DESIGN OF POINT OF SALES APPLICATION USING DESIGN THINKING APPROACH AT UKM MART

UNDERGRADUATE THESIS

Submitted to the International Undergraduate Program in Industrial Engineering in Partial Fulfilment of Requirement for the Degree of Sarjana Teknik at the Faculty of Industrial Technology Universitas Islam Indonesia

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INTERNATIONAL UNDERGRADUATE PROGRAM
IN INDUSTRIAL ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
UNIVERSITAS ISLAM INDONESIA
YOGYAKARTA
2024

AUTHENTICITY STATEMENT

AUTHENTICITY STATEMENT

For the sake of Allah SWT, I admit this work is the result of my own work, except for the excerpts and summaries from which I have explained the source. If in the future, it turns out that my confession is proven to be untrue and violates the legal regulations in the paper and intellectual property rights. In that case, I am willing to get a diploma that I have received to be withdrawn by Universitas Islam Indonesia.

Yogyakarta,October 9, 2024

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DESIGN OF APPLICATION POINT OF SALES USING DESIGN THINKING APPROACH AT UKM MART

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DESIGN OF POINT OF SALES APPLICATION USING DESIGN THINKING APPROACH AT UKM MART

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DEDICATION PAGE

Alhamdulillahirabbil‘alamin

I dedicate this undergraduate thesis to my parents, whose love, prayers, and support never stop accompanying me every step. Thank you for the love and faith that has always been a strength in every journey.

My beloved siblings and family, who always provide encouragement, laughter, and happiness when I need it. You are the inspiration in every achievement.

My friends, who faithfully accompanied me in the struggle to complete this thesis, through various joys and sorrows. Thank you for all your help, jokes, and endless support.

Supervisors and teachers, who patiently guided and directed me, providing knowledge and inspiration at every opportunity. Your guidance and support have been an important part of the completion of this work.

To all parties who have played a role in the process of preparing this thesis, I also dedicate this dedication as an expression of gratitude for the contribution and support provided.

MOTTO

“The best of people are those who are most beneficial to others.”

(Al-Mu'jam Al-Awsat by Tabarani).

PREFACE

Assalamualaikum Warahmatullahi Wabarakatuh,

Alhamdulillah, all praise to Allah SWT, because only with his permission the author can finish the undergraduate thesis, Shalawat, and greetings to the prophet Muhammad SAW, who has saved mankind from jahiliyyah era to the Islamiyah era and give syafaat in yaumul akhir.

This report was made to fulfill the requirements for completing a degree in Industrial Engineering at Universitas Islam Indonesia. The author realizes that he cannot finish this project without the help of their teammate. The author also says thanks for all the support, prayers, and motivation for all families that have already supported the author to finish this undergraduate thesis. Thus, the author would like to thank:

1. Prof. Dr. Ir. Hari Purnomo, M.T., IPU., ASEAN.Eng. as Dean of Industrial Technology Faculty, Universitas Islam Indonesia.
2. Dr. Drs. Imam Djati Widodo, M.Eng.Sc. as the Head of the Department of Industrial Engineering Universitas Islam Indonesia.
3. Ir. Muhammad Ridwan Andi Purnomo, S.T., M.Sc., Ph.D., IPM. As Head of the Undergraduate Program in Industrial Engineering Universitas Islam Indonesia
4. Ir. Ira Promasanti Rachmadewi, M.Eng, as the Secretary of the International Undergraduate Program in Industrial Engineering Universitas Islam Indonesia.
5. Mr. Bambang Suratno, S.T., M.T., Ph.D. as the supervisor who always provides guidance and knowledge to help the author finish this undergraduate thesis.
6. Ms. Devy Nurrahmah, S.Kom Staff of the International Undergraduate Program in Industrial Engineering Universitas Islam Indonesia always help the author by providing administrative aspects during this study.
7. The author's beloved parents, Mr. Hemly Jambo and Mrs. Yuni Ayu, the author's siblings M. Tohri Maulana Jambo and Dihla Nabila Jambo, and my big family who always give support, motivation, and prayers.
8. The Author's best friend that always supports the author and gives him motivation.

In crafting this undergraduate thesis, the author acknowledges the impossibility of achieving perfection. Instead, the author invites readers to engage with the work critically, offering constructive critiques and valuable recommendations. The ultimate goal is to ensure that this report provides substantial benefits to all parties involved.

Wassalamualaikum Warahmatullahi Wabarakatuh.

Yogyakarta, October 9 ,2024

Gahly Mulyana Jambo

ABSTRACT

The increasing use of technology has resulted in the growth of various kinds of advances, including marketplaces and shops that sell website-based goods so that sales can increase and are not only limited to sales in nearby areas. The Point of Sales system created is also expected to be able to manage data quickly and precisely, the application can be used easily by workers and is time efficient in carrying out bookkeeping. The design and implementation of the Point of Sales (POS) system for UKM Mart were approached using the Design Thinking methodology. This methodology facilitated a user-centered design process, ensuring the final application met the specific needs and preferences of the users at UKM Mart. The primary objectives of this study were to design a user-centric POS application, develop the application to meet the specific needs of UKM Mart and evaluate its usability to ensure it aligns with user expectations. The key stages included Empathize, Define, Ideate, Prototype, and Test. Each stage contributed significantly to the overall usability and effectiveness of the POS system. Through the Design Thinking approach, which includes stages such as empathizing, defining, ideating, prototyping, and testing, we have successfully identified and incorporated the essential features required by the users. The POS application was developed using the Bootstrap framework, which facilitated a responsive design suitable for various devices, including PCs, smartphones, and tablets BlackBox testing ensured that the application functions met user expectations. Usability testing revealed that the application significantly improves the transaction recording process, reduces manual bookkeeping errors, and saves time.

Keywords: The Point of Sales (POS), Design Application, Blackbock Testing.

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CHAPTER I
INTRODUCTION

1.1 Research Background

In this modern era, technology has become quite an important need to help with work in various fields. One of the results of technological progress is in the economic and business fields. A business that was originally carried out using conventional methods can change with the presence of information technology (Akhmad & Purnomo, 2021) and can provide added value and advantages to the business being run (Sugumonrong, et al., 2019). The increasing use of technology has resulted in the growth of various kinds of advances, including marketplaces and shops that sell website-based goods so that sales can increase and are not only limited to sales in nearby areas.

UKM mart is a mini market that operates in the field of selling SME products in the city of Bekasi. Not only managing sales, UKM mart also manages the warehouse and stock of Bekasi City UKM products. The large number of SME products in the city of Bekasi makes UKM marts experience difficulties in collecting data on goods, both in the form of goods sales and orders. Another difficulty experienced by UKM marts is that the store's income and expenses are recorded manually using a ledger when there are sales and orders. Manual recording takes quite a long time and is ineffective, and information errors may occur, such as recording profit and goods losses (Marisa & Yuarita, 2017) as well as difficulties in recording sales transactions, store checking management, and payments (Wiguna, et al., 2019). It cannot be denied that if you only use manual bookkeeping and recording, it will require more time and costs, which are used to buy paper and so on. Not to mention, you have to carry out monthly recapitulations, which will add to various problems in its implementation. Therefore, a more computerized transaction system is a quite appropriate solution. With a computerized transaction system, activities have become faster and more organized. One of them is the use of a cashier system. The use of a cashier system often called point of sales will make recording transactions and making recapitulations more efficient. In practice, there are various types of cashier systems, ranging from web-based, desktop, and mobile. There are various advantages and disadvantages to each type. One of the advantages of a web-based system is that it can be accessed anywhere and from various platforms, such as mobile and desktop. Even though you have to use a browser to access it, a web-based cashier system would be a pretty good solution.

The Point of Sales application can be a useful solution to ease the bookkeeping process at UKM mart so that it can be carried out quickly and precisely. The Point of Sales system created is also expected to be able to manage data quickly and precisely, the application can be used easily by workers and is time efficient in carrying out bookkeeping. In the end, this paper aims to design and create a website-based point of sales information system application to make it easier for UKM mart workers to operate the application to get bookkeeping results quickly and accurately.

In designing applications that suit user needs, user experience is needed that suits user needs in solving problems experienced by users so that the application can be easily used by users. User Experience is how a person feels when using a product or application. By applying User Experience to the application design process, the products created will have a greater opportunity to compete and have a greater opportunity to be used by users who need the products we make. When users use applications with poor User Experience, users will prefer other products that have a better User Experience (Krug, 2014). Design thinking is a human-centered approach where innovations taken from designer tools are used as an integration of human needs, technology, and business success (Kelley & Brown, 2018). The author uses a design thinking approach in the process of understanding the user's needs and steps taken to achieve the user's goals, as well as the process of empathizing with the user. This iterative process of design thinking helps the process of designing solutions that suit the user.

1.2 Problem Formulation

From the explanation of the research background above, the problem statement is :
Not only managing sales, UKM mart also manages warehouses and stock inventory of Bekasi City SME products. UKM mart still runs conventionally in running its business. However, the large number of Bekasi City SME products makes it increasingly difficult for UKM mart to record goods, both in the form of selling goods and recording stock. Another difficulty experienced by UKM mart is that the income and expenses of the store are recorded manually using a ledger when there are sales, orders, and stock records. Therefore, if only using manual bookkeeping and recording, it will require more time as well as costs, which are used to buy paper and others.

From the problem statement above, the research questions can be formulated as follows:

1. How is the design of the information system of point of sales that suits to user needs?
2. How can the design of point of sales application suit user needs?
3. How to develop a point-of-sales application that suits user needs?
4. How to evaluate the usability of point of sales application?

1.3 Research Objective

The research objectives related to overcoming the problem formulation above are as follows:

1. Identifying the feature needs that users require.
2. Determine an application that makes it easier for users to achieve their goals and make it easier to use the application.
3. Identifying solutions from the stage of understanding user needs and analyzing user needs by making prototyping.
4. To find out whether the application is suitable

1.4 Scope of Research

To limit the space in this research, the limitations of the problem given are as follows:

1. The users who will be involved are workers from UKM mart.
2. The approach used is design thinking in designing point-of-sales applications.
3. This research is limited to the application design stage and does not include full system implementation.

1.5 Research Benefit

This research is expected to provide benefits to all parties, including:

1. For researchers to compare knowledge from theory and reality in the field, it is a requirement for the writer to obtain a bachelor's degree in industrial engineering from Indonesian Islamic University.
2. For the company, this research is expected to be a reference for making improvements

in various aspects so that the company can make it easier to record transactions and the company could use the result of this research as a consideration of system change in the field of business management. The company is also able to know what aspects that still need improvement.

3. For further researchers, this research can be used as a reference and source of information in conducting research related to these topics, either continuing or complementary.

1.6 Systematic Writing

The systematic in writing this research are as follows:

CHAPTER I INTRODUCTION

Explaining the background of technology in the modern era which has become an important enough need to help work such as managing stock and recording sales. However, UKM mart is still doing it manually, so the author designs a point of sales application with a user-focused design thinking approach to answer each problem formulation and the author hopes that with this research UKM mart will benefit after using the point of sales application.

CHAPTER II LITERATURE REVIEW

This chapter contains a literature review and empirical studies, in which a literature review contains previous studies related to previous point of sales applications which are used as a reference for conducting research. At the same time, the theoretical basis contains thetheories supporting the research.

