WEB E-COMMERCE RKU COMPUTER PALEMBANG

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ABSTRACT

In the increasingly developing digital era, the role of the internet and information technology is increasingly important in supporting various aspects of business, including marketing and product sales. Especially the presence of a website has become an important need for a business that wants to compete in this increasingly competitive market, to expand market reach and increase their brand visibility. RKU Computer Palembang is a business engaged in computer sales and services. Currently, the RKU Computer sales system is still manual, namely prospective buyers come directly to the RKU Computer store to buy its products. To overcome this problem, the author tries to provide a solution to RKU Computer, namely by building an e-commerce website as an online sales media, to help RKU Computer sell its products, and to help RKU Computer compete with other businesses that have implemented an online sales system. The research methodology used in this study is a software development method using extreme programming consisting of 4 stages, namely planning, design, coding, and testing, and a process method using market basket analysis (MBA). The desired result of this study is to create an RKU Computer Palembang e-commerce website as an online sales media.

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I. INTRODUCTION

Indonesia's digital economy is developing at a very quick pace every year [1]. In the increasingly developing digital era, the role of the internet and information technology is increasingly important in supporting various aspects of business, including marketing and product sales. Especially the presence of a website has become an important need for a business that wants to compete in this increasingly competitive market, to expand market reach and increase their brand visibility. The World Wide Web [2] is a universe of information that can be accessed through a global network, where people can interact, and is mostly filled with interconnected text, image, and animation pages, with occasional sound, video, and three-dimensional worlds. A website is a collection of interconnected web pages that can be accessed from all over the world as long as they are connected to the internet network, and can be used for various needs ranging from providing information, to marketing and selling products or services [3]. A collection of website pages [4] is stored on the internet network as a domain or subdomain.

E-commerce web is a type of website that supports online sales and purchase systems by connecting sellers and buyers through online transactions. Anyone who has a computer, is connected to the internet, and has a means of payment can be involved in the purchase and sale of goods and services through electronic commerce [5], [6]. E-commerce provides a platform for the exchange of goods and services via the internet, which allows a company to obtain higher sales, because the transaction process is easier [7]. The quality of e-commerce is determined by the added value provided to the product or service such as user interaction and the quality of service in e-commerce itself [8]. The principles that must be met by a company to gain trust in using e-commerce[9] are business practice disclosure, transaction integrity, and information protection.

Market Basket Analysis (MBA) is an important approach in web commerce that helps organizations analyze customer purchasing habits by finding commodities that are commonly purchased together. Market basket analysis (MBA) [10] using the apriori algorithm can help in finding association rules that meet the minimum support and minimum confidence requirements that have been determined. MBA is one method for analyzing a company's sales data [11]. This method analyzes customer spending data based on existing transaction records, with the aim of

finding out which products are often purchased together [12]. This technology uses transaction data to identify product relationships, allowing e-commerce platforms to optimize product placement and cross-sell strategies [13].

Ria Kencana Ungu (RKU) Computer is a business engaged in computer sales and service. In addition, RKU Computer also sells laptops, printers, other accessories, such as mouse, keyboard, hard disk, and others. Currently, RKU Computer's sales system is still manual, namely prospective buyers come directly to the RKU Computer store to buy its products. This is certainly a problem for RKU Computer, because in this era of technology, most prospective buyers prefer to buy products online rather than offline, because it is more efficient both in terms of time and costs incurred [14]. To overcome this problem, the author tries to provide a solution to RKU Computer, namely by building an e-commerce website as an online sales media, to help RKU Computer sell its products, and to help RKU Computer to be able to compete with other businesses that have implemented an online sales system.

To strengthen this research, the author conducted a study of a number of previous studies that had similar themes. The first research is building an e-commerce website to develop the Trendy Muslim Fashion Store business by implementing a recommendation system [15]. The second study applied the MBA method as a marketing strategy to increase sales by knowing consumer purchasing patterns [16]. The third study applied the MBA [17] method to find a combination of Eid snacks that consumers often buy and this combination was used as a reference in arranging the items close together in order to increase sales. Based on previous research, my research will build an RKU Computer Palembang e-commerce website by implementing product recommendations where when customers see one product, under the product description there are recommendations for other products, then in finding product combinations will implement the MBA method on the RKU Computer Palembang e-commerce website so that apart from being able to be used to carry out online transactions, this website can also be used by the admin to analyze customer purchasing patterns, and the minimum support and minimum confidence values that will be used are 40% and 60% respectively because the higher the minimum requirements specified, the more accurate it will be.

