Transaction Application Management through Wireless LAN for Small and Medium Enterprises

I Made Ari Dwi Suta Atmaja[1][a], I Nyoman Gede Arya Astawa[1][b], Ni Wayan Wisswani[1][c],
I Made Riyan Adi Nugroho[1][d] and Putu Wijaya Sunu[2][e]

1Department of Electrical Engineering, Bali State Politechnic, Badung, Indonesia
2Department of Mechanical Engineering, Bali State Politechnic, Badung, Indonesia

Keyword: Management Order, Wireless LAN, Waitress App, Tablet, SME.

Abstract: In the current condition, business actors, especially Small and Medium Enterprises (SMEs) are increasingly showing a tendency to utilize information technology by conducting business operational transactions using local applications as needed. In general, transactions carried out in the SME business model are data input directly through the PC device used. This causes the infrastructure model used for these applications to tend to be fixed and inflexible and cannot be operated on a mobile basis or move from one place to another in the business area. The solution to these problems is to build a transaction management system that utilizes Wireless LAN network infrastructure modeling so that it can facilitate operational activities where employees can serve transactions not only in one place. But by moving from one place to another around the business area. With this application, the process of printing order notes is separated between food and beverage orders. Benefits This application can be accessed using smaller devices such as smartphones or tablets, making it easier to carry around mobile in the business area

1 INTRODUCTION

Today's information technology is growing very rapidly along with the development of human needs for flexibility and efficiency of time and thought energy in various aspects of life. Information technology is useful as a means to communicate, disseminate, search for data, and the most widespread nowadays is to use it to conduct business transactions (Ana Rita Sampaio, Rhodri Thomas, Xavier Font, 2012). It is undeniable that information technology has changed the behavior of economic actors in conducting business transactions, from conventional paper-based business to modern electronic and digital-based business (J. Srikanth and S. Mohanavel, 2018).

Business actors, especially Small and Medium Enterprises (SMEs) are increasingly showing a tendency to utilize information technology by conducting business operational transactions using local applications as needed (V Prajová, M Homokyová, M Horvátová, 2019). One of the specific SMEs is the food outlet business. In a food outlet business like this, the applications used are generally operated on a standalone basis with PC devices and must be connected directly to the application provider server (Irving Reascos Paredes, João Alvaro Carvalho, 2017). In general, transactions carried out in the application model are inputting data directly through the PC device used (Linus Udoh, Ibrahim Inuwa, 2016). This causes the infrastructure model used for these applications to tend to be fixed and inflexible and cannot be operated on a mobile basis or move from place to place within the business area. As with transaction applications in general, this modeling does not provide flexibility for business

[a] https://orcid.org/0000-0002-1103-528X

[b] https://orcid.org/0000-0003-1472-896X

[c] https://orcid.org/0000-0003-0318-4178

[d] https://orcid.org/0000-0002-3448-3405

[e] https://orcid.org/0000-0002-6915-0475

actors who have limited employees and a fairly large business area (Umar Bin Qushem, Akram M. Zeki, Adamu Abubakar, 2017). The customer order process must be recorded by the waitress then inputted manually through the PC device used as Order Taking (Maia A.W. and Farias P.P.M., 2019). Another problem that arises in the SME business of food outlets is that generally the printing of food and beverage orders is not separated so that if there are quite a lot of orders, it will cause difficulty in managing the time in completing orders between food and drinks (Holzinger A., Treitler P. and Slany W., 2012). And one of the most importantly are the security of transaction data via wireless lan must also be well protected, because transaction data is important data for a company (N. C. Kiran and G. N. Kumar, 2011).

From the problems faced by SME business actors, especially food outlets, this research will build a system for transaction management that utilizes Wireless LAN network infrastructure modeling so that it hoped that the construction of this system can facilitate operational activities where employees can serve transactions not only in one place but also in one place. By moving from place to place according to the customer's location. As well as in the process of printing the order note, it is possible to separate food and beverage orders. This application can be accessed using smaller devices such as smartphones or tablets, making it easier to carry on mobile in the business area.