CHAPTER II METHODOLOGY

This chapter contains the object of research, namely UKM Mart, design of point of sales application using the design thinking approach, with primary data (Software Requirements and User Experience), as well as the flow of research conducted from the beginning of the research to the end.

CHAPTER IV DATA COLLECTION AND PROCESSING

This chapter contains data collection and data processing obtained by predetermined methods and designed based on software requirements, then, the processed data is tested and analyzed using blackbox testing and

usability analysis to achieve research objectives.

CHAPTER V DISCUSSION

This chapter contains an explanation of the analysis obtained in detail with the suitability of the results of the research objectives so that they can provide recommendations for improvements.

CHAPTER VI CONCLUSION AND SUGGESTION

This chapter contains the conclusions from the research that has been carried out and provides recommendations for suggestions for improvements to the results obtained by the formulation of the problem that has been determined so that it is hoped that it can be studied further in further research.

CHAPTER II
LITERATURE REVIEW

2.1 Literature Review

G. Pamungkas and H. Yuliansyah (2017) researched the design of application points of sales at cafes for portable cashiers and Bluetooth printers. A portable cashier application that helps process sales transactions in several cafes that do not have a digital sales system recapitulating income from sales and purchases is still done using the Microsoft Excel application which is done by filling in a special form containing a list of food and drinks then filling in the order list into a form which is then used as a tool to summarize transaction data and proof of sales for buyers. Transaction data recording is carried out after the cafe has closed and includes all proof of sales. After all the transaction data has been entered, you can find out how many and what items were sold in real-time, this can happen because we already have our format for collecting this data. However, shop owners still have difficulties because they have to record data one by one every day in an Excel file. "This is what inspired the creation of this application to simplify the transaction process and recapitulate cafe transaction reports more precisely, quickly, and clearly.

Sidhunata, Billy Macarius, et al. (2023) researched the challenge of MSME business is the change of transaction systems from conventional to digital processes to minimize human error. This research offers an idea to identify problems, classify digital innovation ideas, analyze needs, and design management information systems Point of Sales (POS) modules in CV. Renaldi Motor. The method used in designing the management information system of the POS module of the OmO Jaya Workshop application is design thinking. The stages in this research consist of empathizing, defining, ideating, prototyping, and testing. The results of this study show that the problem faced by Micro, Small, and Medium Enterprises (MSMEs) workshop businesses is the process of recording transactions that still use conventional methods. Through the digital innovation of the POS module management information system in the form of the OmO Jaya workshop application. Through the application, a CV. Renaldi Motor is expected to optimize the digital transaction recording system and improve business performance. Thus, the risk of business losses due to human error can be minimized. In addition, the Blackbox test results show that the test results in each process have been successful and as expected. This study concluded that the Point of Sales (POS) System can

improve CV. Renaldi Motor's business performance through digitizing the sales transaction recording process.

Suratno, B., & Shafira, J. (2022) researched Information systems have an important role for firms to increase productivity. A service company located in Bontang, East Kalimantan, Indonesia (GMS), is engaged in scaffolding installation services and scaffolding rentals. The company has steadily experienced an annual increase in the number of customers over the years. However, due to the manual way of managing the scaffolding material, the increase in workload has also led to the increasing number of material handling human error cases and inefficient service processing time. As a company that provides B2B services, the management (user) then needs a website-based system for scaffolding material management that is tailored to their service operations and suits their special needs to support their operation. Thus, this study analyzes the suitable user interface/user experience using the Design Thinking method, which consists of 5 steps, namely Empathize, Define, Ideate, Prototype, and Test. It serves as the initial phase of information system building to make sure that the design of the website-based information system will suit the needs of their management. After conducting empathize stage using interview techniques and questionnaires and also conducting the define stage to gain insights on the required needs, it was known that the website system needed particular features, namely the availability of customer data, material data, user data, work partner data, transaction reports, invoices, integration with WhatsApp and email, as well as a dashboard to visualize data such as the amount of material rented, available materials, and transaction history. In the prototype development stage, online UI/UX design tools are used. Using the prototype, the testing stage was then carried out, using the System Usability Scale (SUS) method. As a result, a value of 80.86 was obtained, meaning that the system created has good usability and can be used on an ongoing basis.

Fernando, R., & Wiratama, J. (2023) researched Efficiency and effectiveness are crucial in the food & beverage industry. Conventional methods employed by companies often lead to discrepancies between actual stock and the stock available for sale, resulting in significant losses. To address this issue, a point-of-sales-based system has been implemented, enabling companies to monitor transaction activities seamlessly. The research utilized the RAD (Rapid Application Development) method to develop a concise and fast software

application. Furthermore, hashing and encryption methods have been incorporated to enhance database security, utilizing the SHA-512 algorithm for hashing and data encryption. This research has yielded a point-of-sales website-based application that supports various business processes. The website has been tailored to meet the specific requirements outlined by the company owner. The UAT test results have demonstrated that the application encompasses all the desired features, effectively addressing the company owner's concerns.

Dewi, E. Z., Fransisca, M., Handayani, R. I., & Cahyanti, F. L. D. (2022) researched the “Product UMKM Online” website is a marketplace or e-commerce that is used as a medium to facilitate UMKM actors in Indonesia in marketing their products and helping UMKM actors to further increase their product sales and help play an important role in the UMKM business process in Indonesia. however, the author found on the website there are still some shortcomings, so the author researched. this study aims to provide recommendations as reference material in the form of a prototype design so that it can be developed in the future. in this study, the author uses a Design Thinking method approach to be able to produce a UI/UX design that fits the user’s needs. There are several processes in the research method that the author uses, namely empathize, define, ideate, prototype, and test. The prototype stage goes through several stages, namely understanding a problem, designing a solution then making a prototype which is then tested on several users. The application of the Design Thinking method in this research is expected to improve the user’s experience better than before.

Putra, R., Pebiansyah, A. O., Sulaeman, L. R., Nurali, N., & Utama, D. (2023) researched CV REN is a company engaged in convection. CV REN is one part of PT Minori, a Job Training Institute (LPK) that sends trainees to Japan. CV REN is currently still producing and selling using conventional techniques, namely manually. In addition, at this time, Muslim trainees who wear hijabs who will go to Japan are not allowed to use hijab that uses needles or similar tools because it is considered to be dangerous for both the trainees themselves and consumers. Therefore, a special hijab e-commerce application was designed without needles for trainees who want to buy hijabs so that it can be used while interning in Japan, easily, and quickly trusted. Observations, interviews, and literature studies were conducted for data collection. The design thinking method is also used in the analysis stage of application design needs.

Maulana, M. S. (2017) This study aimed to design and implement an application point of sales on children's boutique "Gallery Freya" in order to improve service quality in sales, monthly transaction reports, income statements, and balance sheets as well as facilitate the monitoring of inventory so availability may in check without having to manually check in the closet goods. Applications designed with server and client systems using the programming language PHP and MySQL database. The result of this research is the web application point of sales order facilitates the management of goods, recaps monthly transactions, and income statement and balance sheet.

Tambunan, R. A., & Silviana, N. A. UI/UX (2023) researched the livestock sector as one of the income sources for people in Laupakam Village who are engaged in poultry farming, goats, buffaloes, and other types of livestock planning to sell and market online but are constrained by website-based application information systems to sell and market various livestock products. In addition, the sale of livestock is commonly done is also still traditionally done, such as selling around the village using a freight car or marketing in traditional markets, which slows down sales and does not guarantee sales. Based on the above problems, the author provides a solution by designing a user interface user experience website for livestock sales that creates the final result in the form of a prototype and can be used directly by users for the testing stage. So that with this design it can make it easier for people to sell and buy livestock products and easily improve the economy in Laupakam Village. This design process uses the design thinking method, which includes five stages, namely empathize, define, ideate, prototype, and test. Then, testing in this study includes aspects of effectiveness, efficiency, and user satisfaction using the usability testing method. Based on these tests, the effectiveness aspect obtained a value of 78.9%, the efficiency aspect obtained a value of 85%, and the user satisfaction aspect obtained a value of 82.7%. So, the design of the livestock sales website solution gets a value of 81.78%; this value is included in the very good category.

Nasution, W. S. L., & Nusa, P. (2021) researched Humans are basically inseparable from education in carrying out life. The implementation and development of educational studies must also be adapted to the conditions and social situations that exist in the community. The main focus of Goal 4 on Sustainable Development Goals (SDGs) is to provide inclusive quality education or to ensure everyone has an equal opportunity to get

good quality education. In fact, Indonesia is still struggling with the quality of teachers issues. In the school year of 2019/2020, there are 8.98% unqualified teachers and headmasters at the primary school level, 6.16% at the junior high school level, 10.07% at the senior high school level, and 10% at the vocational high school level. Cumulatively, from the primary school level to the vocational high school level, there are 247.462 unqualified teachers and headmasters in Indonesia. This is a serious problem, considering that teachers are an important component in determining the quality of education itself. In this research, the UI/UX design prototype of a learning web application named “IdeIn” was developed using the Design Thinking method that consists of empathize, define, ideate, prototype, and test stages. The main focus of this learning web application is to provide an opportunity for the whole community to support education in Indonesia by conducting online classes.

Putra, F. G. N. P., & Djajanto, L. (2023) researched The Point of Sales (POS) system refers to a system that supports sales transactions where POS is currently growing since it has the ability not only to record sales, record inventory, print invoices, calculate profits but also improve services for business people and entrepreneurs. Super Mama Frozen Food is a store that is currently developing in Malang. In addition, simple access to buying products through online services has increased transactions. However, at Super Mama Frozen Food, most of the data management, data processing, and sales transaction processing have so far relied on a manual or paper-based recording system. As a result, this condition may open up risks in both data management and security. By designing a website-based Point of Sales System, recording sales, collecting inventory, printing invoices, and calculating profits can be done using the PHP programming language with the CodeIgniter framework and MySQL. This system was developed using the Agile Method with the reason that short-term system design can increase client satisfaction.

P. Pramono and H. M. Nur (2013) researched the sales system currently running in the Zone Café Purwokerto, the transaction process often increases; to overcome this, a Point of Sales application was created based on the existing transaction system. Processing employee data, food, transactions, granting admin access rights, granting cashier access rights as well as a password security system that works well and smoothly, the security system in the application and database is equipped with a login password that is limited to 3 errors. This Point of Sales application has input design specifications in the form of a billing order

document which is useful for recording customer orders and a product menu list which is useful for viewing food and drink menus. The data specifications produced by this application are in the form of payment notes which are useful as proof of payment, stock reports, transaction reports, and sales data.