While existing literature extensively covers general e-commerce frameworks and user behavior, there is a dearth of focused research on the specific challenges and opportunities confronting local e-commerce platforms in Indonesia, particularly in light of regional economic dynamics and technological adoption. Research on e-commerce in Southeast Asia has focused on legislation in Singapore and Indonesia, but frequently fails to include local issues that impact user experience and confidence in regional platforms [18]. Previous research has not fully explored how digital literacy affects customer behavior in Indonesian e-commerce environments [19].

This gap emphasizes the importance of conducting empirical research that not only explore user experiences but also take into account the socioeconomic ramifications of e-commerce development in local areas. The proposed research intends to fill a vacuum by offering a detailed analysis of these aspects in Palembang's e-commerce scene, contributing to theoretical frameworks and practical applications in the area.

The purpose of this study is to build an RKU Computer Palembang e-commerce website as an online sales media, by implementing the results of the market basket analysis method as product recommendations to customers.

II. RESEARCH METHODS

This research builds a web-commerce equipped with a market basket analysis method. This section consists of data collection methods, tools and materials, extreme programming system development methods, and market basket analysis methods.

A. Data Collection Methods

Data collection methods consist of primary data and secondary data. Primary data is data obtained directly [20] using observation and interviews. The observation stage is the stage of direct observation or monitoring of RKU Computer. At this stage, the author visited RKU directly to obtain some information related to RKU Computer Palembang. The interview stage is the discussion or question and answer stage to collect data about RKU Computer Palembang. At this stage the author will conduct an interview with RKU Computer. While secondary data is obtained by conducting a literature study by collecting references from various sources, including journals, articles, or websites that are relevant to the topic of discussion [21].

B. Tools and Materials

In order for this research to be carried out properly, tools and materials are needed. The tools used in this study include hardware and software, namely: a) Hardware consists of an Acer Laptop, Android Smartphone, and Printer, and b) Software consists of XAMPP (Apache, MySQL, PHP), and Visual Studio Code for writing coding. The
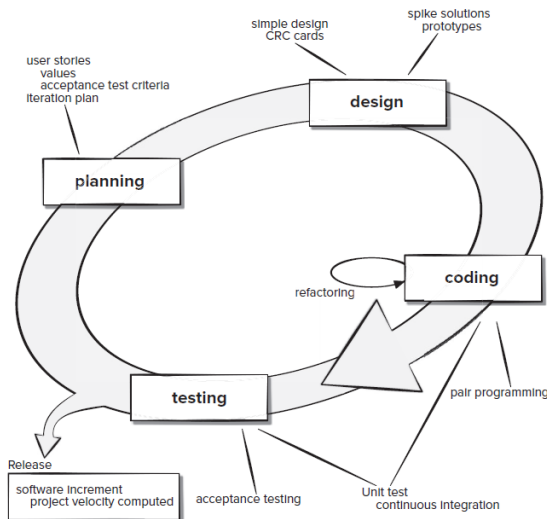
Fig. 1. Extreme Programming Process.

materials used in this research include product data, customer data, transaction data, and additional information from journals or the internet.

C. Extreme Programming

Extreme Programming (XP) is a software development process designed to increase product quality and responsiveness to changing client needs [22]. It is a form of agile software development that values adaptability, tight cooperation, and good code quality. Extreme Programming [23] is a collection of norms and behaviors that take place within the framework of four activities (Figure 1) : planning, design, coding, and testing.
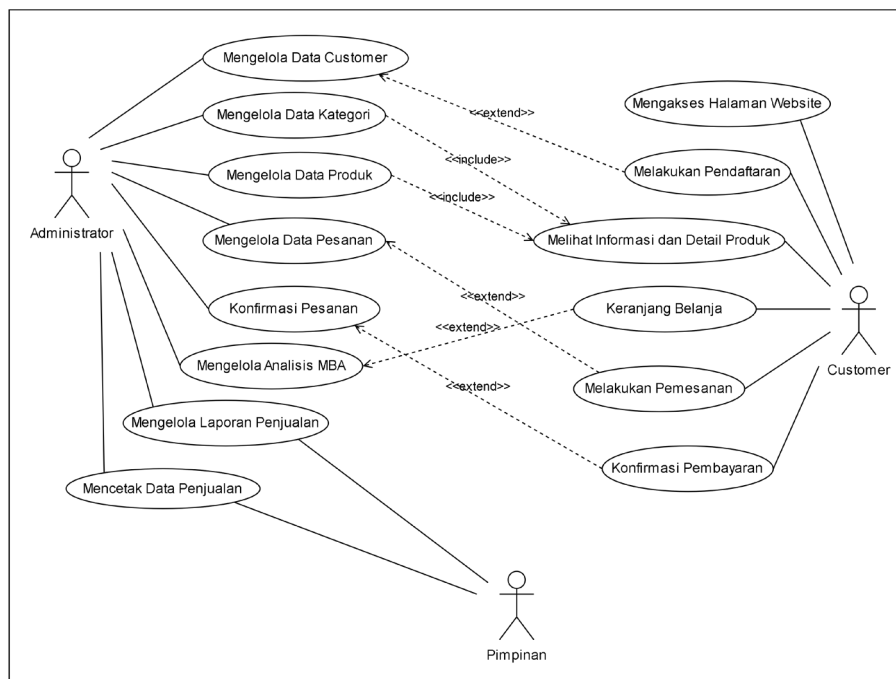
Fig. 2. Use Case Diagram RKU.