2 RESEARCH METHOD

The development of this application can be applied to SME businesses anywhere. The flow of the application system that was built as shown in Figure 1 below:
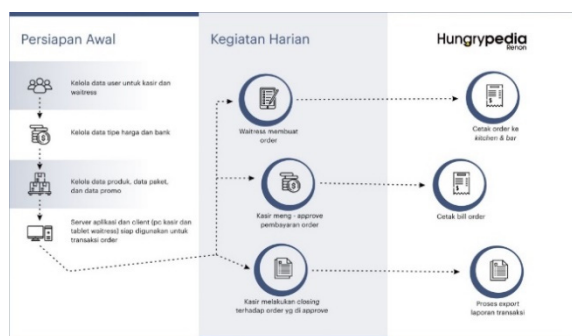

Figure 1: Application System Flow.

The applications that are built are customized according to the needs of the ongoing business operations For details of the application system that was built, it is shown in Figure 2 below:
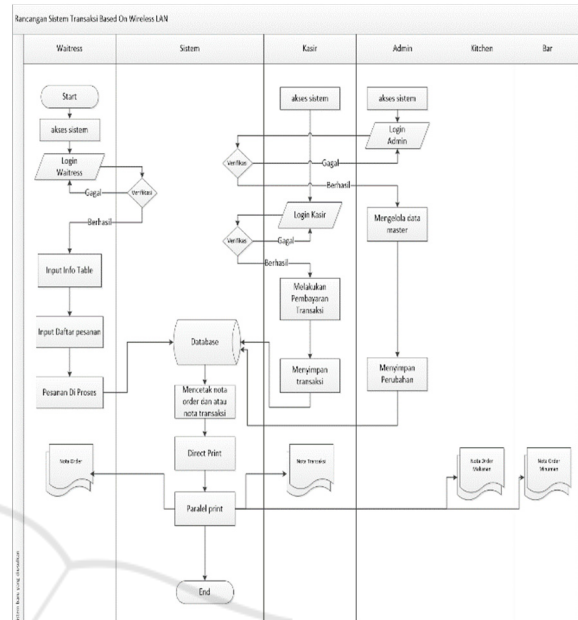

Figure 2: Detail Flowchart of Wireless LAN-based Transaction System.

The process flow system according to the flow chart Figure 1 and Figure 2 is described as follows:

1. Waitress accesses the system via a browser. Where the device used is a device such as a smartphone or a tablet that can be carried anywhere in the business area. The device accesses the application through a Wireless LAN Network that has been built and is intended for applications.
2. The waitress will make an order (login required), the waitress will access the order page and enter the table information from the customer, then the waitress will input the customer order list and process the order.
3. When the order is processed by the waitress, the order data will be saved to the database, and the system will print the order customer in the waitress printer, a food order note printed in the kitchen, and a drink order note printed the bar by direct and parallel print.
4. After the waitress makes an order, the cashier can make payments on orders that have been inputted by the waitress, where the cashier will access the system via a browser and log into the system, then the cashier will make payments according to the

order information listed, and save it to the database.

5. When payment information is saved to the database by the cashier, the order data will be saved to the database, and the system will print a transaction note for the cashier.

6. In the system admin has access to manage master data, be it product data, package data, promo data, and user data. To manage master data the admin will access the system via a browser (login required) then manage the required master data and save changes to the system.

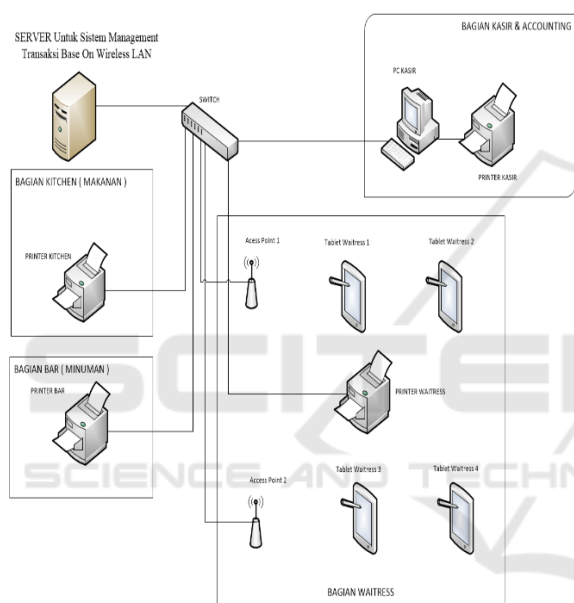Then for the design of the Wireless LAN Network Framework for the application is described in Figure 3 below

Figure 3: Wireless LAN Network Design.

The network design flow process according to Figure 3 is explained as follows

1. The application is installed on the Server device where all transaction data is stored.

2. There is one printer in each section which used in printing order notes and transactions.

3. In network modeling, there are two access points that use as Wireless LAN infrastructure that serves as a medium for communicating order data entered by the waitress.