Table 2.1 Summary Literature Review

No	Author	Title	Method	Category
1.	G. Pamungkas and H. Yuliansyah (2017)	Rancang Bangun Aplikasi Android Pos (Point of Sale) Kafe Untuk Kasir Portable Dan Bluetooth Printer.	Waterfall	Food and Beverage
2.	Sidhunata, Billy Macarius, et al. (2023)	Point of Sales (POS) System Design using Design Thinking Framework for Motorcycle Workshop	Design Thinking	Repair Service
3.	Suratno, B., & Shafira, J. (2022)	Development of User Interface/User Experience using Design Thinking Approach for GMS Service Company	Design Thinking	Service
4.	Fernando, R., & Wiratama, J. (2023)	Developing Web-Based Point of Sales Application with SHA-512 Encryption on DBMS for Indonesian MSME's Culinary Industry	Rapid Application Development	Culinary

No	Author	Title	Method	Category

5.	Dewi, E. Z., Fransisca, M., Handayani, R. I., & Cahyanti, F. L. D. (2022)	Analysis and Design of UI/UX Mobile Applications for Marketing of UMKM Products Using Design Thinking Method	Design Thinking	Retail
6.	Putra, R., Pebiansyah, A. O., Sulaeman, L. R., Nurali, N., & Utama, D. (2023)	Application of Design Thinking and Prototype Methods in The Design of Mobile-Based Hijab E-Commerce Applications: CV REN	Design Thinking	Retail
7.	Maulana, M. S. (2017)	Rancangan dan Implementasi Aplikasi Web Point of Sales pada Butik Anak "Galery Freya"	Waterfall	Fashion
8.	Tambunan, R. A., & Silviana, N. A. UI/UX (2023)	UI/UX Design Web-Based Livestock Sale Using Design Thinking to Rapid Prototyping	Design Thinking	Farm
9.	Nasution, W. S. L., & Nusa, P. (2021)	UI/UX Design Web-Based Learning Application Using Design Thinking Method	Design Thinking	Service
10.	Putra, F. G. N. P., & Djajanto, L. (2023)	Design and build a Point of Sales (POS) application model using the agile method for super mama frozen food	Agile	Culinary
11.	P. Pramono and H. M. Nur (2013)	Perancangan Aplikasi Point of Sales Berbasis Desktop (Studi Kasus: Zone Cafe Purwokerto)	Classic Life Cycle	Food and Beverage

2.2 Empirical Study

2.2.1 Point of Sales

Point of Sale is a system that allows the sales transaction process to be carried out such as sales in shops, hotels, restaurants, supermarkets, and retail stores. POS is also defined as a transaction service in a retail store that includes the use of a cash register (Wahyudi, et al, 2018). Point of Sale consists of software which is the main component in carrying out the process and hardware to support running applications such as transactions that require reading. barcodes and printing customer shopping receipts (Wiguna, et al, 2019). POS systems are designed with customer needs in mind (Alexander, 2020) because there are several different needs for each field that uses POS applications.

How a POS system works can at least do:

1. Automate processes such as sales transactions.
2. Track sales data.
3. Collect sales information during a certain period.
4. Monitor inventory of goods and stock.
5. Can work on computer networks so that transactions related to goods and sales can be carried out in different places.
6. Can make multiple payments or payments using various methods such as cash, credit card, debit, and transfer.

2.2.2 Design Thinking

Design Thinking is a process or approach that is centered on human needs to combine individual or group needs as a way to solve an existing problem. According to Kelley & Brown written in journal (Lazuardi & Sukoco, 2019), design thinking has several important elements, including:

1. People-Centered: this element focuses actions on user needs.
2. Highly Creative: this element provides space to create high levels of creativity in the planning process.
3. Hands-On: this element aims to provide a statement regarding the success and feasibility of an idea.
4. Iterative: this element shows a process of improvisation and producing a product according to user needs.

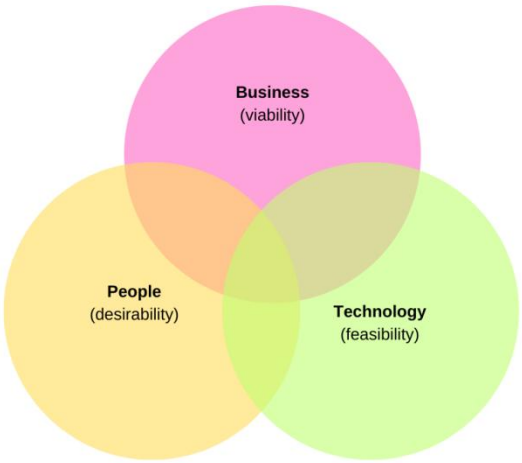


Figure 2.1 Elements of Design Thinking

Source: (Marbun, 2018)

Figure 2.1 shows that the design thinking approach combines three elements, namely business (viability), people (desirability), and technology (feasibility) as considerations in creating an idea.

According to Kelley & Brown, written in the journal (Lazuardi & Sukoco, 2019), along with the development of this modern era, the design process has begun to change and evolve a lot. Design is not just a product that sells well on the market, or an attractive shape, or is easy to look at. Design in the current era is related to creating things that suit the desires and needs of users.

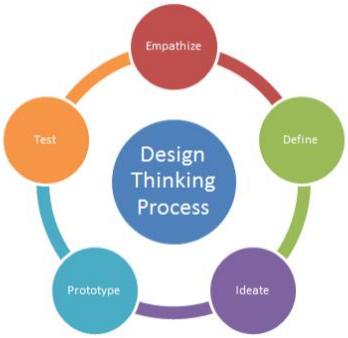


Figure 2.2 Stages of Design Thinking

Source: (Marbun, 2018)

Figure 2.2 shows that there are five stages in the design thinking process, namely empathize, define, ideate, prototype, and test.

1. Empathize

   In this stage, the author focuses on searching for information and observing user experience. The purpose of this stage is for the writer to be able to empathize with the user so that he can be in the same position and point of view as the user.

2. Define

   After passing the information collection stage, at this stage the author identifies the information that has been collected. From this identification, the core of the problem that occurred was found, which became the main goal in creating a point of sales application.

3. Ideate

   At this stage, the search for ideas will be carried out by paying attention to assumptions and creating innovative ideas. Through this stage, a list of ideas that can be responded to will be generated. These ideas will become high-fidelity mockups that will develop into prototypes.

4. Prototype

   After getting the results of the idea design in the ideate stage, then proceed to prototype design, so that the abstract ideas that have been presented can be realized into a prototype design. This stage is an experimental stage to test whether each solution idea is appropriate or not.

5. Test

   The prototype that has been created in the previous stage will be experimented with by users. From user experience in using prototypes, input will be obtained to make better products and make improvements to existing products.

2.2.3 User Experience

User experience is defined as a design process based on user experience so that a product is easy to use and relevant to the user experience. The structure of the user interface influences the user's learning process and is one of the most important factors in developing an application. An application cannot run optimally without careful preparation and design (Aziza and Hidayat, 2019).

2.2.4 Interview

In the empathy stage, the user interview stage is carried out. This stage uses a semi-structured interview, which is carried out by asking a series of open questions based on the topic you want to research or ask. This open question can make the interviewee answer more broadly without having to answer according to the general structure of interview questions. Semi-structured interviews also carry out interviews that are not typical, even like normal conversations, which are able to elicit more information from the person you are talking to (Blandford, Furniss, & Makri, 2016).

In the semi-structured interview process (Blandford, Furniss, & Makri, 2016) there are several stages of the structure as follows:

a. **Opening conversation**: the opening conversation is quite important to make the participant comfortable and convince the participant that the participant has a lot of experience and understands the purpose of the interview.
b. **Providing an understanding of the research objectives**: providing understanding to participants so that participants understand the objectives of the research and provide information according to the research objectives.
c. **Initial interview**: the initial stage of the interview focuses on gathering background information from the participant.
d. **Interview in progress**: at the interview stage, participants' behaviors will be seen whether they are comfortable or not.
e. **End of interview**: at the final stage of the interview participants are given the opportunity to add anything else they want to say. This happens when participants forget what they want to say during the interview.

2.2.5 BlackBox Testing

Black-box testing, also known as behavioral testing, is testing that focuses on things that can be done on a system, in this case, the functional requirements. This test is conducted by creating a set of input conditions that may occur as test cases to ensure that all defined functional needs of the system have run properly (Pressman, 2010). In this test, the tester does not have access to the source code or components of the system but only refers to the previously created system specifications (Sommerville, 2016).

2.2.6 Usability Analysis

Some definitions of usability according to sources:

a. Usability analysis is an evaluation process used to evaluate the ease of use of a product or system. It aims to identify problems that may arise in the use of the product or system, such as navigation problems, less intuitive interfaces, or difficulties in accessing certain features.
b. Usability is the extent to which a product can be used by users to achieve goals with effectiveness, efficiency, and user satisfaction (ISO, 2009).
c. Usability is a measure of the quality of the user's experience when interacting with a product or system, whether a website, software application, mobile technology or other equipment operated by the user (Nielsen, 2012).

It can be concluded that usability in general is a product used by users to measure the quality of the user's experience when interacting with the product. These measurements can be obtained with a questionnaire.

CHAPTER III
RESEARCH METHOD

3.1 Research Object

According to the KBBI Dictionary are objects, things, and so on that are targeted for research and attention. In this study, the company that became the research object was UKM mart, which is located on Jl. Perjuangan No.1, Teluk Pucung, Bekasi Utara.

3.3 Research Flow

Below is the research flow:

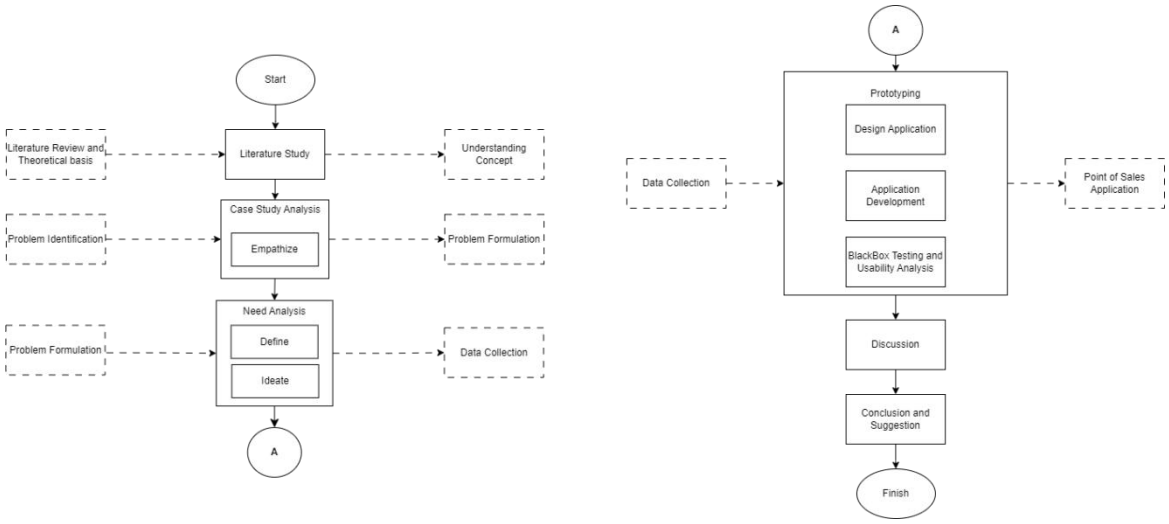


Figure 3.4 Research Flow

3.3.1 Literature Study

At this stage, a literature study is carried out related to the research topic, such as point of sale, UI/UX, Design Thinking, and other literature related to the problem of designing web-based applications. As well as collecting literature in the form of previous research papers with topics similar to the topic being worked on, such as the development of point-of-sale applications with a design thinking approach to serve as a reference source for this research work.

3.2 Data Collection Method

The following are the two types of data used in this research.

1. Primary Data

Primary data is obtained from sources through interviews and surveys. According to Smith (2020), primary data is data collected directly by researchers using methods such as surveys, interviews, and experiments, as opposed to data that has previously been published or collected by others. In this study, primary data was obtained through interviews and surveys. Interviews were conducted directly with UKM mart workers to collect data on software requirements and surveys to measure user satisfaction using the System Usability Scale (SUS).