Planning is the first step in developing this e-commerce website by analyzing system requirements to determine what features and functions are needed. User Needs Analysis seen from the Admin and Customer side. Admin Needs Analysis: a) Can log in as admin, b) Can manage product categories and data, c) Can manage transaction or order data, d) Can manage customer data, e) Can manage sales reports, f) Can manage profiles, and g) Can log out. While Customer needs analysis: a) Can register and log in as a customer, b) Can view product categories and information, c) Can search for products, d) Can add products to the cart, e) Can make transactions or orders, f) Can view order data, g) Can manage profiles, and h) Can log out.

Design is the stage of designing a software system, starting from designing use case diagrams, activity diagrams,

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class diagrams, table structures, and interface designs. Use case diagrams (Figure 2) describe the interactions
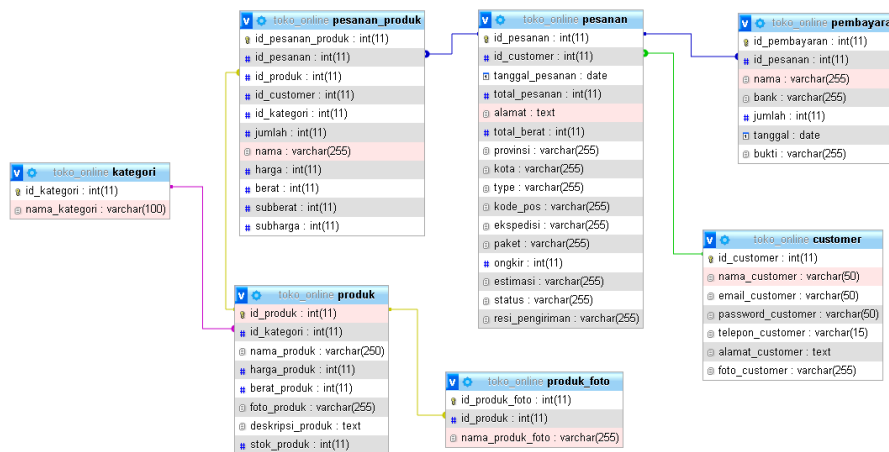

Fig. 3. Class Diagram RKU.

between an information system and its users. Use case diagrams are a key component of the Unified Modeling Language (UML), which is widely used in software development to describe functional requirements and interactions between users (actors) and the system. This method allows for a better grasp of the extent of the information system being developed [24]. The use case diagram involves three actors: administrator, principal, and

Fig. 4. Program Coding in PHP.

customer. Activity diagrams describe a task performed by a software system. Class diagram (Figure 3) defines the classes that will be used in system development. The class diagram consists of seven classes: category, product order, order, payment, product, product_photo, and customer.

Coding is the stage of implementing a model or system design into a program code (Figure 4). This stage is also called the programming stage, the code will be refined to produce output that is in accordance with the design. In the programming process will use the programming languages PHP, XAMPP, MySQL, and Apache. MBA implementation is also carried out in this phase.

Testing is a stage of software testing, to ensure that the program functions as expected and to find out what problems may occur when the program is run. The method used for testing is black box testing, which will test the functional aspects of the software.

D. Market Basket Analysis (MBA)

Market Basket Analysis (MBA) [10] (Figure 5) using the apriori algorithm can help in finding association rules that meet the minimum support and minimum confidence requirements that the user has specified. The way the apriori algorithm works is by calculating the dataset to find eligible itemsets and deleting unqualified itemsets [12]. MBA is one method for analyzing a company's sales data. This method analyzes customer spending data based on

existing transaction records, with the aim of finding out which products are often purchased together. The apriori algorithm is an algorithm for finding relationships between products by determining the minimum support and minimum confidence values which aim to find out how likely it is that customers will buy a product together with other products [15].

