus on web development.

Android Mobile Application

- JAVA SE v.12 19 is a powerful general-purpose programming language. It is used to develop desktop and mobile applications, big data processing, embedded systems, and so on. Java runs on 3 billion devices worldwide, which makes Java one of the most popular programming languages for mobile applications.
- *Android Studio v.3.5* 18 is the official Integrated Development Environment (IDE) for Android app development, based on IntelliJ IDEA. On top of IntelliJ's powerful code editor and developer tools, Android Studio offers even more features that enhance productivity when building Android apps. The proponents will be using this IDE in building the native mobile application for finding boarding houses.

Database

- MySQL 46 is a structured query language 37 based on an open-source relational database management system. The application is used for a wide range of purposes, including data warehousing, e-commerce, and logging applications. It can be used to store anything from a single record of information to an entire inventory of available products for an online store.



Software Requirement Specification

In order to use TacMart: An Online Market App for Tacloban City, a browser and internet are needed when accessing it via the web. Meanwhile, an Android mobile phone with the following specification is needed.

Android Mobile Minimum Specification:

- Operating System – Android 4.4 KitKat

Meanwhile, when using the web-based system, the following requirements are needed to follow:

⁶³
Personal Computer/Laptop Minimum Specification:

- Operating System - Windows 7, 8, 10
- Web Browser - Chrome 45, Firefox 38, Internet Explorer 10, Microsoft Edge 12, Opera 30

Hardware Requirement Specification

This requirement must be satisfied when using TacMart as an Android mobile app and website, so users will not encounter performance problems.

Android Mobile Minimum Specification:

- Processor – any processor
- RAM – Between 100 MB and 150 MB
- ROM – 512 MB, 2 GB is recommended

Personal Computer/Laptop Minimum Specification:

- ²²
- Processor - Intel Pentium 4 or AMD Athlon Dual Core, 3.0 GHz or higher with SSE2 technology.
 - RAM – 2 GB
 - Storage – 150 GB HDD



System Evaluation Procedure

Instrument

The researchers use a survey questionnaire as an instrument. This survey questionnaire is composed of several questions where it refers to the Systems and Software Quality Requirements and Evaluation (SQuaRE) using the ISO/IEC 25010:2011 standards to evaluate the proposed system. Randomly selected shoppers and sellers answered the evaluation form to determine the quality of the system if it is ready for implementation. The evaluation form was based on the ISO/IEC 25010:11 standards. The ISO/IEC 25010:2011 is a foundation of the quality of a specific product. The quality of the system is determined from the client's implied needs, and these needs are the basis of the software's quality which is categorized into different characteristics. (iso25000.com, 2019). The quality in use model is composed of six (6) characteristics.

Functionality refers to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

Efficiency refers to the performance relative to the number of resources used under stated conditions.

Usability refers to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.

Reliability refers to which a system, product, or component performs specified functions under specified conditions for a specified period of time.



Security refers to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

Maintainability refers to the effectiveness and efficiency with which a product or system can be modified by the intended maintainers.

Using the survey questionnaire, the researchers can identify if there is a function the system has not met yet and there are failures that the user encountered.

Validation

Before conducting an actual survey, the survey questionnaires must first undergo reliability testing also known as Cronbach Alpha Test. In obtaining the necessary data for the Cronbach Alpha Test, the proponents were advised to conduct a survey on random people living in Tacloban City. The target population for the survey is 30, as suggested by the proponent's adviser during their consultation.

Alpha testing, as commonly known by technical terms, is an acceptance test that is usually conducted in a development site (Craig, 2002). It is intended to scan the existing bugs or issues that may be encountered before officially being deployed to the client. It is relatively called alpha testing because it is an initial stage before the beta testing eventually (Guru99, 2019).



Figure 8. Discussion regarding the Alpha Testing to be conducted.

The researcher conducted the evaluation among selected 30 respondents from both shoppers and sellers for alpha testing at Tacloban Public Market. The questions were categorized into four (4) categories that would determine the system's functionality, efficiency, usability and reliability that were based on ISO 25010/2011.

In the alpha testing, the researchers used the Cronbach Alpha Reliability test method to measure the internal consistency or reliability of the survey questionnaires or test items. The minimum acceptable value for Cronbach Alpha is 0.70, and the maximum expected value is 0.90. According to Tavakol and Dennick (2011) a low value of alpha could be due to a low number of questions, poor inter-relatedness between items, or heterogeneous constructs. For example, if a low alpha is due to a poor correlation between items, then some should be revised or discarded. The easiest method to find them is to compute the correlation of each test item with the



total score test; items with low correlations (approaching zero) are deleted. If alpha is too high, it may suggest that some items are redundant as they are testing the same question but in a different guise. A maximum alpha value of 0.90 has been recommended.

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

source: <https://www.statisticshowto.com>

In computing the result for Cronbach Alpha, the researchers used the formula: $(k/k-1) * (1-(\sum x/\sum y))$

where:

k is the number of the questionnaires

$\sum x$ is the sum of all variance of all respondents per question

$\sum y$ is all variance of all questions per respondent

The Cronbach Alpha on Table 11 shows the Functionality of the hybrid app, which is 0.90. This means that the items within the category are enough to consider the data efficiently reliable, and consistent between the items.



Table 11. Cronbach Alpha of the items under the Functionality category

Functionality			N ²⁰	%
	Valid	30	100%	
	Cases	Excluded	0	0
		Total	30	100%
Reliability Statistics				
	Cronbach Alpha		N of items	
	0.90		5	

The Cronbach Alpha on Table 12 shows the Efficiency of the hybrid app which is 0.81. This means that the items within the category are enough to consider the data efficiently reliable and consistent between the items.

Table 12. Cronbach Alpha of the items under the Efficiency category

Efficiency			N ²⁰	%
	Valid	30	100%	
	Cases	Excluded	0	0
		Total	30	100%
Reliability Statistics				
	Cronbach Alpha		N of items	



	0.81	5
--	------	---

The Cronbach Alpha on Table 13 shows the Usability of the hybrid app, which is 0.78. This means that the items within the category are enough to consider the data efficiently reliable, and consistent between the items.