4. The smartphone or tablet device will be carried by each waitress on a mobile basis or move from place to place around the business area.

5. The ordering process is carried out through a device brought by the waitress where the device is connected to the Server via Wireless LAN.

6. After the order input is made by the waitress, later the order will be printed directly in the kitchen section for food and the Bar section for drinks. Likewise, the waitress printer will also print all the orders that have been inputted earlier.

7. Once there is a note printed on the Kitchen or Bar, depending on the order. Then the Kitchen or Bar will immediately process the order without having to be manually informed by the waitress that there is an incoming order.

8. For printing notes on the waitress printer, it is used by the waitress to cross-check which orders have been completed and brought to the customer. Thus minimizing the order process errors.

9. When the customer wants to make a payment, he or she is immediately invited to the cashier to make a payment there either in cash or using a debit/credit card. And the payment receipt will be directly printed on the cashier's printer.

10. All transactions will be stored and recorded in the application on the Server. If you want to print transaction reports, the admin can do it directly through the server or through the cashier's PC by first logging in as Admin

For the IP Address scheme of the device used, it is explained in table 1 below:

Table 1: IP address device configuration mapping.

DEVICE	LOCATION	IP ADDRESS	INFORMATION
PC Server	3rd Floor	192.168.0.1 /28	Application Server
PC Cashier	1st Floor	192.168.0.2 /28	PC Cashier and Accounting
Tablet 1	1st Floor	192.168.0.6 /28	Device Waitress 1
Tablet 2	1st Floor	192.168.0.7 /28	Device Waitress 2
Tablet 3	2nd Floor	192.168.0.8 /28	Device Waitress 3
Tablet 4	2nd Floor	192.168.0.9 /28	Device Waitress 4
Printer 1	1st Floor	192.168.0.10 /28	Waitress Printer
Printer 2	1st Floor	192.168.0.11 /28	Kitchen Printer
Printer 3	1st Floor	192.168.0.12 /28	Bar Printer
Printer 4	1st Floor	192.168.0.13 /28	Cashier and Accounting Printer

System testing will be carried out directly through the tablet waitress device so that the orders entered will be directly printed through the cashier printer in each section, making it easier to manage customer orders. This transaction management application's goal is to process orders through wireless LAN so that the waitress can move around the business area to adjust the customer's position. Then for order management

and output notes can be arranged according to the type of order made, such as food orders will be directly printed in the kitchen section as well as for drink orders will be directly printed on the bar.

3 RESULT AND EVALUATION

The results obtained from this study are transaction management applications that can be accessed through a wireless network from the waitress device without any problems. This application was built using the programming language commonly used to build an information system is PHP with a responsive display so that it is easy to access via web browsers on smaller devices, such as Tablets and Mobile Phones. And for the database using MySQL. The results of the study are as follows:

3.1 Result

The results of this application have been implemented at Hungrypedia Food Outlets. The figure below is the business logo of the food outlet where this application is used.

Figure 4: Business logo of the food outlet.

Applications are divided into 2 important parts, that is Server Applications and Client Applications. Server applications are placed on a PC Server located in the office and client applications are accessed directly via tablet devices brought directly by the Waitress around the business area. The following is the user interface display if the user (waitress) accesses the system via a tablet device via a Wireless Lan network
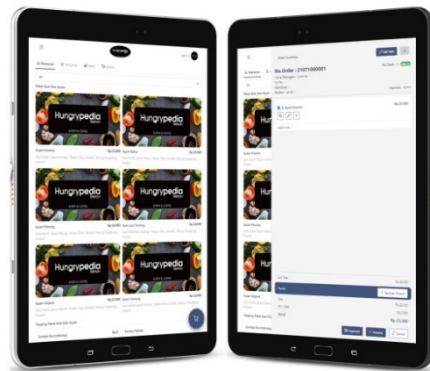

Figure 5: Display applications via tablet devices.