1) *Support*

Support (supporting value) shows the level of dominance of an itemset over all transactions that occur.
The support value of 1 itemset is obtained using formula (1)

$$Support\ (A) = \frac{\sum\ Transaksi\ mengandung\ A}{\sum\ Transaksi} x100\%$$ (1)

The support value of 2 itemsets is obtained using formula (2)

$$Support\ (A \cap B) = \frac{\sum\ Transaksi\ mengandung\ A\ dan\ B}{\sum\ Transaksi} x100\%$$ (2)

2) *Confidence*

Confidence (certainty value) shows the level of certainty of how strong the relationship is between two items (Formula 3).

$$Confidence = \frac{\sum\ Transaksi\ mengandung\ A\ dan\ B}{\sum\ Transaksi\ mengandung\ A} x100\%$$ (3)

```php
$minSupport = 4;
$arr = [];
for ($i = 0; $i < count($data_item); $i++) {
    $ar = [];
    $val = explode(",", $data_item[$i]["item"]);
    for ($j = 0; $j < count($val); $j++) {
        $ar[] = $val[$j];
    }
    array_push($arr, $ar);
}

$frekuensi_item = frekuensiItem($arr);
$dataEliminasi = eliminasiItem($frekuensi_item, $minSupport);

do {
    $pasangan_item = pasanganItem($dataEliminasi);
    $frekuensi_item = FrekuensiPasanganItem($pasangan_item, $arr);
    $dataEliminasi = eliminasiItem($frekuensi_item, $minSupport);
} while ($dataEliminasi == $frekuensi_item);
```

Fig. 5. MBA Implementation in PHP.

III. RESULTS AND DISCUSSIONS

The results obtained from this study are in the form of an RKU Computer Palembang e-commerce website that can be used as a medium for online transactions between RKU Computer Palembang and RKU customers, as well as the results of testing the e-commerce website using black box testing. The results of the RKU Computer Palembang e-commerce website that has been built can be accessed by customer actors and also admin actors.

A. *Association Rule Calculation Results*

The results of these association rules are obtained from the market basket analysis (MBA) method by searching for the frequency or combination between one product and another product implemented in PHP. Figure 6 shows an itemset that meets the min support of 40%, then a confidence calculation is performed which produces three association rules that meet the min confidence of 60% (Figure 6). The first rule, if you buy a Vgen 512gb SSD, you will buy a Vgen ddr4 4gb Laptop Ram, with a certainty value of 75%. The second rule, if you buy a Philips Keyboard, you will buy a Philip m314 Wireless Mouse, with a certainty value of 62%. The third rule, if you buy an Acer AV14 Laptop, you will buy an Epson L3210 Printer, with a certainty value of 80%. Based on the

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association rules that have been found, the author will make these products as product recommendations.

Fig. 6. Association Rules Results.