A. Software Requirements

The first step in effective software requirement definition is to gather and document what users want and need the software system to do (Pressman, 1982). In the software requirements process, the author designs a research project plan so that the purpose of the interview becomes definite, and the results of the interview are more useful in the process of designing solutions to existing problems. The following is a draft research project plan that the author used during the user interview:

a) Objective

The purpose of this research is to find out how workers make transactions and make records and monthly recapitulations. The author needs to understand these things so that the author can find out what features will be very relevant and helpful for users.

b) Methods

Conducting directed interviews with workers and asking workers to share experiences that occur when they do their work. The participants were workers aged 21 and 24 years, totaling 2 participants.

c) Location

Conduct interviews both face-to-face and through online media. For time and the place of the interview are determined by the interviewee so that the interviewee feels more comfortable.

d) Time

The interview time is adjusted to the free time of the interviewee and in accordance with the agreement that has been agreed upon.

e) Question List

The following questions will be asked during the interview :

Table 3.1 Questions List

No	Question
1.	What is the typical process of selling, recording and managing stock at UKM mart?
2.	What are the difficulties in the process of selling, recording, and managing stock?
3.	Do you need the ability to manage product inventory?
4.	Do you need the ability to accept cash, bank transfer, or other payment methods?
5.	Do you need the ability to print sales receipts or invoices?
6.	Are you aware of Point of Sales applications?
7.	What are the features that must be present in a point of sales application?

B. User Experience

The method used for POS testing is the BlackBox method, the method focuses on how the application works used by users, without paying attention to how it is made or how the program is written. The purpose of BlackBox testing is to ensure that the POS application is used easily and effectively by users in accordance with the needs and expectations set. In the user experience process, the author gave a questionnaire to a number of respondents who were UKM mart workers. The questionnaire used in this study is the System Usability Scale (SUS) questionnaire which consists of 10 statements that aim to measure the usability level of an application or system. With the number of statements that are not too many then in completing the SUS statement takes a fairly short time. SUS statements on odd numbers have statements with positive sentences while on even numbers there are statements with negative sentences. In answering SUS statements, a Likert scale is used, namely from strongly agree, agree, doubt, disagree, and strongly disagree (Kusumawardhana, et al., 2019). The average score obtained from the SUS questionnaire is then used as an indicator of the usability level of the tested web-based POS application. The following are the statements submitted to

respondents:

Table 3.2 Questionnaire Questions

No	Question
1.	Are you familiar with using a computer?
2.	Are you not used to using a web browser?
3.	Is the POS application display easy to understand?
4.	Does the POS application have buttons that are not in the right position?
5.	Do you feel that the functions in the POS application work properly?
6.	Is the POS application fast when loading?
7.	Do you feel you will be able to learn this POS application quickly?
8.	Is the POS application confusing to use?
9.	Do you feel there are no obstacles in using the POS application?
10.	Do you need to familiarize yourself first before using this POS Application?

Table 3.3 5-point Likert scale

Response	Score
SD = Strongly Disagree	1
D = Disagree	2
N = Neutral	3
A = Agree	4
SA = Strongly Agree	5

For the calculation itself, you can use the rules according to the SUS method. Instrument statement odd number instrument answer scale minus 1, instrument statement even number then 5 minus instrument answer scale, 0-4 scale assessment results (4 is the best answer), summing up the answers then multiplying by 2.5, and determining the average value of the test instrument answers of all respondents. The data obtained from respondents, which has been processed using the SUS formula, is then converted into 4 (four) ways of SUS assessment methods, namely:

1. Net Promoter Score: A significant correlation is obtained between the SUS score results and the Net Promoter Score. To be called a promoter, the SUS score obtained must be at

least 78.9.

2. Acceptability: This is the result of the SUS score which is described in terms of "acceptable" or "not acceptable". The criteria are acceptable if the SUS score is at a value above 70.
3. Adjective: The scale is represented by adjectives which are expressions that are often spoken by users when responding to the usefulness of a system.
4. Grade Scale: In this research, a grade scale type will be used which consists of five scales, namely A, B, C, D, and E. The SUS weight at each grade level is as follows:
   - A: score ≥ 78.8
   - B : 78.8 > value ≥ 72.6
   - C : 72.6 > value ≥ 62.5
   - D : 62.5 > score ≥ 51
   - E : score > 51

3.3.2 Case Study Analysis

At this stage, an analysis of the case study will be carried out as a research topic, where here the case study uses one of the MSMEs in Bekasi which is a mini market that sells Bekasi city MSME products, namely UKM Mart. This analysis was carried out using the Empathize.

3.3.2.1 Empathize

Here, interviews are conducted with UKM Mart workers to find out the feature needs that users need in the point of sales application.

3.3.3 Needs Analysis

After analyzing the case study, the next is to analyze the needs that will be carried out in this study, the topic of this research is the design of the point of sale for UKM Mart, therefore the needs that will be explored are related to the problems faced by UKM Mart, the data needed in making applications, user preferences, and so on.

3.3.3.1 Define

At this stage, the author identifies the information that has been collected. From this identification, the core of the problem that occurred was found, which became the main goal

in creating a point of sales application.

3.3.3.2 Ideate

At this stage, the search for ideas will be carried out by paying attention to assumptions and creating innovative ideas. Through this stage, a list of ideas that can be responded to will be generated. These ideas will become high-fidelity mockups that will develop into prototypes.

3.3.4 Prototyping

After getting the results of the idea design in the ideate stage, then proceed to prototype design, so that the abstract ideas that have been presented can be realized into a prototype design. This stage is an experimental stage to test whether each solution idea is appropriate or not.

3.3.4.1 Design Application

Furthermore, from the analysis of the needs obtained, a design is carried out for application development. Designing a database that will be created according to the data and needs to create a point of sale application, along with the application interface design that will be developed.

3.3.4.2 Application Development

After making designs for databases and application interfaces, at this stage the development of web-based point-of-sale applications is carried out in accordance with the solutions initiated and needs, the development of this application is in accordance with the interface design that has been designed in the previous stage and the database design that has been made, application development using the Bootstrap framework with its grid system which is easier to organize website layouts according to several devices with different screen sizes which will help in making the web application interface responsive and suitable for access via PC or smartphone or tablet mobile devices.

3.3.4.3 BlackBox Testing and Usability Testing

The method used for POS testing is the BlackBox method, the method focuses on how the application works used by users, without paying attention to how it is made or how the

program is written. The purpose of BlackBox testing is to ensure that the POS application is used easily and effectively by users in accordance with the needs and expectations set. Usability analysis is an evaluation process that is used to evaluate the ease of use of a product or system. It aims to identify problems that may arise in the use of the product or system, such as navigation problems, a less intuitive interface, or difficulties in accessing certain features

3.3.5 Discussion

At this stage, the prototype that has been processed is then analyzed and discussed to determine and determine the results of application testing at UKM Mart.

3.3.6. Conclusions and suggestions

Conclusions and suggestions are the final part of this research. In this section, researchers draw final conclusions from the results of the analysis and discussion carried out to answer the initial objectives of this study. This conclusion is also used by researchers as a basis for recommendations for UKM Mart or other researchers who are conducting similar research.

CHAPTER IV
DATA COLLECTING AND PROCESSING

4.1 Empathize

The empathy stage in design thinking emphasizes a user-centered approach to deeply understand the user's perspectives, experiences, and problems. Compared to other methods that may favor system logic or process efficiency directly, the empathy stage of design thinking seeks to gain a deep understanding of what users really want and need. Here are the specific differences when using the empathic design thinking approach compared to other methods:

1. Focus on User Experience: This approach starts with understanding the user's emotions, motivations, and daily context. In the SME Mart case study, for example, interviews were conducted to find out the challenges employees faced when manually recording sales and managing stock. The results of the interviews helped in discovering the POS app feature needs that are relevant to them.
2. Observation and Direct Involvement: The empathy stage in design thinking often involves direct observation or semi-structured interviews that allow users to share their experiences without fixed answer patterns. This yields richer data than other more structured or rigid methods, such as standard questionnaire surveys.
3. Deep Understanding of User Problems: In this approach, the researcher tries to put themselves in the user's shoes to understand problems that may not be obvious from quantitative data alone. For example, the design thinking approach in SME Mart helped the researcher realize that manual processes led to the risk of data loss and inaccuracies in financial records that could impact the business.
4. Basis for Creative Solution Development: Through empathic understanding, the design team was able to identify the unique needs of the users that formed the basis for creative solution development. This differs from other approaches, such as waterfall, which are more linear and may not allow room for innovation based on user experience.

The empathy stage in design thinking guides the team to not only solve the problem technically but also ensure that the solution is relevant, easy to use, and provides value to the user, something that is not always achieved through other design approaches.

Interviews were conducted to find out the features that users want so that they can become a reference for the author to provide features in the application to suit user needs. The following are the responses from the 2 workers interviewed:

Table 4.1 Worker Response 1

No	Response 1
1	Still using books to record sales and stock, for transactions also still using only cash.
2	Counting manually, writing one by one, risk of miscalculation
3	Yes
4	Yes
5	Yes
6	Yes, I know
7	Transaction Recording, product management, stock management, online payment system, financial reports

From the response of worker 1, it is stated that the sales and recording process still uses books and only cash and has learned the point of sales application.

Table 4.2 Worker Response 2

No	Response 2
1	for the sales process it is still as usual, only cash. if the stock is using the sales recording book
2	Miscalculation, forgetting to put the record book (lost)
3	Yes
4	Yes
5	Yes
6	Yes, I know
7	Transaction Recording, product management, stock management, online payment system, financial reports

The response of worker 2, also stated that the sales and recording process still uses books and only cash and has learned the point of sales application. Then a survey is conducted to find and find out the features that prospective users want so that it can become a reference for the author to provide features in the application, the survey aims to make the Point of Sales

application in accordance with the needs and desires of prospective users. Table 4.3 shows the features written by respondents for the application, including easy online payment features, Product management features, Stock management features, and Accounting Features. Other features can be seen in Table 4.3 below.

Table 4.3 User desired features

No	Desired Features
1	Transaction recording feature
2	Product management feature
3	Stock management feature
4	Payment system feature
5	Accounting Feature

4.2 Define

After collecting various information obtained in the previous stage, the next stage is to identify user needs based on the information that has been collected. Identification of user needs is done by observing the results of interviews that have been conducted to find out what features the user needs. Based on the results obtained from interviews with workers, there is information that workers already know about the Point of Sales application. Workers also provide responses or opinions regarding what features users need in the point of sales application. From the results of these interviews, the authors can be helped to identify user needs from the responses experienced by workers. Here are some statements of user needs that have been found by the author:

1. The platform that Point of Sales will use needs to be able to run on the Internet.
2. Determination of features used based on needs, namely Transaction recording Feature, Product management Feature, Stock management feature, Payment system feature, and Accounting Feature.
3. Designing an easy-to-use interface design
4. Online payment system that is safe and easy to use by users

4.3 Ideate

After identifying user needs at the define stage, these four aspects become a reference in determining solution ideas in designing point-of-sales applications, especially to continue the UI/UX design process and the next application design process.

1. Platform that will be used Point of Sales.

   In designing this point of sales application, the author determines the platform to be used, namely the website. The platform plays an important role in the design of point-of-sales applications where all sales and recording processes occur. Some considerations made by the author in choosing this website platform include the aspect of the costs incurred can be said to be quite low in using the website, then in the aspect of users who do not need to download and install applications on smartphones or PCs. In addition, the website platform has high credibility and is able to display a lot of content needed. The consideration is one of making UKM mart workers easy to access.