And Figure 5 below show the system interface when accessed via a desktop computer.
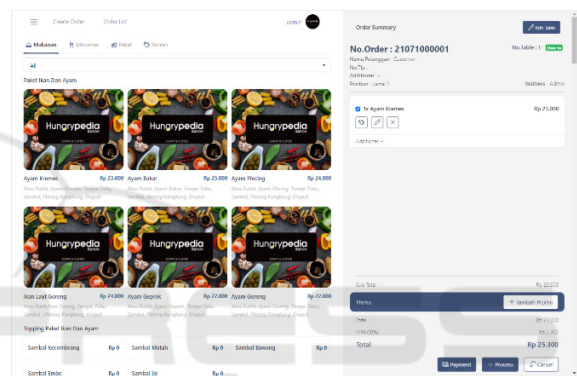

Figure 6: Display the application via a desktop computer

In Figure 6 below, we can see a list of menus and pages available on the system if accessed with an admin account. For the administrator menu and pages, users with cashier and waitress roles cannot have access rights.
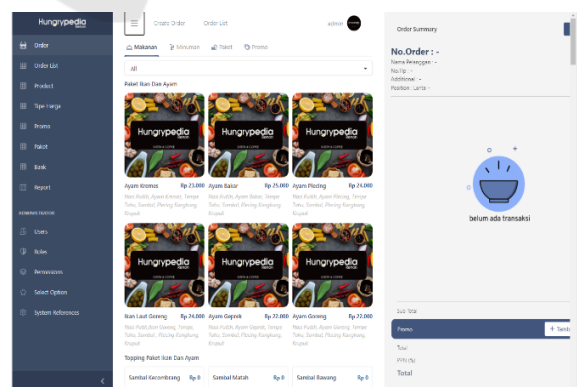

Figure 7: Display list of main menu admin user.

In access the system, 2 application shortcuts were created, namely through the cashier's desktop PC and

via the waitress tablet device. This application runs on a local network so that to access the application the localhost system used as shown in Figure 7 below :

Figure 8: Application Shortcut via Desktop PC.

Then for system access via tablets, application shortcuts have been created and configured to the Transaction Management Application which remains connected to the application server. Figure 8 below is an application shortcut display via a tablet device
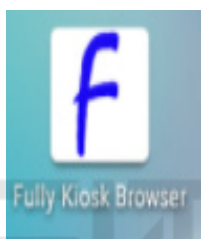

Figure 9: Application Shortcut via Tablet Waitress.

Furthermore, figure 9 shown the login display on the application. The login option in the application adjusts the floor position of the waitress working so that it can do tracing if an input error occurs
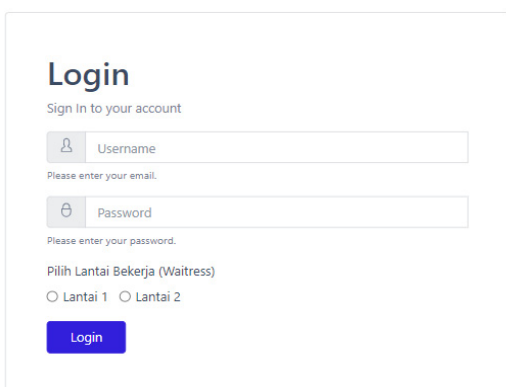

Figure 10: Waitress Login Form display.

After login, the Transaction Management Application can be used properly

3.2 Evaluation

The tests carried out were testing the connection test from the tablet device waitress then testing the order input according to the type of food until an order note was printed in each section. To test the connection from the tablet device waitress equipment to the application server, it is shown in Figure 10 below:
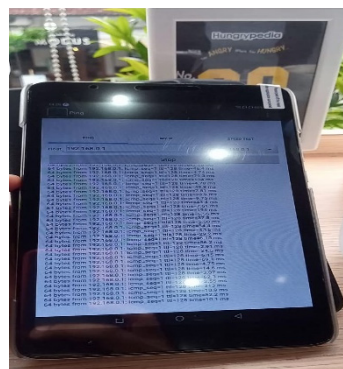

Figure 11: Test the tablet waitress connection.

The results connection test evaluation shown that the tablet device waitress connected well to the application server, as well as testing connections to other devices that used in this application

Furthermore, evaluation of the application itself is carried out to ensure that the order input process can run properly, both order input from the tablet waitress or order input from the cashier's PC. Order input from the cashier's PC is still needed to be an alternative to input orders other than the tablet waitress. For order input, it is shown in Figure 11 below:
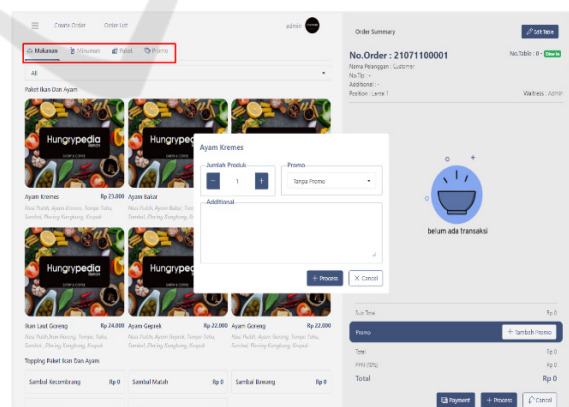

Figure 12: Input Order PC cashier.