B. Home Page

The homepage (Figure 7) is the main page of the e-commerce website. In the navigation section there is a homepage menu, products, about us, and contact, then there are some products displayed on the homepage, there is information about the year RKU was founded. In the Contact Us section, the RKU location map, RKU address, and RKU operating hours are displayed. In the footer there is a main page menu, contact us via WhatsApp and social media services (WhatsApp, Facebook, and Tiktok).
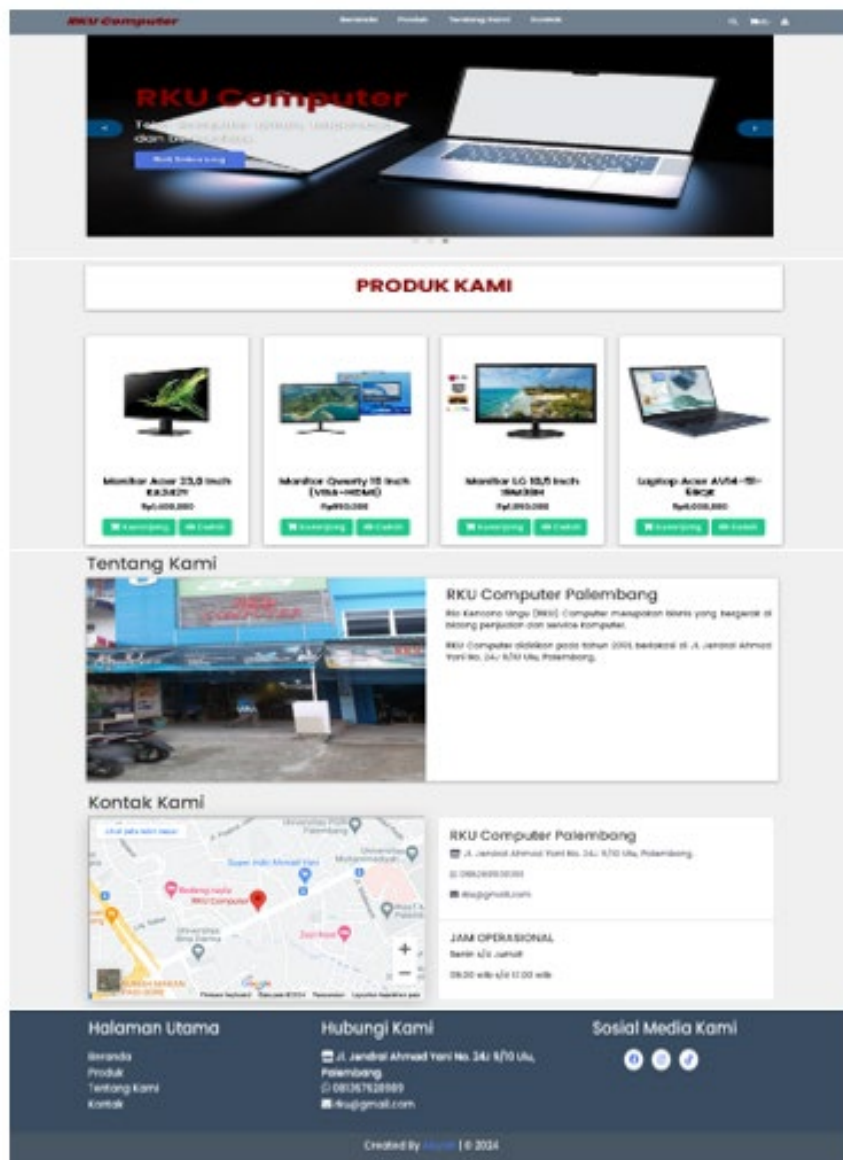

Fig. 7. The Homepage of RKU Computer Web-commerce.

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C. The Product Page

The product page (Figure 8) displays all RKU Computer Palembang products. Customers can also filter what products they want to see based on the available categories (Computers, Laptops, Printers, Keyboards, Mouse, etc.). Each product image is equipped with a 'Cart' and 'Detail' button. The button is for entering the product to be purchased, while the detail button is for finding out information about the product of interest.
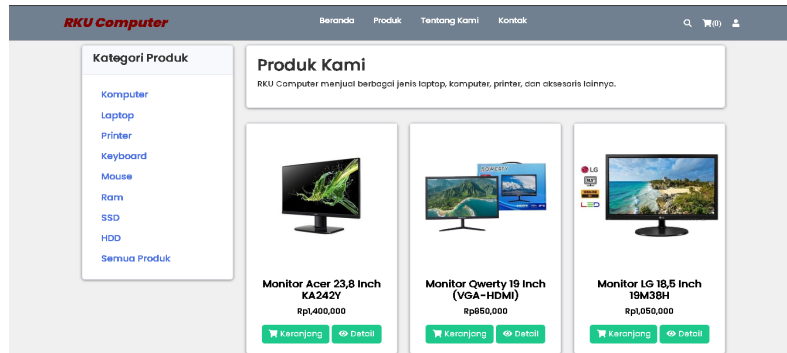

\Fig. 8. The Homepage of RKU Computer Web-commerce.

D. Product Recommendation Page

The product recommendation page (Figure 9) is a page that displays product recommendations offered by RKU Computer Palembang to customers. These product recommendations are obtained from the Market Basket Analysis (MBA) method, where when a customer sees the details of a product, other recommended products will be displayed below the product description.
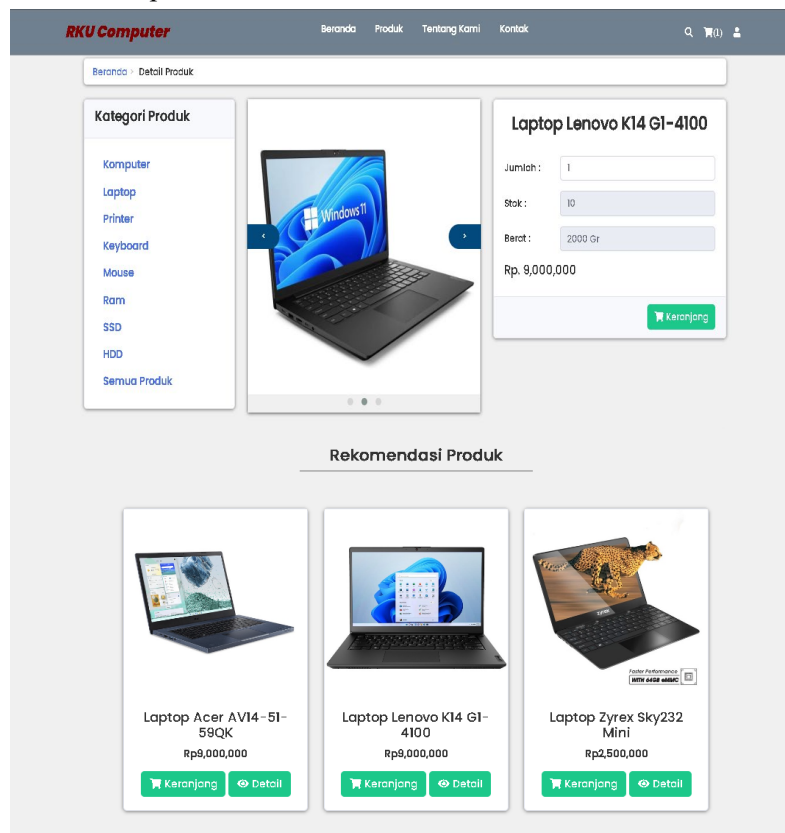