2. Design of Features used

   The concept of designing a point of sales application is that users play an important role in the design process. Users can access and view various information about the features of the application. Users are also able to operate accounting and sales and check stock.

3. User-friendly interface design

   At the beginning of designing the interface design concept to be used based on observations that have been made through interviews with potential users, there is information about users who want a website platform using an interface design that is easy to understand, easy to understand, and easy to use. So that when users access or process records or transactions on the website, there is no confusion experienced by users.

4. Online Payment System Used

   At the beginning of the concept design of the payment system carried out by the author was to use cash, bank transfer, and online payment (Qris).

4.4 Prototyping

Point of Sales application is a web-based application; this application is designed and designed based on the wants and needs of users, including the features contained on each page of the Point of Sales application. This prototype design also aims to provide instructions to users about the flow of using the Point of Sales website application in outline. The author makes a prototype design with an interactive, communicative, and easy-to-use interface design in order to attract enthusiasm from users in using the Point of Sales website that will be developed in the next stage. The following is the design of the Point of sales application for UKM mart.

4.4.1 Design Application

To make it easier to understand, the results of the discussion will be explained using a diagram to explain the flow of using a website-based point of sales application. The author will also explain the appearance of what has been made.

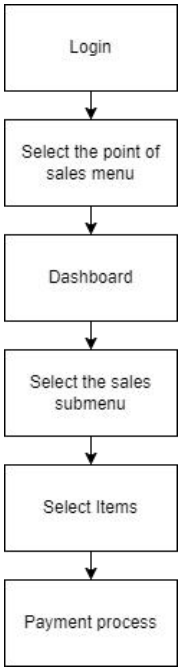


Figure 4.1 Point of Sales Sequence Diagram

Figure 4.1 is a diagram that explains the sequence of using the application by the cashier. The cashier will log in. After that, choose the point of sales menu then the dashboard and the Sales submenu. Products purchased by customers will be inputted by searching for barcodes or product names. After that, the cashier will input the amount of customer money. The change will be calculated automatically according to the method:

Total money - Total spending = Money back

Then the cashier can continue the payment process by pressing the Process Payment button and a shopping receipt will appear that can be printed by the cashier.

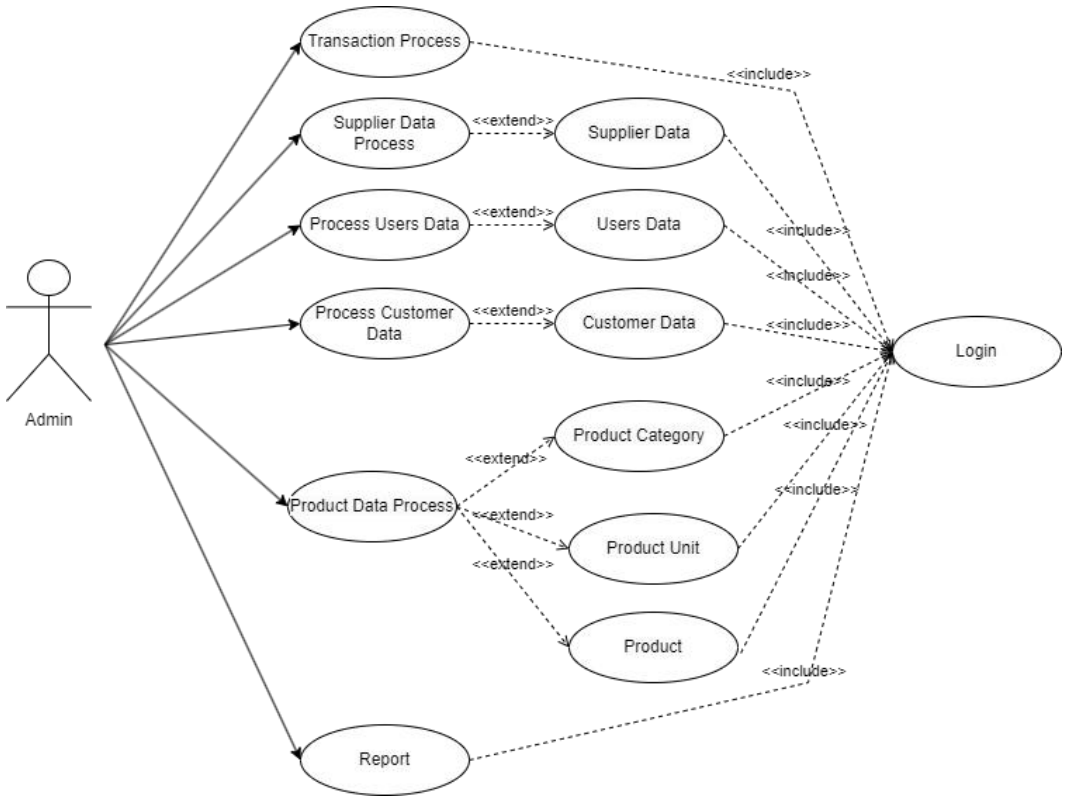


Figure 4.2. Admin Use Case Diagram

Figure 4.2 is a use case diagram for the admin that explains the tasks that the admin has. First, the admin can process transactions like a cashier. The admin is also tasked with processing supplier data, namely by adding, changing, or deleting supplier data owned by the store. Next is the user data process. User data here is data for cashiers. In this application, the cashier cannot create his own account. So that Admin can add, change, or delete accounts for cashiers. Next is the Customer data process. Customer data is intended to store customer data that has subscribed to the store so that it is neatly recorded. Admin is also tasked with processing product data such as adding, changing, or deleting product categories, product units, and products.

4.4.2 Application Development

The database design is described by using the database scheme used in making website-based point of Sales applications.

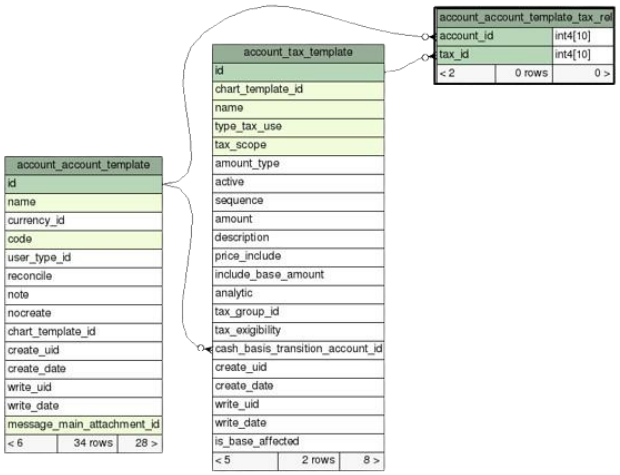


Figure 4.3 Database Design

Figure 4.4 shows the results of the interface design of the website-based point of sales application prototype design.

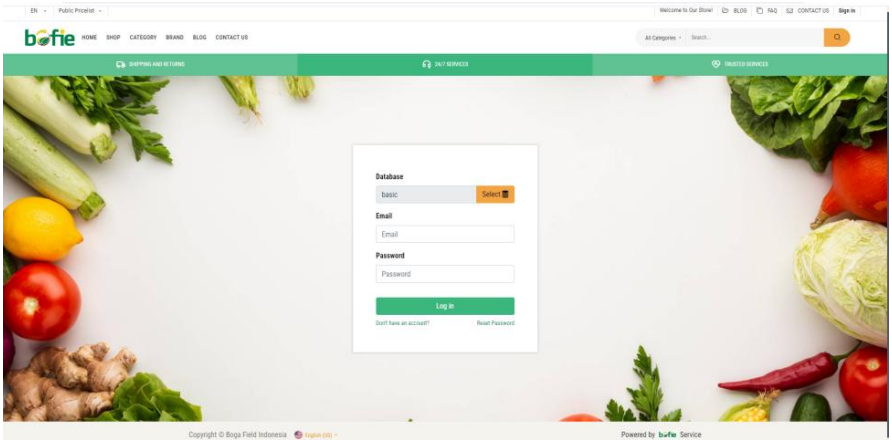


Figure 4.4 Login page view

Figure 4.4 is a view of the login page. On the login page, workers must input the appropriate username and password.

Figure 4.5 Admin Dashboard Page

Figure 4.5 is a view of the dashboard page for the admin of the cashier application. The main page displays the number of items, the number of suppliers, the number of customers who have billed, and the number of users for the cashier.

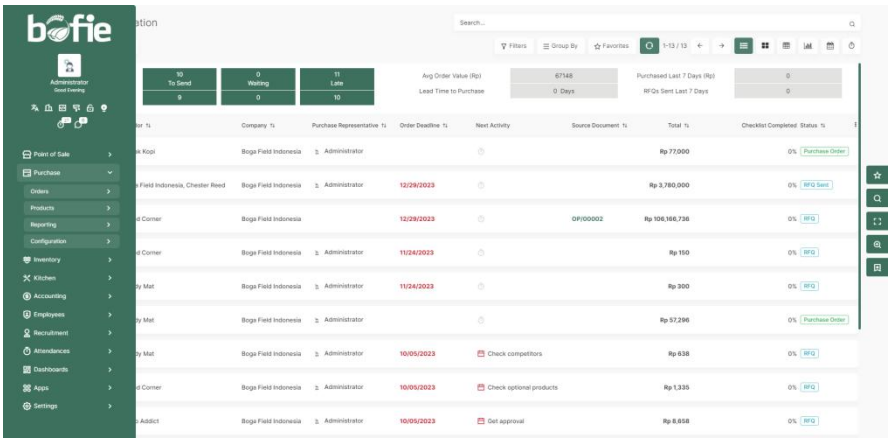


Figure 4.6 Supplier Data Page

Figure 4.6 is a view of the supplier data page. On this page there is supplier data from the products owned which displays the supplier's name, contact phone number, address, and description. Admins and cashiers can add, change and delete supplier data if needed.

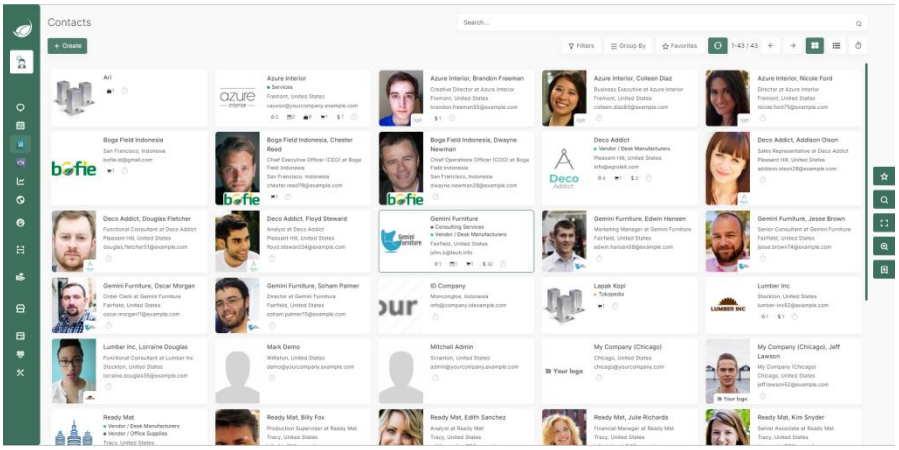


Figure 4.7 Customer Data Page

Figure 4.7 is a view of the Customer data page. Admins and cashiers can access this page, so that admins and cashiers can add, change or delete customer data.