Table 13. Cronbach Alpha of the items under the Usability category

Usability			20 N	%
	Valid	30	100%	
	Cases	Excluded	0	0
		Total	30	100%
	Reliability Statistics			
	Cronbach Alpha	N of items		
	0.78	5		

The Cronbach Alpha on Table 14 shows the Reliability of the hybrid app, which is 0.80. This means that the items within the category are enough to consider the data efficiently reliable, and consistent between the items.

Table 14. Cronbach Alpha of the items under the Reliability category

Reliability			20 N	%
	Valid	30	100%	
	Cases	Excluded	0	0
		Total	30	100%
	Reliability Statistics			
	Cronbach Alpha	N of items		
	0.80	5		



Reliability Statistics		
	Cronbach Alpha	N of items
	0.80	5

To get the overall Cronbach Alpha result, the researchers used the following formula:

(Cronbach Alpha Value of Functionality (0.90) + Cronbach Alpha Value of Efficiency (0.81) + Cronbach Alpha Value of Usability (0.78) + Cronbach Alpha Value of Reliability (0.80)) / Number of categories (4) = 0.82

Using the ISO 25010/2011 standards, the result of the Cronbach Alpha is 0.82. The interpretation of this result is valid and the proponents are able to gather necessary data to be used in the study and it is concluded that the survey questionnaire or test item used in the alpha testing is reliable and consistent.

Beta Testing

Beta testing is an acceptance test being conducted at the client or recipient's site. Since beta is still on a testing part, this should involve cases like expected and unexpected results. The proposed system on this phase is allowed to be used thoroughly to check the quality and if there are major or minor issues that should be criticized in order to attain the expected outcome of the system (Craig, 2002).



Figure 9. Introducing the system to the client for beta testing purposes.

The researcher conducted the evaluation for beta testing among selected respondents of 10 (ten) employees at the Tacloban Public Market Office (MASA), which was the recipient of the proposed system. The questions were categorized into six (6) categories that would determine the system's functionality, efficiency, usability, reliability, security, and maintainability that were based on ISO 25010/2011.



Data Gathering Procedure

In conducting the survey, the researchers have prepared a total of 28 questions per evaluation form and use purposive sampling. According to Crossman (2018), this type of sampling is very useful in situations wherein you need to reach a targeted sample quickly and where sampling for proportionality is not the main concern. Target users of the developed system were the shoppers and sellers of essential goods in the Tacloban Public Market. This survey was conducted and given to the people living around the area of Tacloban City. A total of 30 people were surveyed, 15 people each from both shoppers and sellers were randomly selected to answer the survey. Moreover, the researchers followed a Likert scale to create a survey questionnaire in order to have an outcome relevant to the study being undertaken. The Likert scale is a unidimensional scale that researchers use to collect respondents' feedback. Researchers often use this psychometric scale to understand the views and perspectives towards a brand, product, or target market (QuestionPro, 2018).



Statistical Tool

The researchers use the Likert Scale as one statistical tool in this study. Using the Likert scale, each question can be answered by numbers, and these numbers have equivalent remarks:

17

1 – Strongly Disagree; 2 – Disagree; 3 – Neutral or Fair; 4 – Agree; 5 – Strongly

Agree.

The computation of the survey result is displayed using the tables below.

Table 15. Five Point Likert Scale with an equivalent value that serves as an indicator from the results of the evaluation.

Limits of Scale	Description	Definition
4.21 – 5.0	Strongly agree	All of the proposed system components and features are functional, efficient, usable, reliable, maintainable, and secured.
3.21 – 4.20	Agree	Most of the proposed system components and features are functional, efficient, usable, reliable, maintainable, and secured.



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2.61 – 3.20	Neutral	There are only parts of the proposed system components and features that are functional, efficient, usable, reliable, maintainable and secured.
1.81 – 2.60	Disagree	Most of the proposed system components and features are not functional, efficient, usable, reliable, maintainable, and secured.
1.0 – 1.8	Strongly Disagree	The hybrid application is not functional, efficient, usable, reliable, maintainable, and secured.



In determining the average, the researcher used the formula:

$$\bar{x} = \sum fw/n$$

wherein:

\bar{x} is the computed mean

$\sum fw$ is the sum of all the scores in the set

n is the total number of respondents



Chapter V

Result and Discussion

In general, the researchers have accomplished and developed a hybrid application for Tacloban City Public Market, which is a cart. Below are the results and discussion with its respective evidence.

Objectives of the Study with the Result:

1. *Create a system that will enable local market vendors to sell their products online.*

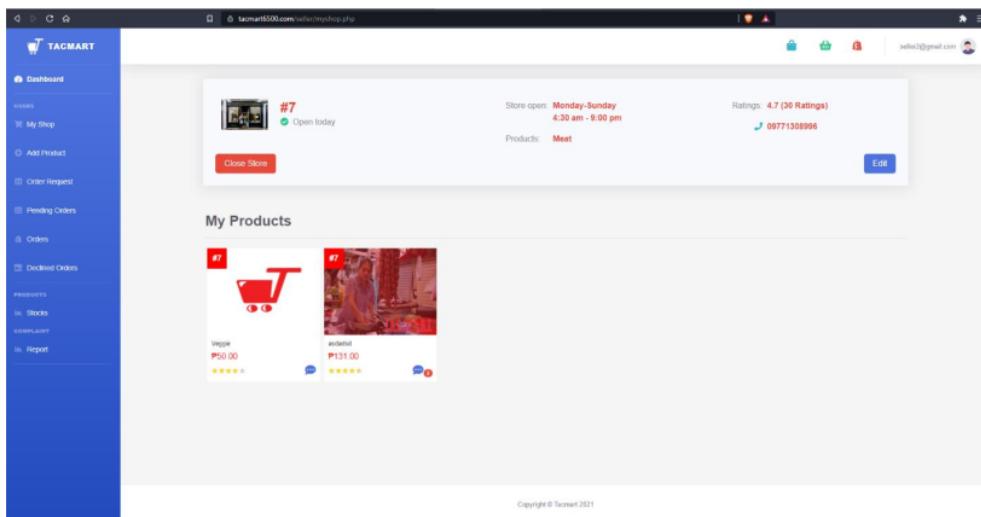


Figure 10. Local market vendor sells their products online via TacMart App

The researcher designs a user-friendly interface wherein local market vendors can sell their products online via the TacMart App. Local market vendors must register first to become a seller. The registration process in the system requires verification from the admin to ensure that they are registered market vendors in Tacloban Public Market. After registration, they can start uploading their product online.