Fig. 9. The Homepage of RKU Computer Web-commerce.

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E. Admin Profile Settings Page

On this settings page displays admin profile data (Figure 10). The profile data can be updated or changed, starting from changing the name, changing the email address, changing the password, changing the phone number, address, and photo, then when finished click save. Administrators oversee the day-to-day operations of the eCommerce platform, ensuring that all systems are running smoothly. This involves managing system upgrades, debugging difficulties, and maintaining system health to ensure efficient online shopping experiences.
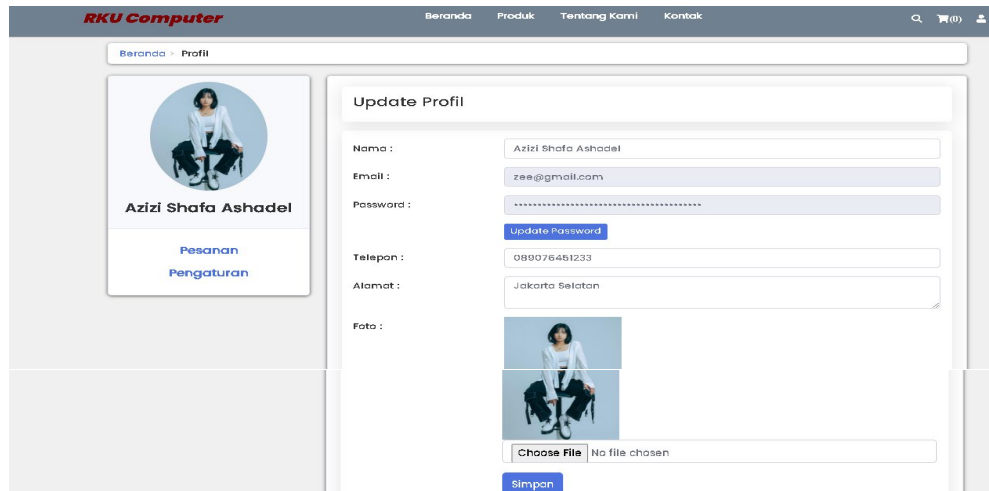

Fig. 10 Admin profile Page.