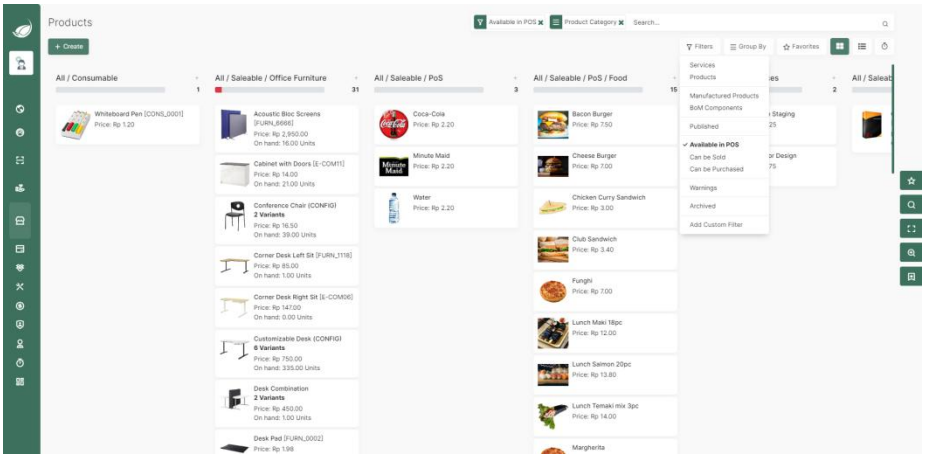
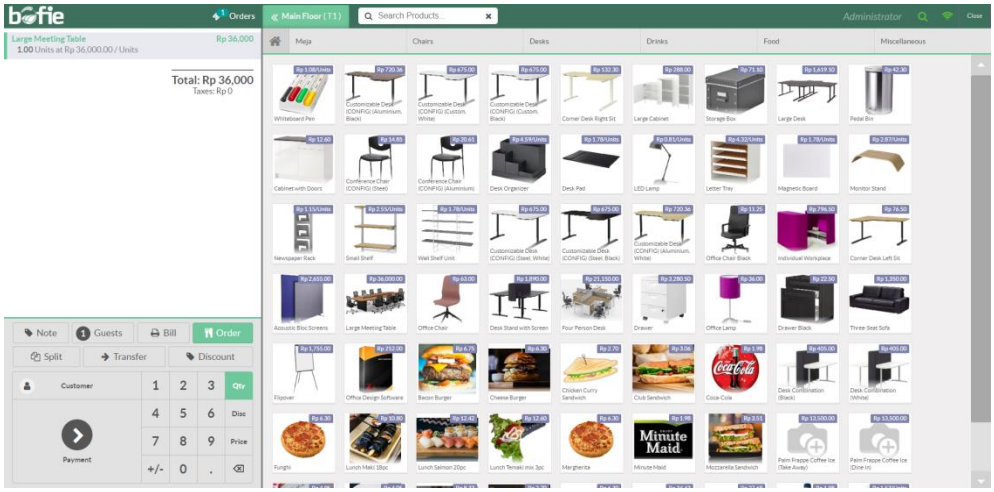


Figure 4.8 Product Item Page

Figure 10 is a view of the item product page. The product menu has 3 sub menus namely filter, category and favorite. The category sub menu page is used to manage product categories. The sub filter page is for managing products according to status. For example, the filter “available in POS” is a product that is available at POS such as Coca-Cola, water. While the favorite menu is to mark and display all products that are favored by the store such as good sales.



Feature 4.9 Point of Sales Page

Figure 4.9 is a view of the cashier page located on the Transaction menu and Sales submenu. This page is used by workers and admins in the transaction process. In addition to the Sales submenu, the transaction menu has two other sub-menus, namely the Stock in and Stock out sub-menus. The Stock in sub-menu is used to increase the amount of product stock. While the Stock out submenu is used to add the number of stock products that have been sold. And there are several other sub-menus such as notes, customers, split bills, discounts and other features as shown in Figure 11.

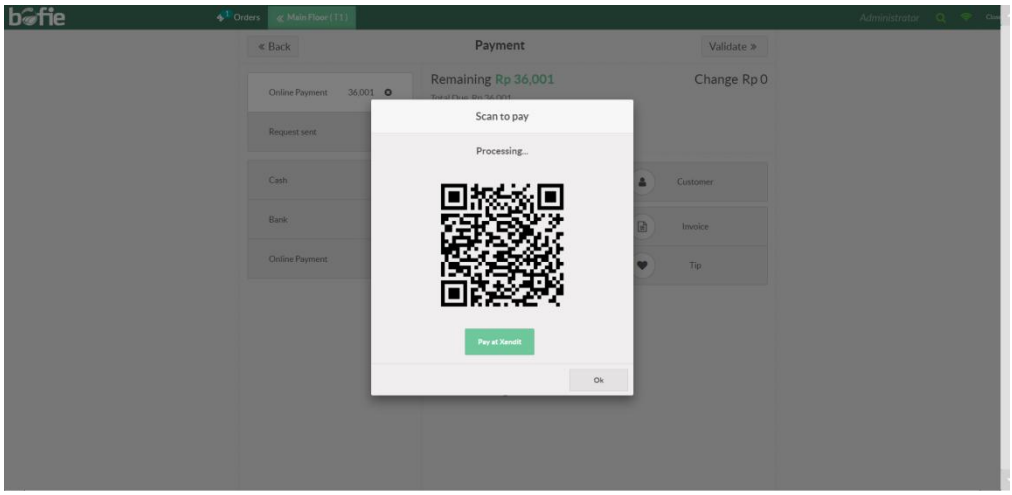


Figure 4.10 Online Payment (Qris)

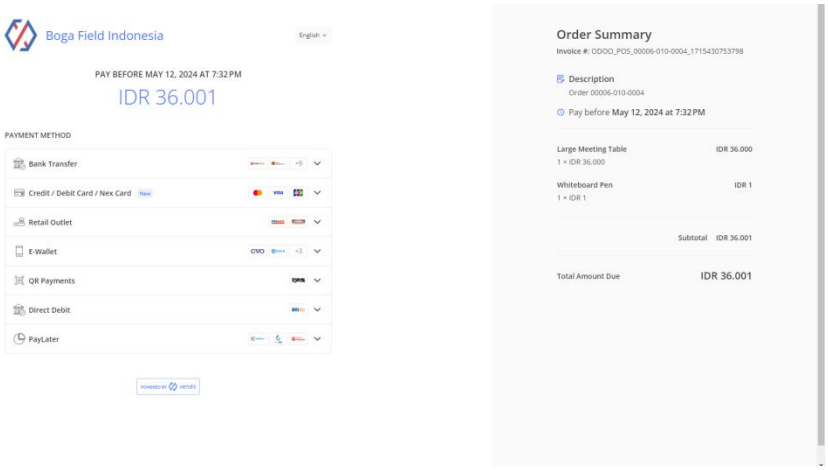


Figure 4.11 Payment Gateway Page

Figure 4.10 is a page that displays payment methods, which consist of cash, bank, and online payment. There are also payments using Qris and the payment gateway, Xendit, as shown in Figure 4.11.

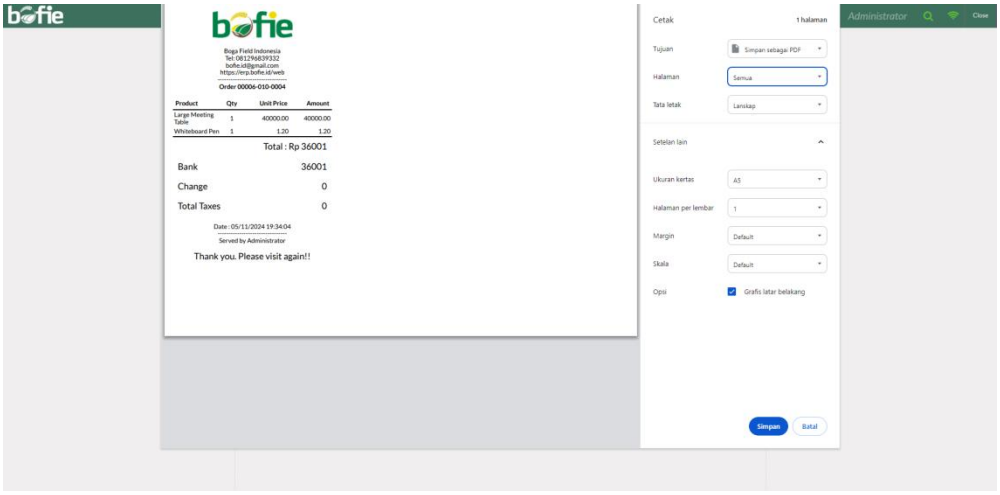


Figure 4.12 Invoice Print Page

Figure 4.12 is a page that displays invoices or receipts from the transaction process. This invoice or receipt can be printed and given to the customer.

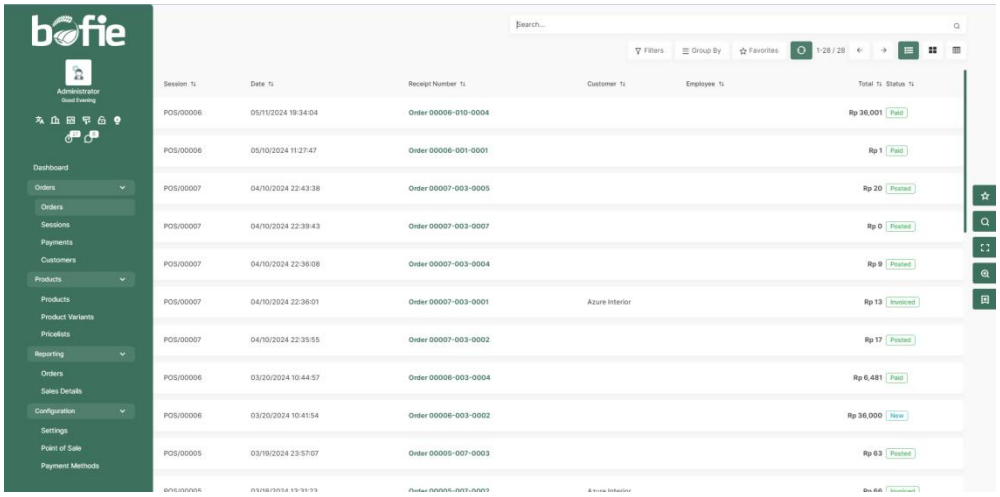


Figure 4.13 Sales Report Page

Figure 4.13 is the report page or sales report. This page displays all transactions that have been made using the cashier application as a sales report.

