An Analysis of Point of Sales (POS) Information Systems in SMEswith The Black Box Testing and PIECES Method

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Abstract:
Background: The role of SMEs is crusial in economic growth. To help them running their business, they need to use information system. The research objective was to test the functional level of the Point of Sales (POS) information system and to analyze the effectiveness of the POS information system.
Materials and Methods: The research method tested the functional level of the system using the black box testing method and testing using the equivalent partitioning. The analysis of the effectiveness of the POS information system use the PIECES method. The analysis process was carried out by distributing questionnaires to 183 respondents about the effectiveness of the POS information system using six variables and testing the validity.
Results: The results of functional test research using the black box testing method are very satisfying because the test cases that have been tested show that there is no interface that is functionally invalid or error. The results of measuring the effectiveness of the POS information system using the PIECES method on the aspects of performance, information, economy, control, efficiency, and service are effective.
Conclusion: POS information system is in line with SMEs needs because it provides faster services in obtaining transaction receipts and sales report.
Key Words: InformationSystem; Point of Sales; SMEs; Black Box Testing;PIECES.

I.   Introduction

Retail sales are sales for end customers that are used for household needs for families and individuals. The retailing position is the distribution of the factory chain to the final consumer[14].Eventhough Small and Medium Enterprises (SMEs) in the retail sector have an important role in supporting the economy in Indonesia, but they must also be balanced with the use of information technology to run their business. Information technology is specifically used to manage financial transactions and information. However currently the majority of SMEs businessmen process transactions and financial records in a conventional manner. Until now, 89% of SMEs businessmen in East Java, Indonesia use Point of Sales (POS) for transaction management and financial information management because the POS information system is an alternative business management for them, minimizing the risk of human error in business management and as a measure of total profit[13]. The problem is the functional level of the POS information system is not yet known, as well as the level of effectiveness of the POS information system with aspects of performance, information, economy, control, efficiency, and service on retail sales for SMEs. Finally, it discovers whether the POS information system is in accordance with the needs of SMEs businessmen in retail.

So far, many SMEs do not know how much success the sales information system uses[1,2,11]. Based on the description above, this research conducts tests on the POS information system which is carried out through functional testing of the software interface whether it is in accordance with user needs. The testing uses the black box testing method as a software testing strategy that focuses on functionality and aims to find errors through specification-based testing. This method is used because the design and testing are independent of each other, the test is carried out from use, it becomes easier to test only on the application, this test does not require a programming language, and testers pay attention to the interface of the software used[2].

Black box testing or recognized as behavioral testing is a technique for testing software and is used to determine the functionality of application by focusing on the availability of expected inputs and outputs[9,17] and is used to determine the output based on the data entered in software regardless of what design and code was used. This method is to test whether the software is in accordance with the businessmen needs[7,10,12,18] and detect software failures so that failures can be repaired[4,8,9]. Black box testing focuses on system functions and types of testing, namely equivalence partitioning, boundary value analysis, cause effect graphing, decision table based

testing, and error guessing[17]. The test results in the test case table are used as a conclusion whether the Point of Sales (POS) is successful in the test, then a test table for input, expected results, output, and conclusions is made.

Meanwhile PIECES framework is a framework used to classify problems that exist in the scope definition of system analysis. The analysis of the information system effectiveness of the PIECESis performance, information, economy, control, efficiency, and service because the PIECES method is the basis for obtaining more specific issues. Its function is to assess the effectiveness of the POS information system.

The POS information system is software that is specifically for sales transactions (supermarkets/ minimarkets, restaurants, cafes, and others) and is designed to help produce sales reports so that they can produce information related to sales[5,16] for customers, stakeholders, and retail business managers at SMEs[13]. POS consists of stock management, purchasing and sales reporting, customer and supplier management, transaction security standards (passwords), and the return process[6].