2. Design an app that will enable buyers to purchase foods and essential needs online.

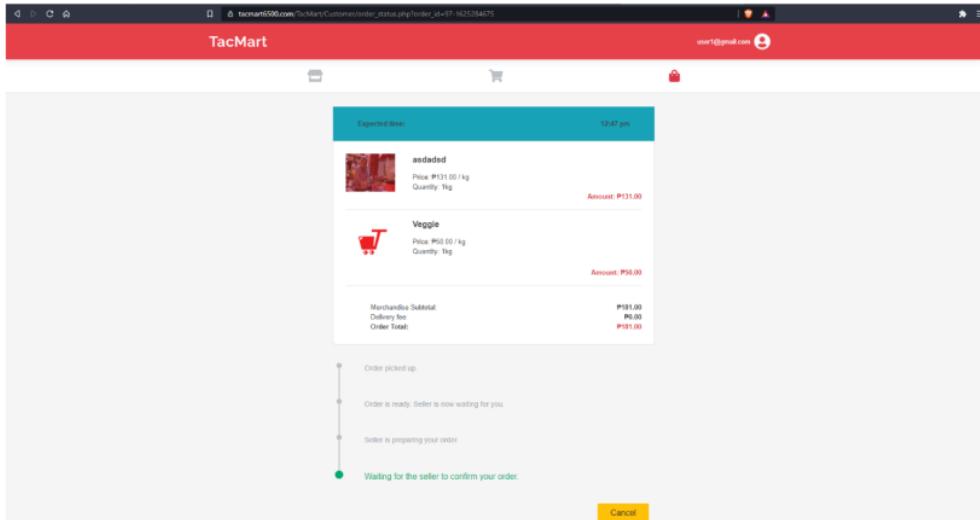


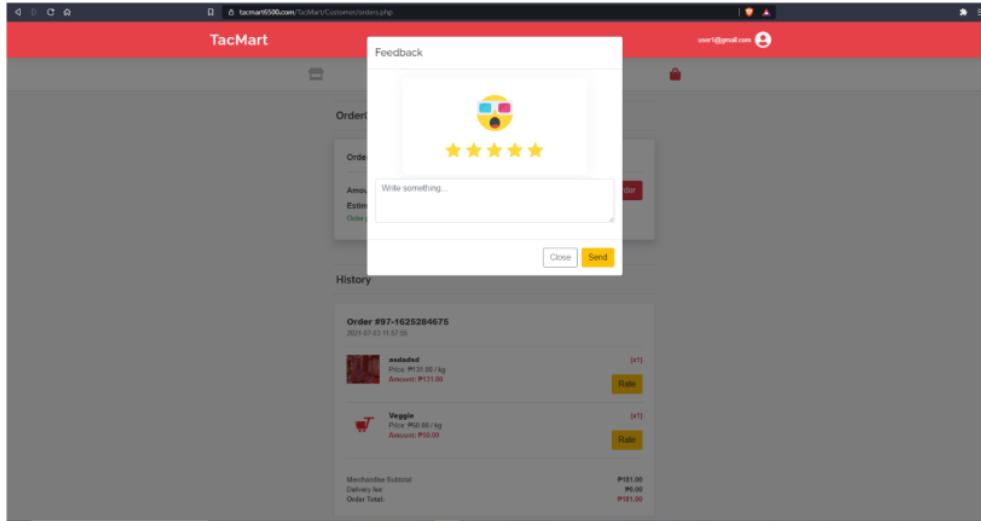
Figure 11. Buyers purchasing order from a local market vendor

Result

The researchers design an interface wherein buyers can purchase essential goods through the app by adding this to their cart and placing an order. Moreover, when placing an order, the buyer must indicate his or her address for the delivery of the product.



3. Develop a system where shoppers can rate and put reviews on purchased items.



items.

Figure 12. Buyers put ratings and reviews on a purchased item.

Result

In the proposed system, the researchers design an interface wherein shoppers can put ratings and reviews. The purpose of this interface is to get feedback from customers.



4. Apply a geolocation technology to determine the nearest rider to market.

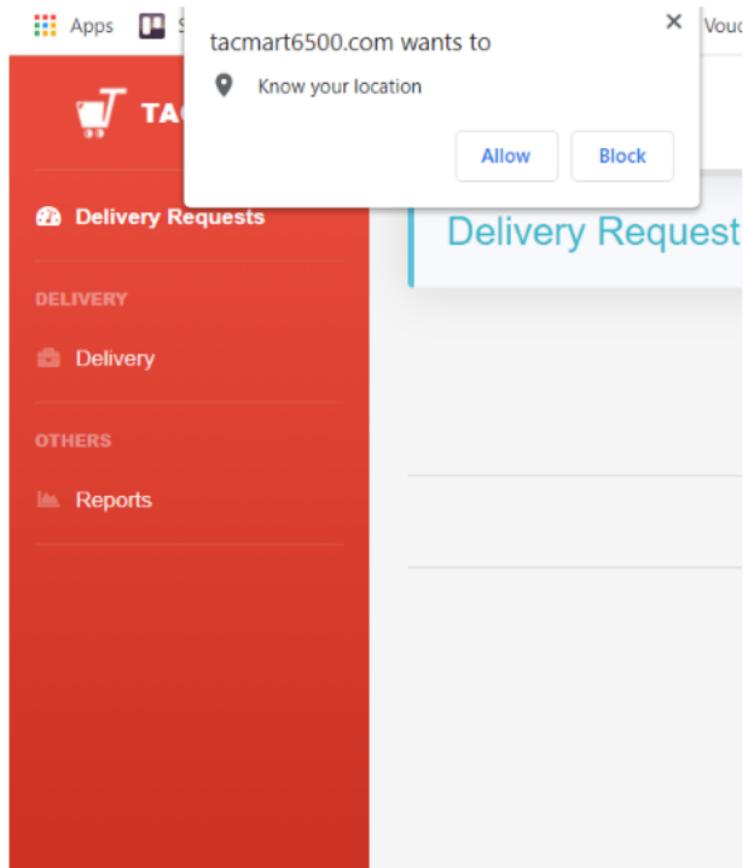


Figure 13. Geolocation technology in detecting the nearest rider to the market.