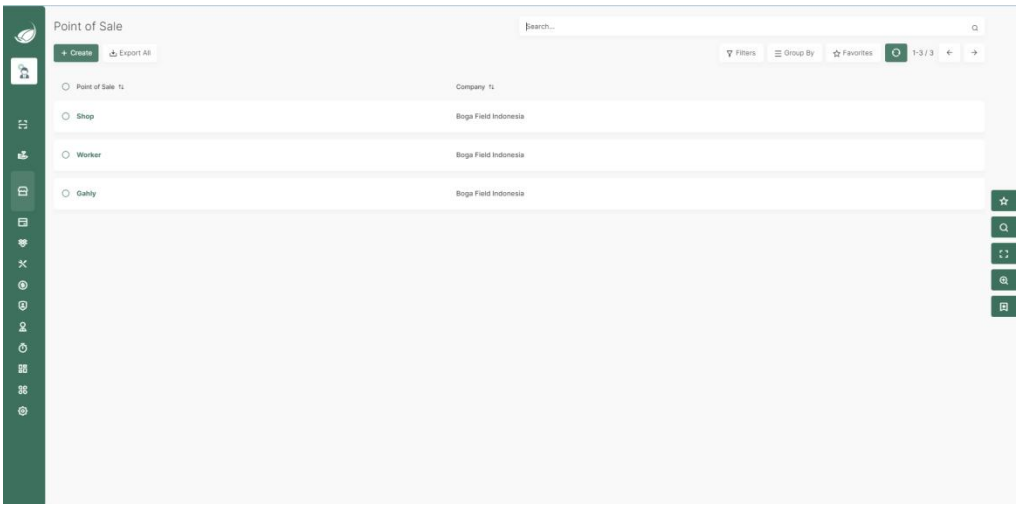


Figure 4.14 Users Data Page

Figure 4.14 is the user's data page. Admins can add, change or delete user data used for cashiers.

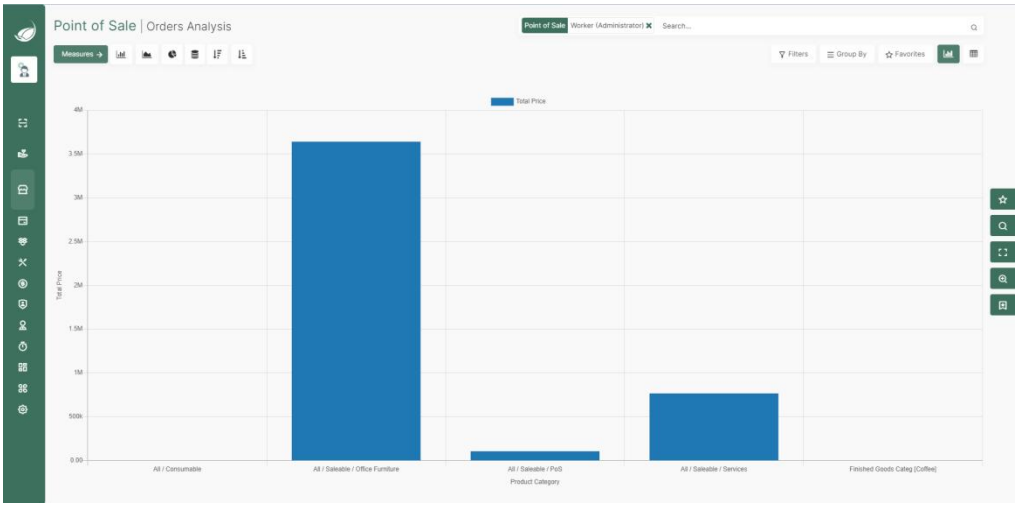


Figure 4.15 Cashier Dashboard Page

Figure 4.15 is the point of sales dashboard page to see the results of sales.

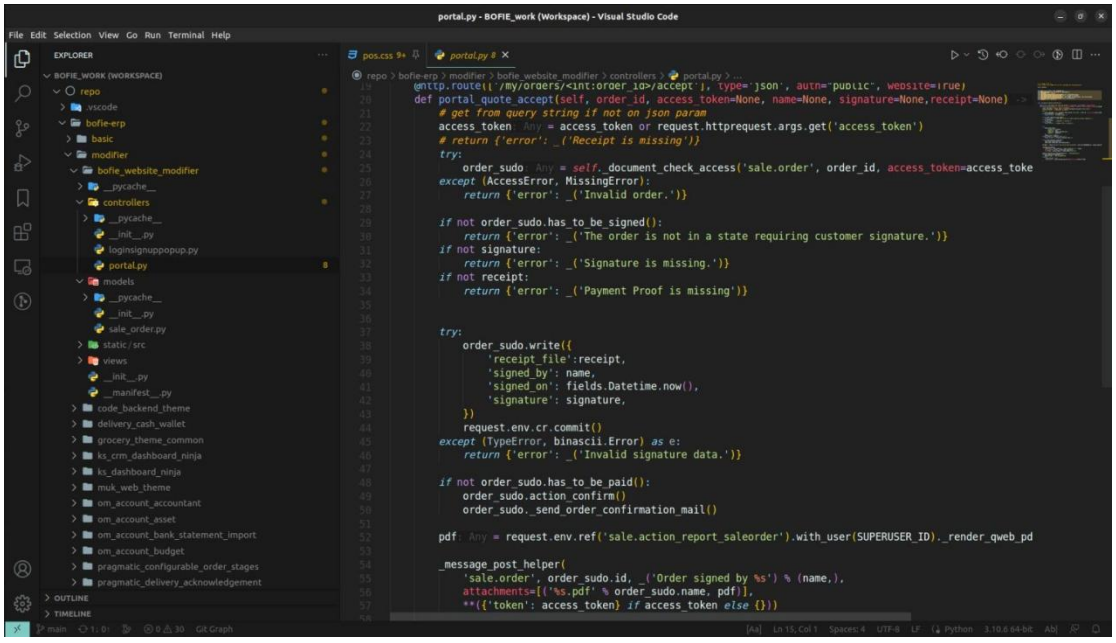


Figure 4.16 Development

Figure 4.16 is the development is a process that includes various activities to designing, coding, and testing software applications.

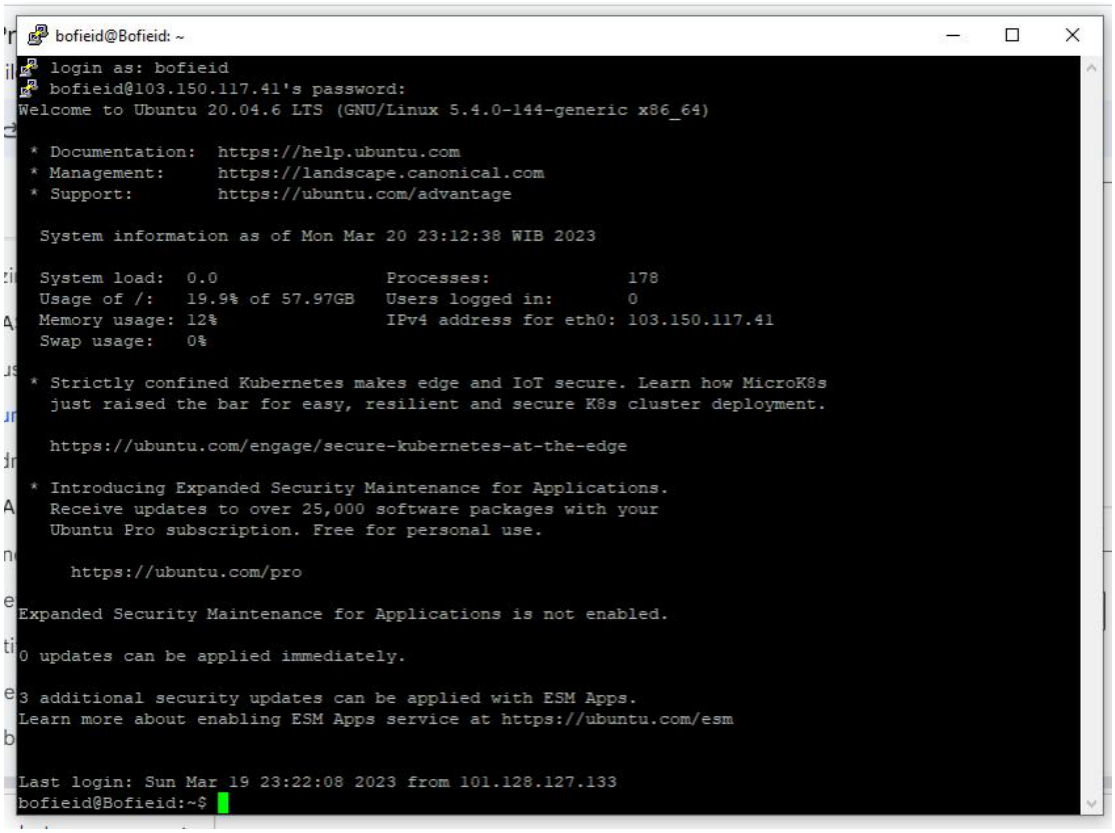


Figure 4.17 Server Deployment

Figure 4.17 is server deployment is the process of making an application available for use by placing it on a server.

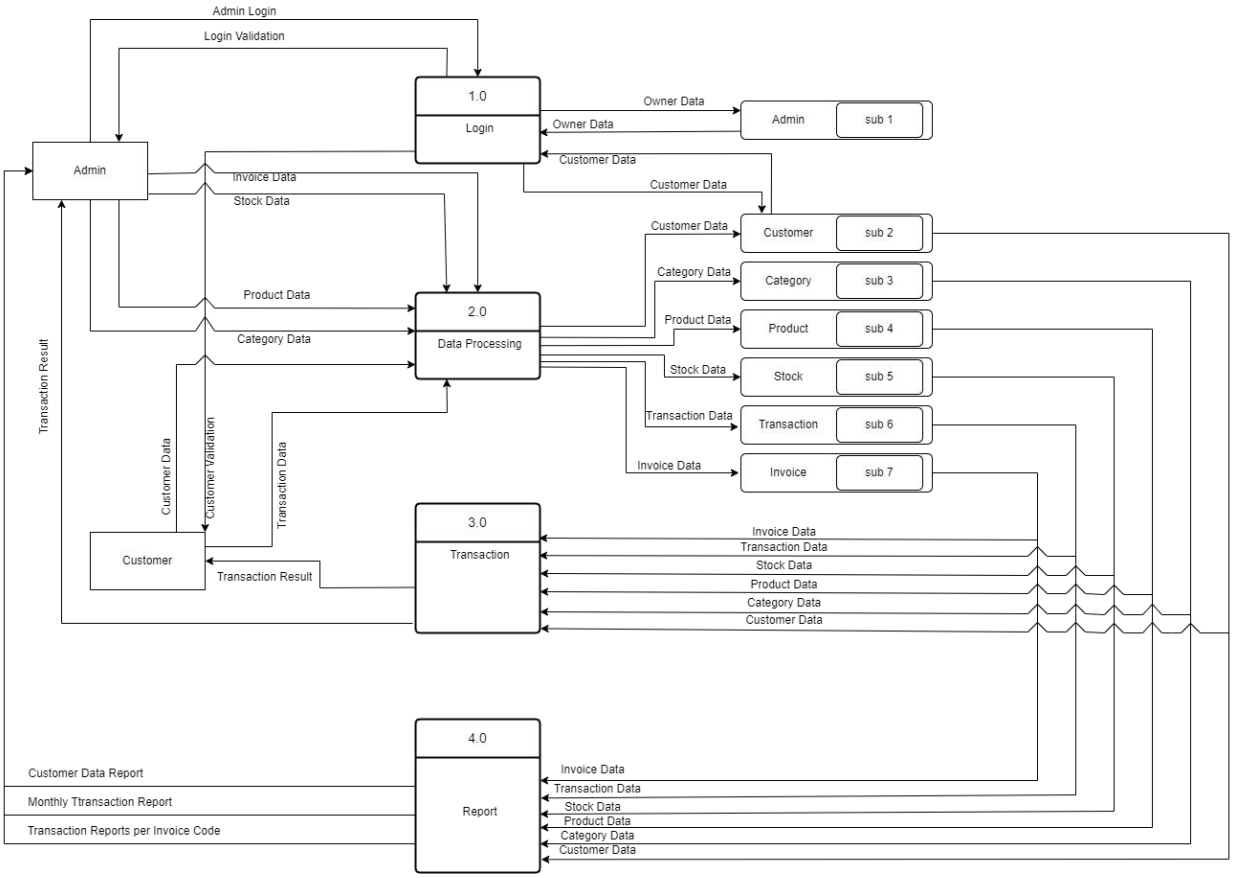


Figure 4.18 Data Flow Diagram (DFD)

Figure 4.18 is a Data Flow Diagram (DFD) with multiple processes and subsystems in the context of a management or transaction system. The following is a breakdown of the main elements:

1. Entities (Admin & Customer):

- Admin: This actor is responsible for managing the overall operations of the system. They interact with different modules of the system, such as adding or modifying customer data, managing product categories and stock, and handling transactions.
- Customer: This entity represents external users or clients who interact with the system, likely through interfaces related to transactions or customer management.