II. Material And Methods

The target of this research is the owner, leader, and cashier at retail SMEs who use the POS information system for at least six months. The first stage is to carry out the functional test of the POS information system with the black box testing method through an interface test, equivalence partitioning. The following sections are related to the sales process and its relation to the menu or tools used in the POS which are presented in the flow diagram of the POS retail sales process context.
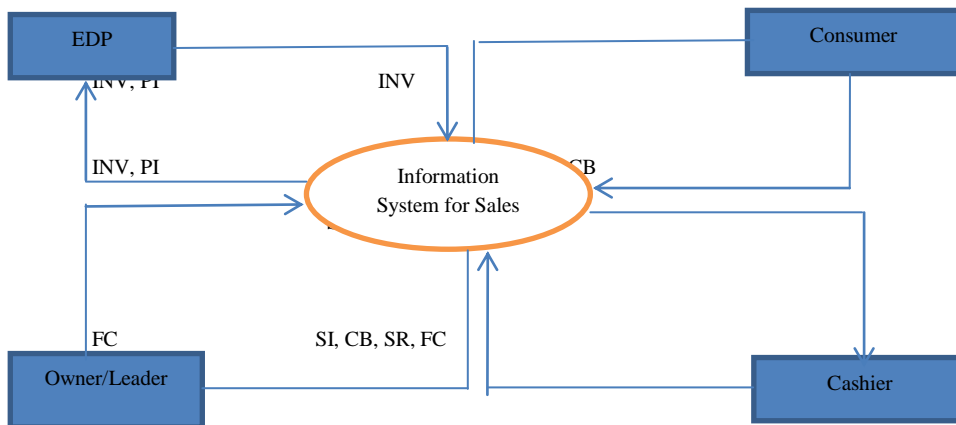

Figure no 1: Context Diagram Flow of POS Retail Sales Process

Figure no 1 illustrates the flowchart of the EDP section recording the identity of products on the inventory menu (INV) and entry of merchandise transactions purchased on the purchases invoice (PI) menu in the sales information system (SIP). The consumer share makes purchases that affect the purchases invoice (PI) menu, inventory (INV) because it reduces products, and makes payments from the bank cash menu on the SIP. The cashier makes cash sales entries using the sales invoice (SI) menu, bank cash (CB) to receive payments, and generates sales reports in the sales report (SR) menu on SIP. Meanwhile, the owner leader receives financial reports from the financial report (FC) menu on SIP.

Tabel no 1: User Interface on Point of Sales (POS)

Related Part	Task
EDP	(1) Enter the name of the products to be sold. (2) Record the number of items in the inventory. (3) Check incoming and outgoing products
Cashier	(1) Entering product sales transactions through cash sales and sales returns based on notes obtained from waiters. (2) Print out the total sales (sales receipt) that must be paid by customers (3) Recap a sales report
Owner/Leader	(1)Receive sales reports on all sales transactions. (2) Taking decisions on the procurement of products to be sold (added, reduced, or replaced by products)

Table no 1 describes the related parts and tasks of the user interface using Point of Sales (POS) and the tasks of each user who is a respondent.