Result

Using the geolocation technology, the system has the capability to determine if a rider is near to the market and is available to pick up the order.



Alpha Test Result

Table 14, under Functionality, shows the result of the survey based on the ¹⁴ respondents' feedback. The table data received an overall mean of 4.08, which is interpreted as Agree. With this result, this means that most of the proposed system components and features are functional, and it meets the user's expectation when used under specified conditions (ISO, 2019).

Table 14. Description and Questions on Functionality

Questions	n	Mean	Interpretation
1. The system is accurate in executing its functions	30	4.0	Agree
2. The software does what is appropriate logically	30	4.1	Agree
3. The software runs with the different user level	30	4.0	Agree
4. The software generates a report.	30	4.20	Agree



5. The organization of menus and other information are arranged accordingly.	30	4.1	Agree
OVERALL MEAN		4.08	Agree

Table 15, under Efficiency, shows the result of the survey based on the ¹⁴ respondents' feedback. The table data received an overall mean of 4.1, which is interpreted as Agree. This result defines that most ⁶ of the proposed system components and features are efficient as it works with accuracy and completeness with which users achieve specified goals (ISO, 2019).

Table 15. Description and Questions on Efficiency

Questions	n	Mean	Interpretation
1. The software has the capacity to respond to every module in real-time	30	4.1	Agree
2. The system has the capability to upload files like pictures in real-time.	30	4.0	Agree
3. The system runs over the internet and can be used online.	30	4.3	Strongly Agree



4. The software displays information that are easy for the users to understand in order to complete a task	30	4.1	Agree
5. The system displays an error message and informs the user.	30	4.0	Agree
OVERALL MEAN		4.1	Agree

In table 16, under Usability, shows the result of the survey based on the feedback of 14 respondents. The table data received an overall mean of 4.1, which is interpreted as Agree. This result means that most of the proposed system components and features are usable and can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (ISO, 2019).

Table 16. Description and Questions on Usability

Questions	n	Mean	Interpretation
1. The system has a user-friendly interface.	30	4.3	Strongly Agree
2. The system is easy to use and shows no complications when using it.	30	4.0	Agree



3. The system has the saved option and the capability to edit it in the future.	30	4.3	Strongly Agree
4. The users feel comfortable using the system.	30	4.0	Agree
5. The system was simple enough to be used by the users.	30	4.0	Agree
OVERALL MEAN		4.1	Agree

Table 17 under Reliability shows the result of the survey based on the 14 respondents' feedback. The table data received an overall mean of 4.0, which is interpreted as Agree. This result means that most of the proposed system components and features are reliable as it performs specified functions under 5 specified conditions for a specified period of time (ISO, 2019).

Table 17. Description and Questions on Reliability

Questions	n	Mean	Interpretation



1. The system has fully developed functionalities.	30	4.1	Agree
2. The system is available and accessible online.	30	4.1	Agree
3. The system runs smoothly regardless of small bugs or issues.	30	4.0	Agree
4. The system responds appropriately when failures or errors are encountered.	30	4.1	Agree
5. The system provides a message to prevent error	30	4.0	Agree
OVERALL MEAN		4.0	Agree

Beta Test Results

Table 18, under Functionality, shows the result of the survey based on the feedback of the respondents. The table data received an overall mean of 4.1, which is interpreted as Agree. With this result, this means that most of the proposed system components and features are functional, and it meets the user's expectation when used under specified conditions (ISO, 2019).



Table 18. Description and Questions on Functionality

Questions	n	Mean	Interpretation
1. The system is accurate in executing its functions	10	4.1	Agree
2. The software does what is appropriate logically	10	4.2	Agree
3. The software runs with the different user level	10	4.2	Agree
4. The software generates a report.	10	4.1	Agree
5. The organization of menus and other information are arranged accordingly.	10	4.0	Agree
OVERALL MEAN		4.1	Agree

Table 19, under Efficiency, shows the result of the survey based on the ¹⁴ respondents' feedback. The table data received an overall mean of 4.1, which is



interpreted as Agree. This result defines that most of the proposed system components and features are efficient as it works with accuracy and completeness with which users achieve specified goals (ISO, 2019).

Table 19. Description and Questions on Efficiency

Questions	n	Mean	Interpretation
1. The software has the capacity to respond to every module in real-time	10	4.1	Agree
2. The system has the capability to upload files like pictures in real-time.	10	4.0	Agree
3. The system runs over the internet and can be used online.	10	4.3	Strongly Agree
4. The software displays information that is easy for the users to understand in order to complete a task	10	4.1	Agree
5. The system displays an error message and informs the user.	10	4.0	Agree



OVERALL MEAN		4.1	Agree
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In the table 20 under Usability, it shows the result of the survey based on the feedback of the respondents. The table data received an overall mean of 4.1 which interpreted as Agree. With this result, this means that most of the proposed system components and features are usable and can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (ISO, 2019).

Table 20. Description and Questions on Usability

Questions	n	Mean	Interpretation
1. The system has a user-friendly interface.	10	4.4	Strongly Agree
2. The system is easy to use and shows no complications when using it.	30	4.0	Agree
3. The system has the saved option and the capability to edit it in the future.	30	4.1	Strongly Agree



4. The users feel comfortable using the system.	30	4.0	Agree
5. The system was simple enough to be used by the users.	30	4.0	Agree
OVERALL MEAN		4.1	Agree

Table 21, under Reliability, shows the result of the survey based on the respondents' feedback. The table data received ¹⁴ an overall mean of 4.1, which is interpreted as Agree. This result means that most of the proposed system components and features are reliable as it performs specified functions under specified conditions for a specified period of time (ISO, 2019).

Table 21. Description and Questions on Reliability

Questions	n	Mean	Interpretation
1. The system has fully developed functionalities.	10	4.3	Strongly Agree
2. The system is available and accessible online.	10	4.3	Strongly Agree



3. The system runs smoothly regardless of small bugs or issues.	10	4.0	Agree
4. The system responds appropriately when failures or errors are encountered.	10	4.0	Agree
5. The system provides a message to prevent error	10	4.0	Agree
OVERALL MEAN		4.1	Agree

Table 22 under Security shows the result of the survey based on the ¹⁴ respondents' feedback. The table data received an overall mean of 4.0, which is interpreted as Agree. All questions and descriptions pertaining to the security of the system received a mean of 4.0. With this result, this ⁶ means that most of the proposed system components and features are secured as it protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization (ISO,2019).