2. Processes (Labeled 1.0, 2.0, 3.0, 4.0.):

- 1.0 to 4.0: These numbers correspond to various processes within the system. Each process seems to represent a high-level action or operation.
- For example, Process 1.0 might relate to handling Admin interactions, while Process 2.0 involves handling Customer-related operations.

3. Subsystems (on the right side of the diagram):

- The diagram further breaks down the processes into subsystems (sub 1 to sub-7).
- Subsystems for Admin management, customer management, product category management, stock, transaction, and invoicing are likely core components of the system.

4. Arrows:

- The arrows suggest data flow or interaction between entities and processes.
- For instance, Admin interacts with Subsystem 1 (Admin management) and so on.

4.5 Testing

After the design and development of the web-based POS application is completed, the next stage is testing the application using the BlackBox method.

4.5.1 BlackBox Testing

In this test, the tester does not have access to the source code or components of the system, but only refers to the previously created system specifications (Sommerville, 2016). To conduct testing using the BlackBox method, a test list (test case) can be made which includes the input that will be given to the system or application, as well as the expected output after the input is given. The following is a test list table along with the results of the expected output:

Table 4.4 Point of Sales application testing

No	Test Description	Expected Results	Test Results	Results
1.	Admin and Cashier Role Logins.	The system will receive login access based on the role with the registered email and password.	The application receives login access based on the role and is directed to the dashboard menu.	Appropriate
2.	Add, edit and delete product categories. (Admin Role).	The system displays the "Add/Edit/Delete Product Category Successfully" notification.	The system displays the "Add/Edit/Delete Product Category Successfully" notification.	Appropriate
3	Add, edit and delete products. (Admin Role).	The system displays the "Add/Edit/Delete Product Successfully" notification.	The system displays the "Add/Edit/Delete Product Successfully" notification.	Appropriate
4	Cashier main menu page. (Cashier Role).	Click the SAVE button and a notification "Successfully added an order" appears.	The system displays the "Successfully added order" notification and redirects to the order list page	Appropriate
5	Cashier main menu page. (Cashier Role).	Click the PAY button to be directed to the payment process page.	The system redirects to the payment process page.	Appropriate
6	Order List page (Cashier Role).	Click the PRINT button to print the bill.	The system redirects to the bill printing.	Appropriate
7	Order List Page (Cashier Role).	Click the PAY button to navigate to the pay process page.	The system redirects to the pay process page.	Appropriate

No	Test Description	Expected Results	Test Results	Results
8	Payment Process Page (Cashier Role).	Click the PAY PROCESS button to the print bill page.	The system redirects to the bill printing page and changes the order status to completed.	Appropriate
9	Logout	Logout	Logs out and redirects to the login view.	Appropriate

Table 4 is the result of black box testing, where the testing process is carried out based on the test description that has been determined for the expected results and all test results are successful.

4.5.2 Usability analysis

Usability analysis is the process of evaluating the ease of use of a system or application by users (Munanto, 2022). In usability analysis, questionnaire data collection is carried out about the level of ease of use of applications measured using the System Usability Scale (SUS) method. The following are the results of respondent data collection that has not been converted:

Table 4.5 Unconverted Respondent Data

Respondent	**Questions**										**Total**
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	
R1	5	1	4	2	5	3	5	3	4	3	35
R2	5	1	4	2	5	3	5	2	5	2	35

Furthermore, to determine the SUS score, the sum of the total answers is then multiplied by 2.5, and determine the average value of the answers to the test instruments of all respondents. The following is a table of respondent data conversion results using the SUS method:

Table 4.6 Converted Respondent Data

Respondent	Questions										Total	Total x 2.5
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
R1	4	4	3	3	4	2	4	2	3	2	31	77.5
R2	4	4	3	3	4	2	4	3	4	3	34	85
Total SUS score on point of sales application												162.5
Average SUS questionnaire score on point of sales applications												81.25

Based on the final SUS score obtained, the SUS score of the web-based POS application that has been created is 81.25. Referring to the determination of the Net Promoter Score, the SUS score result with a value of 81.25 obtained a net promoter value. This value indicates that the application has a fairly high level of user satisfaction. It can be seen in Figure 4.19.

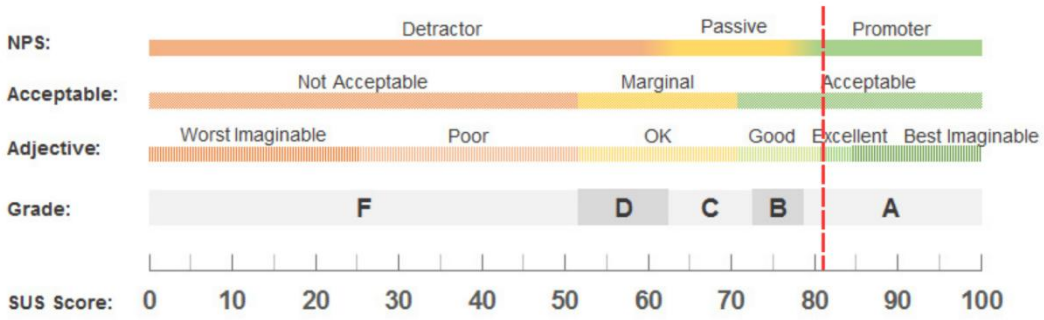


Figure 4.19 SUS Scale Rating

Acceptability by users can be measured using the SUS Score. Scores with values above 70 can be classified in the Acceptability category. The SUS score of the POS application obtained is 81.25. The score meets the Acceptability category. Acceptability SUS score indicates that the system is easy to use and has a high level of user satisfaction. Based on the test results that have been carried out, the SUS score of the web-based POS application that has been made is “Excellent”. This score indicates that the application has a fairly good level of ease of use so that users can easily operate the POS application. In the SUS score calculation, it can be seen that the SUS score of the POS application obtained a value of 81.25 The score obtained the Grade Scale “A” category. Grade Scale “A” indicates that the application has a fairly good level of user convenience.

CHAPTER V
RESULT AND DISCUSSION

5.1 Identification of Design Thinking Methods at UKM Mart

The design and implementation of the Point of Sales (POS) system for UKM Mart were approached using the Design Thinking methodology. This methodology facilitated a user-centered design process, ensuring the final application met the specific needs and preferences of the users at UKM Mart. The key stages included Empathize, Define, Ideate, Prototype, and Test. Each stage contributed significantly to the overall usability and effectiveness of the POS system.

5.1.1 Empathize Stage

In the Empathize stage, interviews with UKM Mart workers revealed several challenges with their current manual systems. Key issues included the difficulty in managing stock and sales records manually, the risk of data loss, and the inefficiency of manual bookkeeping. These insights were crucial in shaping the design requirements for the new POS system.

5.1.2 Define Stage

The Define stage synthesized the information gathered during the Empathize stage to identify core problems. The main issues were the inefficiency and inaccuracy of manual sales and inventory recording, leading to potential financial discrepancies and increased operational workload. The goal was to develop a system that streamlined these processes and minimized errors.

5.1.3 Ideate Stage

During the ideation stage, brainstorming sessions were held to generate potential solutions. The focus was on creating a system that was intuitive, efficient, and reliable. Ideas included features for real-time inventory tracking, automated sales recording, and comprehensive financial reporting. High-fidelity mockups were developed to visualize these ideas and gather feedback from stakeholders.

5.1.4 Prototyping and Application Development

The Prototyping stage involved creating a functional prototype based on the ideated solutions.

The prototype was designed to include features such as user-friendly interfaces for sales and inventory management, real-time data synchronization, and robust reporting tools. The application development utilized the Bootstrap framework to ensure responsiveness across various devices, enhancing accessibility for users whether they accessed the system via PCs, smartphones, or tablets.

5.1.5 BlackBox Testing and Usability Analysis

The usability testing phase employed the BlackBox testing method and usability analysis to evaluate the system's effectiveness. BlackBox testing ensured that the application functions met user expectations without delving into the underlying code. Usability analysis focused on identifying and resolving navigation issues, interface intuitiveness, and feature accessibility. The usability testing results indicated the SUS score results with a value of 81.25 obtained a net promoter score, met the Acceptable category, the SUS score of the web-based POS application that has been made is "Excellent", and obtained the Grade Scale "A" category.

CHAPTER VI
CONCLUSION AND SUGGESTIONS

6.1 Conclusion

Based on the results of the analysis and discussions that have been carried out previously, in this research it can be concluded that:

1. Using a Design Thinking approach, the POS application design was developed based on the specific user needs obtained from the empathy stage. Through interviews with UKM Mart workers, required features-such as transaction recording, product management, and financial reporting-were identified to simplify operational processes.
2. The application features and interface were designed to be responsive using the Bootstrap framework to be compatible with various devices. This facilitates easy access by workers at UKM Mart, so that the POS application can be used on both PCs and smartphones.
3. The application was developed through prototyping based on ideas gathered at the ideation stage. This iterative process resulted in an application that is easy to use, suits the needs of users in the field, and reduces the risk of manual recording errors.
4. Usability evaluation was conducted using the BlackBox Testing method and SUS (System Usability Scale) analysis, which resulted in a score of 81.25 with the category “Excellent.” This score shows that the application has met user expectations, is easy to use, and efficient in improving the process of recording transactions and managing stock.

6.2 Suggestion

Based on the findings and the successful implementation of the POS application, several recommendations can be made for future improvements and further research:

1. Continuous Improvement: It is essential to continuously monitor the performance of the POS application and gather user feedback to identify areas for improvement. Regular updates should be made to incorporate new features and address any issues that arise.
2. Advanced Features: Consider integrating advanced features such as real-time analytics, customer relationship management (CRM) tools, and loyalty programs. These features can provide valuable insights into customer behavior and help in making informed business decisions.
3. Training and Support: Provide ongoing training and support to the staff at UKM Mart to ensure they are fully proficient in using the application. This will help in maximizing the benefits of the application and ensuring smooth operations.
4. Scalability: As UKM Mart grows, the POS application should be scalable to accommodate increased transaction volumes and additional functionalities. Future versions of the application should be designed with scalability in mind.
5. Further Research: Conduct further research to explore the potential of integrating emerging technologies such as artificial intelligence (AI) and machine learning (ML) into the POS application. These technologies can enhance predictive analytics, automate routine tasks, and provide a more personalized user experience.

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