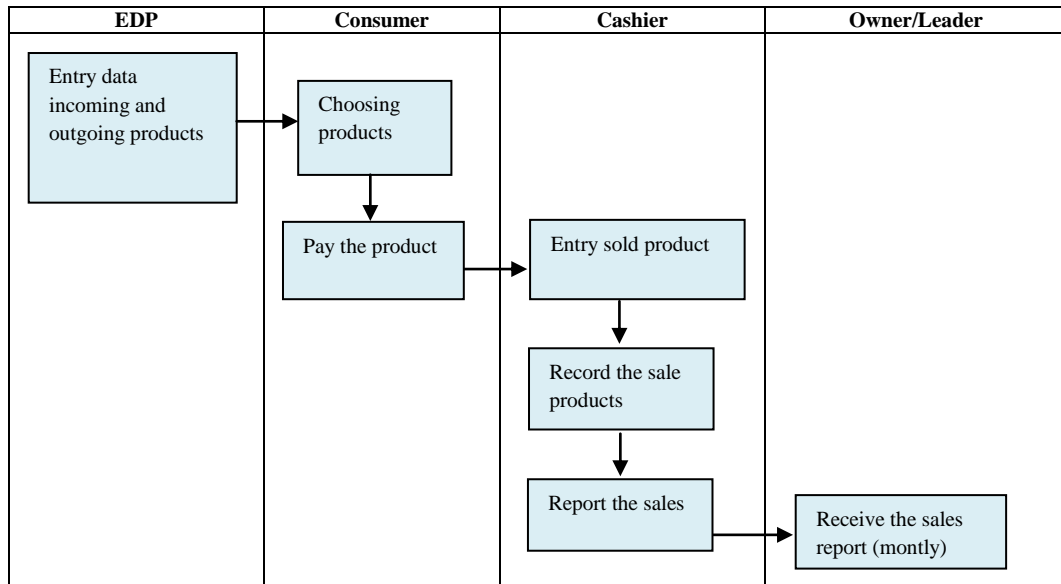| EDP	Consumer	Cashier	Owner/Leader
Entry data incoming and outgoing products → Choosing products	Pay the product	Entry sold product ↓ Record the sale products ↓ Report the sales	Receive the sales report (montly)

Figure no 2:Flow of Sales and User Interface Process

Figure 2 describes the process of the POS retail sales information system flow which explains the task of Entry Data Processing (EDP), which is to enter data (input and output) in the sales section to enter the name of the item in inventory, the number of stock items, and the selling price of the products. Meanwhile, customers choose products at outlets or retail stores then they are brought to the cashier for cash payments. Customers get a receipt from the cashier for the products purchased. The cashier always reports sales results, namely sales reports.
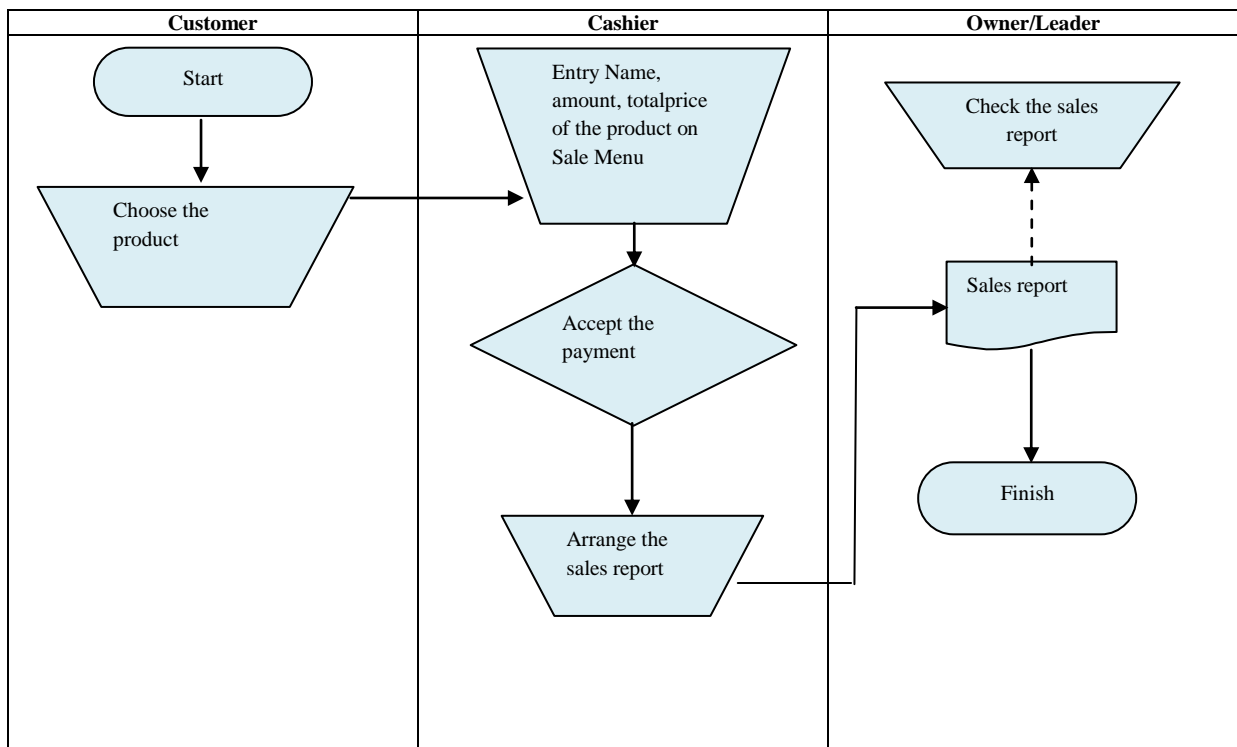
Customer	Cashier	Owner/Leader
Start ↓ Choose the product →	Entry Name, amount, totalprice of the product on Sale Menu ↓ Accept the payment ↓ Arrange the sales report	Check the sales report ↑ Sales report ↓ Finish