Table 22. Description and Questions on Security

Questions	n	Mean	Interpretation



1. The system has restrictions on unauthorized users and secures data.	10	4.0	Strongly Agree
2. The system encrypts sensitive data such as the password.	10	4.0	Strongly Agree
3. The system has logs to track the actions being taken by a user.	10	4.0	Agree
4. The system works appropriately with their secured functionalities.	10	4.0	Agree
5. The system has error/warning message is helpful and easy to comprehend.	10	4.0	Agree
OVERALL MEAN		4.0	Agree

Table 23, under Maintainability, shows the result of the survey based on the ¹⁴ respondents' feedback. The table data received an overall mean of 4.0, which is interpreted as Agree. Based on this result, this defines that most of the proposed system components and features are maintainable as this shows effectiveness and ⁶



efficiency with which a product or system can be modified by the intended maintainers(ISO,2019).

Table 23. Description and Questions on Maintainability

Questions	n	Mean	Interpretation
1. The system has restored the data feature.	10	4.0	Strongly Agree
2. The system's user profile can be updated efficiently.	10	4.1	Agree
3. The system is flexible to changes or update.	10	4.1	Agree
OVERALL MEAN		4.0	Agree

The table above shows the qualities to be followed by the proposed system which it is under *ISO/IEC 25010:2011*. The majority of the question received Agree remarks. The average mean of all the tables is 4.0, and it is interpreted as Agree.



Based on the result, most of the proposed system components and features are able to meet the requirements of the ISO/IEC 25010:2011 in terms of qualitative characteristics.

System screenshot per user Account

TacMart Admin

1. Visual representation to easily determine the Total Earnings of all Sellers.

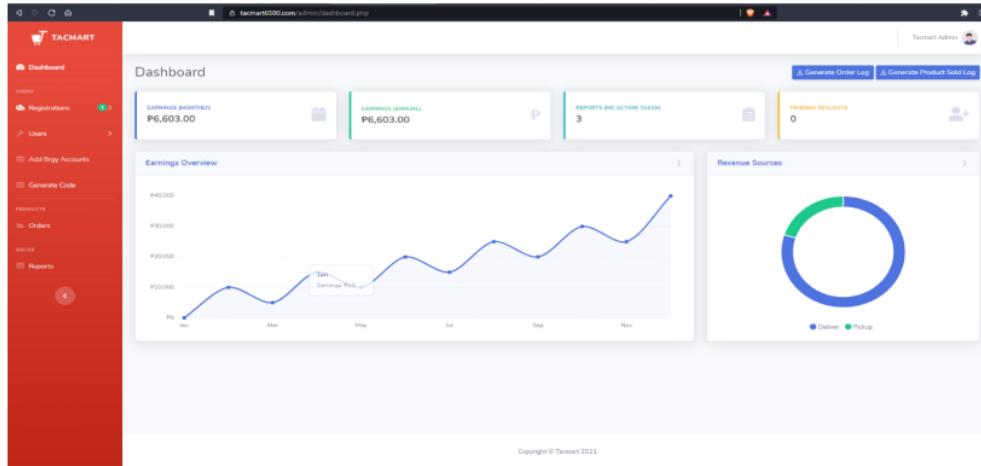


Figure 14. Dashboard Earnings Count of all Seller Page



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2. Visual representation list of Pending Sellers and Approved Sellers

The screenshot shows the 'Seller' section of the Tacmart admin interface. It displays two tables: 'Pending Registrations (Total: 0)' and 'List of Registered Sellers in MASA (Total: 26)'. The pending registration table has columns for Email, Name, Stall Number, Section, Documents, Date registered, and Action. The registered seller table has columns for Name, Stall Number, Section, Date Added, and Action. Both tables show 0 entries.

Figure 15. List of Sellers Page

3. List of Application of Riders and Approved Riders

The screenshot shows the 'Rider' section of the Tacmart admin interface. It displays a table titled 'Pending Registrations (Total: 0)' with columns for Email, Name, Date of Birth, Gender, Address, Vehicle, Documents, Date registered, and Action. The table shows 0 entries.

Figure 16. List of Riders Page



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4. Customers' names are represented visually in this diagram.

The screenshot shows the 'Customer Accounts' page of the TacMart admin system. The left sidebar has a red background with white text and icons. It includes sections for Dashboard, Users (with 'Customer' selected), Add Brgy Accounts, Generate Code, Products, and Reports. The main content area has a white background with a table titled 'Customer Accounts'. The table header includes columns for Email, Name, Contact #, Barangay, Purok/Street, Date Registered, and Action. One entry is listed: awd@gmail.com, alaw Cart, 09062919804, Barangay 10, Purok 6, 2021-06-29 08:54:20. There are also 'Previous' and 'Next' buttons at the bottom of the table.

Figure 17. Customers' accounts Page

5. Barangay Accounts

The screenshot shows the 'Brgy Admin Accounts' page of the TacMart admin system. The left sidebar has a red background with white text and icons. It includes sections for Dashboard, Users (with 'Add Brgy Accounts' selected), Add Brgy Accounts, Generate Code, Products, and Reports. The main content area has a white background with a table titled 'Brgy Admin Accounts'. The table header includes columns for Brgay, Email, Contact #, Name, Date Registered, and Action. Two entries are listed: Brgay 41 (email: brgyadmin@gmail.com, contact: 09062919804, name: Jenico Otobia, date: 2021-06-30 00:17:33) and Brgay 42 (email: tacmart650@gmail.com, contact: 09771308544, name: Mattest1, date: 2021-07-01 18:01:12). There are also 'Previous' and 'Next' buttons at the bottom of the table.