F. Customer Checkout Page

The customer checkout page (Figure 11) is a page that customers can use to order products. Customers can search for the desired product or the one they want to buy, then add the product to the shopping cart, then click checkout. The next step, the customer will be asked to enter the shipping address, starting from entering the home address, then selecting the province, then selecting the destination city, then selecting the type of expedition desired for shipping the order, and then clicking checkout.
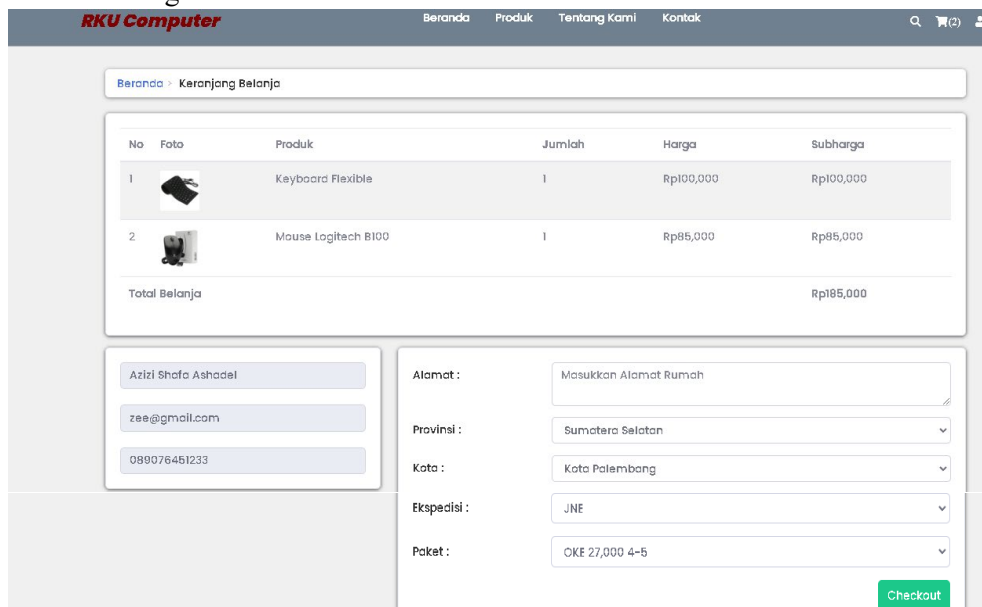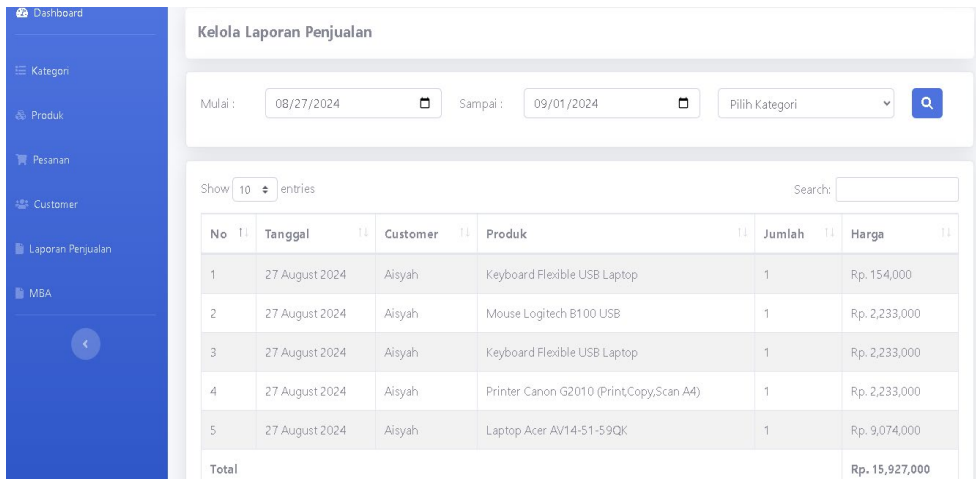

Fig. 11 Customer Checkout Page.

G. Sales Report Page

This Page is an essential component of the company's online marketing strategy, providing a thorough overview of sales success. This page usually contains extensive stats like total sales revenue, product-specific sales statistics, customer demographics, and transaction frequency. It also includes interactive dashboards and charts that assist administrators analyze sales trends and patterns, allowing them to make better decisions regarding inventory management, marketing tactics, and customer interaction. To assist more in-depth study, the page may additionally feature filters for various time periods, product categories, and geographic locations. The Sales Report Page (Figure

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12) integrates data from many sources, including as e-commerce platforms and customer databases, to guarantee that RKU Computer Palembang can efficiently monitor and manage its online sales operations to satisfy market expectations.
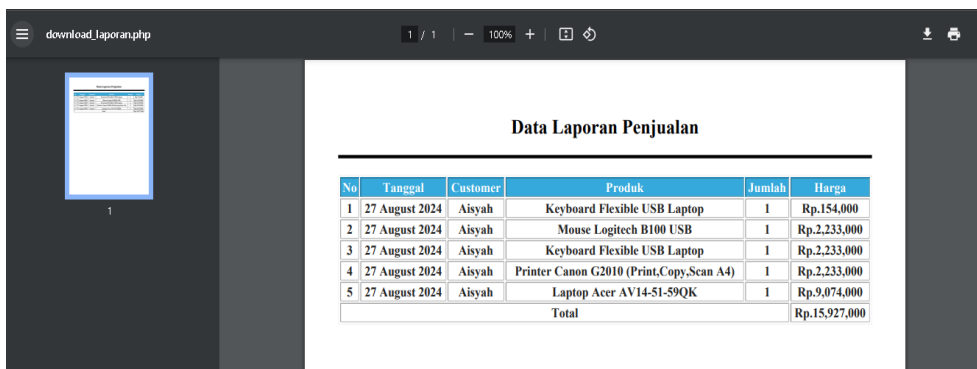

Fig. 12 Sales Report Page.