Figure no 3. Flow of POS Retail Sales Information System

Figure no 3 describes the sales process using POS. The cashier section that is directly related to POS enters the name of the item, the number of products, and the total paid by the customer. Then the manager receives financial reports, especially sales reports that have been made by the cashier.

The second stage of the effectiveness of the POS system was analyzed with the PIECES method consisting of performance, information, economy, control, efficiency, and service variables. This type of research is descriptive quantitative. This stage was carried out by the observation technique by distributing questionnaires online to 183 respondents using the PIECES framework domain in the POS information system. This questionnaire uses Likert scale with a value of 1–5 (very ineffective– very effective). The questionnaire was made based on the PIECES framework analysis with the research object of SMEs retail sales entrepreneurs in East Java, Indonesia. Furthermore, the results of the distribution of the questionnaires are tabulated and tested for the validity of the performance, information, economy, control, efficiency, and service variables. The validity test aims to determine whether the primary data obtained is relevant to the goal. If r count is bigger than (>) r table (2-sided test with sig. 0.05), the statement item is declared valid.

III. Result and Discussion

SMEs retail businessmen who use Point of Sales (POS) information systems was tested by using POS. Furthermore, functional testing is carried out by cashiers, owners, and leaders using the black box testing method through the planning and design stages. This stage collects interview data about the need for item data entry, entry of purchase and sale transactions, preparation of purchase and sales reports. The design stage is carried out with the interface of the POS information system for the inventory, purchases, sales, cash bank, financial reports, user id and password menu. The results of the POS information system functional test are presented in table no 2.

Tableno 2: POS Information System Test Results (Black Box TestingMethod)

No	Testing Description	Expected Results	Testing Result	Information
1	Login user ID and password	The system displays information "fill user and password" and "erroneous password"	The system displays the info "correct user ID and password"	Appropriate
2	Push down inventory, purchases, sales, cash bank menu	Saved transaction is unsuccessful (error)	Saved transaction "successand saved"	Appropriate
3	Save all filled tools	System dispalys the info "fill all fields"	System dispalysthe info "saved"	Appropriate
4	Add, delete, and edit products in the inventory menu,purchases, sales, and cash bank	System dispalys the info "data cannot be deleted, changed, and added if the related transaction has not been deleted"	System dispalys the info "data was successfully deleted / changed / added)	Appropriate
5	Perintah exit	System dispalys the info "need backup data"	System dispalys the info "data backupedand exit"	Appropriate

Table no 2 describes the test results of the POS information system related to the POS operational system starting from entry passwords, processing products input from purchase transactions, and processing products output from sales transactions, processing payments and receiving money, and sales reports. The results are as expected and the interface in the test case is valid or not error.