Figure 18. Barangays account Page



6. Generation of Code for Customers

The screenshot shows the TacMart application interface. On the left is a red sidebar with navigation links: Dashboard, Users (selected), Add Brig Accounts, Generate Code, Orders, Reports, and a settings gear icon. The main content area is titled "Brig Admin Accounts". It displays a table with one entry:

Email	Code	Name	Date Generated	Status
user1@gmail.com	CxU2nQ2	User One	2021-07-01 17:58:53	Not Registered

Below the table, it says "Showing 1 to 1 of 1 entries". At the top right of the content area is a green button labeled "+ Add user". The top of the browser window shows the URL "https://tacmart5000.repl.co/generateCode.php".

Figure 19. Generation of Code Page



7. Generation of reports by the Seller, Buyer, Rider

The screenshot shows the TacMart software interface with a red sidebar on the left containing navigation links: Dashboard, Users, Add Brig Accounts, Generate Code, Orders, and Reports. The main area is titled 'Reports' and contains two sections: 'New Reports: 3' and 'Saved Reports: 1'. Both sections have tables with columns: Email (Reporter), Reported, Issue, Complaint Title & Problem, Images, Date Reported, and Action. The 'New Reports' table has three entries:

Email (Reporter)	Reported	Issue	Complaint Title & Problem	Images	Date Reported	Action
awd@gmail.com	Seller	Delivery Issues	View Problem		2021-06-30 01:04:26	
jhepettcar00@gmail.com	Seller	Delivery Issues	View Problem		2021-07-01 01:54:58	
jhepettcar00@gmail.com	Customer	Delivery Issues	View Problem	View Images	2021-07-01 01:57:34	

The 'Saved Reports' table has one entry:

Email (Reporter)	Reported	Issue	Complaint Title & Problem	Images	Date Reported	Action
awd@gmail.com	Seller	Delivery Issues	View Problem		2021-06-30 01:03:38	

Figure 20. Generation of Reports Page

Sellers Account / Page



1. Dashboard of the Seller

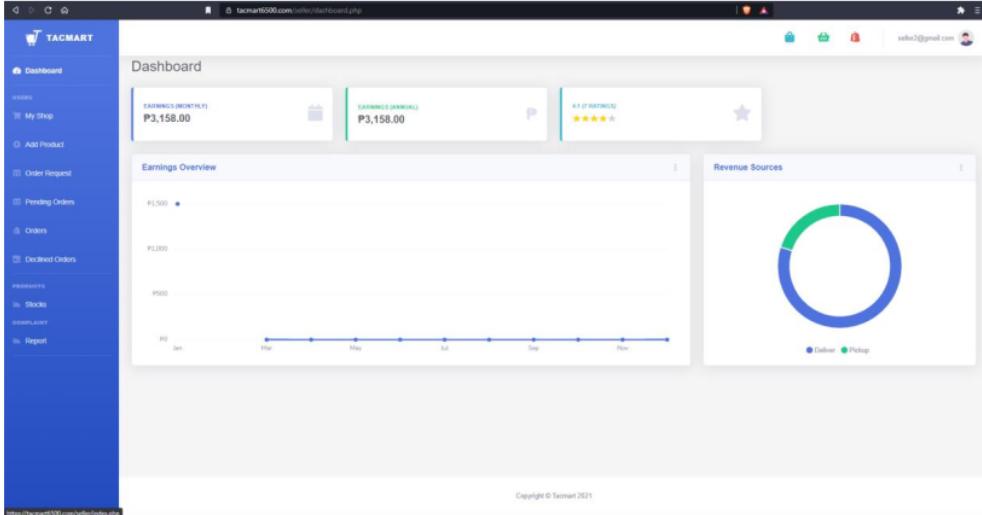


Figure 21. Seller's Dashboard Page

2. Seller's list of products

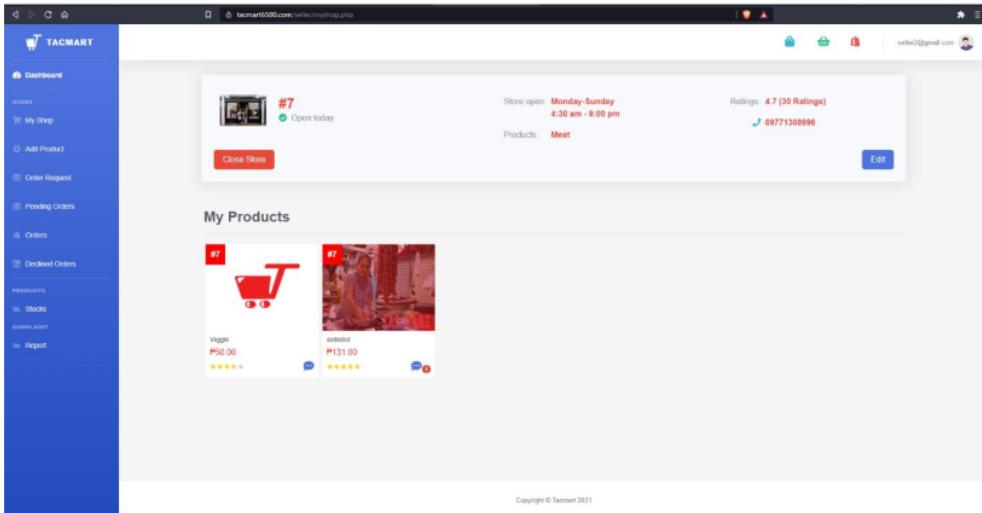
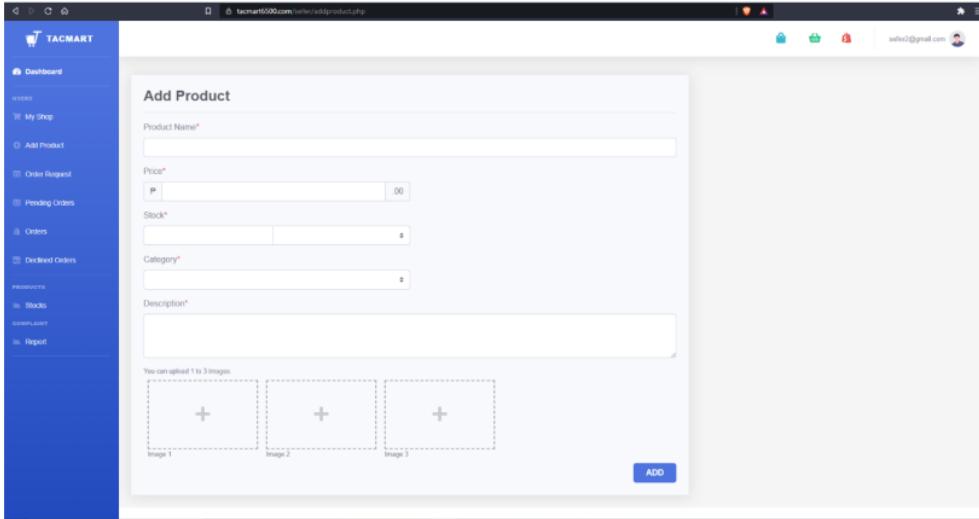