H. Print Report Page

The print report page (Figure 13) is a page that can be used by the admin to print sales reports. The sales report can be printed either in PDF format or can be printed directly to the printer. Reports can also be made based on the desired time period, then click print report, then click download.

Fig. 13 Print Report Page.

I. Testing Results

Testing is a test of software (web-commerce) with the aim of ensuring that the system functions properly and according to expectations, to find out what problems may arise during the system's operation, and to determine the level of user satisfaction with the system. Testing is donewith blackbox testing based on 2 actors, customer and admin, and System Usability Testing (SUS) [25].

Blackbox testing from the customer side includes: Home Page, Registration Page, Login, Product Page, About Us Page, Contact Page, Shopping Cart Page, Place Order/Checkout, View Order, Change Profile of Customer. The results of blackbox testing of all web functions from the admin side were successful. Meanwhile, blackbox testing from the admin side includes: Login, Dashboard Page, Category Page, Product Page, Order Page, Customer Page, Sales Report Page, Printing Sales Report, Changing Admin Profile. The results of blackbox testing of all web functions from the customer side were successful.

Apart from carrying out black box testing to find out whether the system functions and runs well and according to expectations, this research also carries out System Usability Scale (SUS) testing to find out the level of user satisfaction with the system when used.

SUS is calculated using formulas (1) and (2).

$$SUS\ Score = ((Q1 - 1) + (Q3 - 1) + (Q5 - 1) + (Q7 - 1) + (Q9 - 1) + (5 - Q2) + (5 - Q4) + (5 - Q6) + (5 - Q8) + (5 - Q10)) * 2.5 \tag{1}$$

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$$\bar{x} = \frac{\sum x}{n} \tag{2}$$

Notes:

SUS Score = SUS Score = calculation result per respondent

Q = Question

$\bar{x}$ = mean score

$\sum x$ = Total SUS Scores

n = Numbers of participants

After calculations were carried out on 50 respondents using SUS, the final score was 86.25. Based on calculations using the formula above, the average value of the System Usability Scale (SUS) score is 86.3, so it can be concluded that the RKU Computer Palembang e-commerce website has an "Excellent" rating category [26].

J. Discussion

This research presents a critical assessment of local e-commerce dynamics, focusing on the unique issues that regional platforms in Indonesia confront. This study may be compared to earlier research findings to demonstrate its contributions and contextual significance. The study on consumer online purchase intentions did not address the
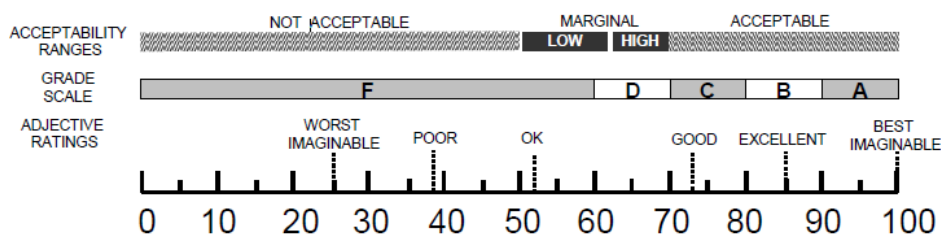

Fig. 14 The Interprertation Range of Final SUS Result.

socio-economic aspects unique to Indonesian consumers, which is a crucial part of the current research [27]. This research intends to address a gap in the comparative examination of e-commerce policies between Singapore and Indonesia, which focuses on regulatory frameworks rather than user experiences in local markets [18]. Additionally, the research focused on cross-border e-commerce purchase intentions without taking into account local market factors, which are critical for understanding consumer behavior in Palembang [28].

Localized studies are crucial for understanding user behavior and confidence in e-commerce systems. Therefore, this study should give empirical data particular to Palembang's setting. A study on online consumer satisfaction found essential characteristics, but did not consider digital literacy as a moderating component in Indonesian e-commerce. By combining various viewpoints, the current study not only covers existing gaps, but also provides useful insights into the creation of local e-commerce strategies adapted to the specific features of Indonesian customers.

IV. CONCLUSION AND SUGGESTIONS

Based on the research of Web E-commerce RKU Computer Palembang conducted by the author, it can be concluded that this research produces an output of an e-commerce web that can be used for online transactions. With this e-commerce web, it can make it easier for RKU to sell products online and make it easier for RKU customers to order products online because the current RKU sales system is still manual. By implementing the MBA method, it can help develop marketing strategies to increase sales by implementing product recommendations.

research can be carried out properly.

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