The results of the PIECES method by using the Likert scale are used to assess the effectiveness of the SMEs retail sales information system at the Point of Sales (POS). The percentage of the results of the questionnaire distributed to 183 respondents was calculated from the value answered by the user. After that, the validity test is conducted to determine whether the data obtained is valid or not. If it is valid, it is relevant for the purpose of knowing the POS information system effectiveness through six aspects. The results of the validity test are presented in table 3 and the results of the data obtained are valid.

Table no 3: Results of Validity Test Data Processing

Domain	Korelation Coef.	Sig.	Inf
Performance	0,684	0,000	Valid
Information	0.467	0,000	Valid
Economy	0,558	0,000	Valid
Control	0,552	0,000	Valid
Eficiency	0,615	0,000	Valid
Service	0,257	0,000	Valid

**. Correlation is significant at the 0,05 level (2-tailed).

Table no 4: Hasil Tabulasi Data (%) Metode PIECES

Aspect	Scale (%)				
	1	2	3	4	5
Performance	-	-	30,1%	50,8%	19,1%
Information	-	0,5%	26,8%	47,5%	25,1%
Economy	-	-	19,7%	50,8%	29,5%
Control	-	-	27,3%	43,2%	29,5%
Eficiency	-	0,5%	24,6%	48,1%	26,8%
Service	-	1,1%	23%	60,1%	15,8%
Rata-rata	0	1%	25%	50%	24%

Table no 4 presents the percentage of tabulated data results from 183 respondents' answers to the questionnaire on a scale of 1-5 (very ineffective to very effective). It was explained that the biggest performance aspect was 50.8%. It shows that the performance of the Point of Sales (POS) information system was effective for the process of productsdata entry, sales transaction entry, payment entry from customers. In addition, financial reports were faster and errors were minimal. The biggest information aspect is 47.5%, it indicates the information generated from the use of POS is very effective with regard to incoming and outgoing products data, transaction report information, and profit information obtained by SMEs. Meanwhile, the biggest economic aspect is 50.8%. It means that economically the use of POS is very effective in obtaining financial information that is comparable to the cost of a POS information system procurement. Next, the biggest control aspect is 43.2% which means that the control of the POS information system use is very effective in using passwords, controlling duplicate numbers of transaction numbers, data backup facilities, and inventory control. In addition, the biggest efficiency aspect is on a scale of four at 48.1%. It describes the efficiency of using POS is very effective in terms of cost and time efficiency, data search and processing and the number of employees needed to operate the Accurate software. Finally, the biggest service aspect is on a scale of four at 60.1%, which means that the results of using the POS information system are very effective in relation to customers to obtain proof of transactions and sales report information for the owner or leader.

Based on the description above, the highest level of effectiveness is from the six aspects, which is the service aspect, which means that the cashier service provides financial reports, especially sales reports to the owner or manager, which will make it easier to make policies related to the procurement of products to be sold. In addition, cashiers find the effectiveness of using the POS information system because it can provide faster service in the process of receiving payments from customers.

IV. Conclusion

The results of the functional test of the SMEs retail sales information system with Point of Sales (POS) do not show invalid and the interface in the POS is as expected, which can help complete the activities of the EDP section for data entry of products, entry of sales transactions and financial reports in particular sales reports.The owner or leader is easy to see the results of financial reports. The Point of Sales (POS) information system used by SMEs is effective from the performance aspects, the information generated, expenses for POS procurement. Furthermore, the POS can be control byhaving a password and transaction error info, in terms of costs incurred and time taken for use. In short, POS is acceptable because the service is faster for speed of obtaining transaction receipts and sales report.

The highest level of effectiveness is the service aspect because the main key to the effectiveness of the SOP sales information system for SMEs lies in the cashier service providing financial reports to the owner or leader. Services provide the sales transaction process with customersfaster and with fewer errors.

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