Figure 22. Seller's Shop Page

3. Adding of product to shop



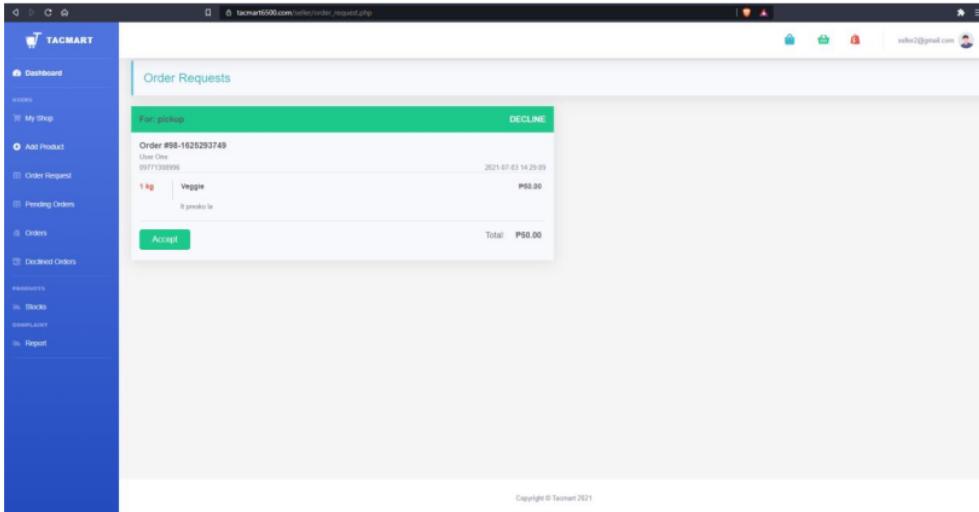
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The screenshot shows the 'Add Product' form on the TacMart platform. The left sidebar has a blue header 'TACMART' with a shopping cart icon. Under 'SELLER', it lists: My Shop (selected), Add Product (radio button), Order Request, Pending Orders, Orders, Declined Orders. Under 'INVENTORY', it lists: Stocks, Report. The main area has a title 'Add Product'. It contains fields for Product Name*, Price* (with a numeric input field showing 'P 00'), Stock* (with a numeric input field showing '00'), Category* (dropdown menu), Description* (text area), and three dashed boxes for image uploads labeled 'Image 1', 'Image 2', and 'Image 3'. A blue 'ADD' button is at the bottom right.

Figure 23. Seller's Adding of Product Page

4. Visual representation of orders from the buyers



The screenshot shows the 'Order Requests' page on the TacMart platform. The left sidebar has a blue header 'TACMART' with a shopping cart icon. Under 'SELLER', it lists: My Shop (radio button selected), Add Product, Order Request, Pending Orders, Orders, Declined Orders. Under 'INVENTORY', it lists: Stocks, Report. The main area shows a single order request card for 'For pickup'. The card details: Order #08-1625293749, User One (09771330996), Date 2021-07-03 14:29:09. It shows a product entry for '1 kg Veggie' with a price of 'P50.00'. At the bottom of the card are 'Accept' and 'Decline' buttons. The footer says 'Copyright © TacMart 2021'.

Figure 24. Sellers Order Request Page



5. Visual representation of orders that are ready to notify the buyer and rider

The screenshot shows a web-based application interface for a seller. On the left is a sidebar with a blue header "TACMART" and various menu items: Dashboard, My Shop, Add Product, Order Request, Pending Orders, Orders, Declined Orders, Stocks, Report, and another Stocks item. The main content area has a green header "Pending". Below it, there is a card for an order labeled "For pickup". The order details are: Order #98-1625293749, User Oba, #89771300996, 2021-07-03 14:29:09. It contains 1 kg of Veggie at P80.00. A green button "Notify Customer" is visible. At the bottom right of the card, it says "Total: P80.00". The footer of the page includes "Copyright © Tacmart 2021".

Figure 25. Seller's Pending Request Page

6. List of orders that are ready to deliver or delivered

The screenshot shows a web-based application interface for a seller. The sidebar is identical to Figure 25. The main content area has an orange header "Orders". Below it, there is a card for an order labeled "For pickup". The order details are: Order #98-1625293749, Customer: User Oba, #89771300996, 2021-07-03 14:29:09. It contains 1 kg of Veggie at P80.00. A green button "Picked up" is visible. At the bottom right of the card, it says "Total: P80.00". Below this card, there is another card labeled "Done" with a grey background. It shows an order labeled "For pickup": Order #97-1625284675, Customer: User Oba, #89771300996, 2021-07-03 11:57:00. It contains 1 kg of asdasdasd at P131.00 and 1 kg of Veggie at P80.00. At the bottom right of this card, it says "Total: P181.00".

Figure 26. Sellers for Order Delivery Page



7. Visual representation of declined orders

The screenshot shows a web browser window for 'TACMART' with the URL 'tacmart6000.com/seller/declined_orders.php'. The left sidebar has a blue background with various menu items: Dashboard, My Shop, Add Product, Order Request, Pending Orders, Orders, Declined Orders, Stocks, Complaint, and Report. The main content area is titled 'Declined Orders' and contains two entries, each for a pickup order:

- For: pickup**
Cancelled by: Customer @2021-07-02 12:45:26
Order #94-1625229914
Customer User One # 09771308996
2021-07-02 20:45:14
1 kg asdasdasd P131.00
It needs to be Total: P131.00
- For: pickup**
Cancelled by: Customer @2021-07-02 12:45:26
Order #93-1625229914
Customer User One # 09771308996
2021-07-02 20:45:14
1 kg asdasdasd P131.00
It needs to be Total: P131.00

Figure 27. Seller's Declined Order Page

8. Visual representation of submitting a report to administrator

The screenshot shows a web browser window for 'TACMART' with the URL 'tacmart6000.com/seller/report.php'. The left sidebar is identical to Figure 27. The main content area is titled 'Report' and contains a form with the following fields:

- Note: Make sure to include photos for evidence.
- Who's your Reporting?*: Select dropdown menu.
- Complain issue*: Select dropdown menu.
- Complaint Title*: Text input field.
- Tell us about your problem*: Textarea.
- Do you have a photo to prove your complaint?*: Choose file input field with 'Browse' button.

A red 'Submit' button is at the bottom right. At the very bottom of the page, it says 'Copyright © Tacmart 2021'.

Figure 28. Seller's Reports Page



Costumers Account / Page

1. Costumer's Market View

The screenshot shows a web browser window for 'TacMart'. The title bar says 'TacMart'. The main content area displays two product cards. The first card is for 'Veggie' at ₱50.00/kg, with a 5-star rating and a 'View Details' button. The second card is for 'Asada' at ₱31.00/kg, also with a 5-star rating and a 'View Details' button. A search bar at the top right says 'Search product'. At the bottom, there is a footer with social media icons and the text '© 2021 TacMart. All Rights Reserved'.

Figure 29. Costumers Market Page

2. Customer's Cart

The screenshot shows a web browser window for 'TacMart'. The title bar says 'TacMart'. A modal window titled '47 - Meat Section' is open in the center. Inside the modal, there are two product cards: 'Asada' (selected) and 'Veggie'. The Asada card shows a quantity of 1. Below the modal, the main page shows a total of 'Total (0 items): ₱0.00' and a 'Checkout' button. A footer with social media icons and the text '© 2021 TacMart. All Rights Reserved' is visible at the bottom.

Figure 28. Seller's Reports Page



3. Visual representation of Tracking Order

The screenshot shows the TacMart Customer Order Tracking page. At the top, there are three tabs: Home, Order, and Profile. Below the tabs, there are sections for 'Order(s)' and 'History'.
Order(s):
- Order #98-1625293749: Amount: P60.00, Estimated time Delivered: 2:59 pm, Order is ready...
- Order #95-1625229978: Amount: P131.00, Estimated time Delivered: 9:16 pm, Order picked up.
History:
- Order #97-1625284675: 2021-07-03 11:57:55, avsdasd, Price: P131.00/kg, Amount: P131.00, Rated (0)

Figure 29. Customers Tracking Order Page

Riders Account / Page

1. Visual representation of rider's delivery request

The screenshot shows the TacMart Rider Delivery Request page. On the left, there is a sidebar with navigation links: Home, Delivery Requests, Delivery, Address, and Reports. The main content area has a header 'Delivery Request' and a message 'Waiting for delivery request...'. At the bottom right, it says 'Copyright © Tacmart 2021'.

Figure 30. Riders Deliver Request Page



2. Visual representation of rider's delivery history and income

The screenshot shows a web-based application interface for a delivery rider. On the left, a vertical red sidebar contains navigation links: 'Delivery Requests' (selected), 'Delivery', 'Address', and 'Reports'. The main content area has a header 'Income' with two boxes: 'EARNINGS (MONTHLY)' showing ₱0.00 and 'EARNINGS (DAILY)' also showing ₱0.00. Below this is a section titled 'Delivery History' which is currently empty. At the bottom right of the main area, there is a copyright notice 'Copyright © TacMart 2021'.

Figure 31. Riders Delivery History Page

3. Riders' report / complaint page

The screenshot shows a web-based application interface for a delivery rider to file a report. On the left, a vertical red sidebar contains navigation links: 'Delivery Requests' (selected), 'Delivery', 'Address', and 'Reports'. The main content area has a header 'Report' with several input fields: 'Who's your Reporting?' dropdown set to 'Customer', 'Complaint issue' dropdown set to 'Delivery Issues', 'Complaint Title' text input, 'Tell us about your problem' text area, and a 'Do you have a photo to prove your complaint?' section with a 'Choose file' button and a 'Browse' button. At the bottom is a large red 'Submit' button. The URL in the address bar is tacmart6500.com/rider/report.php.

Figure 32. Riders Reports Page



Chapter VI

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Conclusions and Recommendations

This chapter states the conclusion and recommendation of the study. The outcome of the research undertaken will be explained here.

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Conclusions

The researcher concluded that in order to lessen the struggle experience by shoppers in buying foods and essential goods in Tacloban Public Market during this time of the pandemic, the proposed system TacMart, a hybrid application, will help them minimize this kind of problem. The app helps the residents around Tacloban City to purchase essential goods online and will limit the need to go to Tacloban Public Market physically.

According to a survey conducted by the researchers, most shoppers states that buying essential goods for their home needs is time-consuming and a tough job during this height of the pandemic, plus the problem in transportation becomes an additional for them.

The proposed system TacMart aims to solve the problems experienced by shoppers in Tacloban Public Market. This system can be accessed online by using a desktop or an android phone. Shoppers can select a variety of items from a store of a local market vendor and make an order. Payment of the transaction made through the system is accepted on cash on delivery which is more favorable and comfortable for the buyers.

In general, the researchers can say that the proposed system is such a great help for shoppers in Tacloban Public Market because it provides assistance to them in buying foods and essential goods.



Recommendation

The proposed system was developed to help shoppers ease their problems being experience when buying foods and essential goods in Tacloban Public Market. In this study, the researcher identified recommendations for further betterment, enhancement, and improvement of the system.

For the future developer, the proponents of the system recommend you to build an app for the proposed system that will run on IOS phones. In this study, the researchers focus on developing only a hybrid app that runs on android phones only due to the limited resources of the proponents. Having this kind of app built on an IOS phone, more people can use the application without having a problem with the device they are using.

For future researchers, if you are going to conduct a study relevant to the proposed system, the proponents recommend you to add some additional user experience like having vouchers and promo codes. In this study, the researchers didn't include it during the development of the proposed system such that the client didn't allow it to include in the system. Moreover, having this kind of user experience will bring more user engagement to the system.

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