After inputting the order through the application, an evaluation of the notes printed on each section is carried out. Where for food orders the order note is printed on the kitchen and for drink orders, the order note is printed on the bar. Order notes that are input

are also printed on the waitress printer, where the notes are used for controlling the order input by the waitress. And for the overall order note accompanied by the total price printed on the cashier, where the customer will make payment after the order is completed. The payment process is still carried out at the cashier's PC where the payment process can be done in cash or using a debit card through the provided EDC machine.

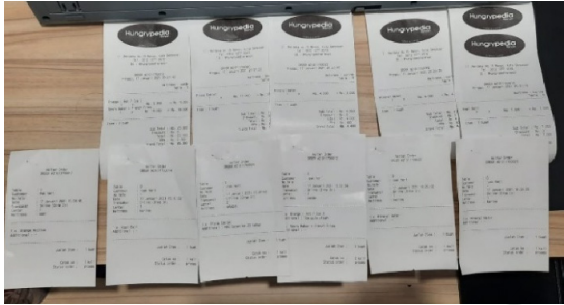The printout of the customer's note on the cashier's PC is shown in Figure 12 below:

Figure 13: Output Bill Customer.

The results of the tests that have been carried out on the equipment and the transaction management application are shown in table 2 below:

Table 2: Application Test Results Through the Equipment.

No	Device	Proses Test	Informaton	Status
1	Tablet 1	Input, Edit, Delete Order	Device Waitress 1	Succeed
2	Tablet 2		Device Waitress 2	Succeed
3	Tablet 3		Device Waitress 3	Succeed
4	Tablet 4		Device Waitress 4	Succeed
5	Printer 1	Print Order Note	Waitress Printer	Succeed
6	Printer 2	Print Food Order	Kitchen Printer	Succeed
7	Printer 3	Print Drink Order	Bar Printer	Succeed
8	Printer 4	Print Order Total Invoice	Cashier and Accounting Printer	Succeed
9	Server	Report Print	Application Server	Succeed
10	Cashier PC	Print Daily Transactions	Cashier and Accounting PC	Succeed

From the tests that have been carried out, all transactions, from inputting orders through the tablet device waitress to printing reports on the application server, run properly. For network infrastructure as application support, maintenance must be carried out, especially Access Point as a key point in order input

wirelessly so that the operational process did not have any problems

4 CONCLUSION

This study concludes that the Transaction Management Application has been able to carry out business operational transactions through wireless LAN order input and the printing of order notes can be separated based on the type of order. And cashier operations have been going well. This application is implemented into a system that will help digitalize small and medium businesses in the future.

ACKNOWLEDGMENTS

REFERENCES

Ana Rita Sampaio, Rhodri Thomas, Xavier Font. 2012. Small business management and environmental engagement. Journal of Sustainable Tourism, 20:2, 179-193

J. Srikanth, S. Mohanavel. 2018. Business Analytics Applications For Small And Medium Enterprises. International Journal of Advance and Innovative Research. Vol. 5, 34-35

V Prajová, M Homokyová, M Horvátová. 2019. Transaction Applications of Enterprise Information System. IOP Conference Series.: Mater. Sci. Eng. 659 012026.

Irving Reascos Paredes, João Alvaro Carvalho. 2017. Understanding the process of implantation IT Enterprise Applications in Small and Medium Enterprises (SMEs). Conferência da Associação Portuguesa de Sistemas de Informação (CAPSI'2017), Guimarães, Portugal. 270-283

Linus Udoh, Ibrahim Inuwa. 2016. Implementation of a Data Driven Transaction Processing System for the AUN's Restaurant, Yola – Nigeria. International Journal of Computer Applications. Vol 149 No.6, 9-20.

Umar Bin Qushem, Akram M. Zeki, Adamu Abubakar. 2017. Successful Business Intelligence System for SME: An Analytical Study in Malaysia. IOP Conference Series: Mater Sci. Eng. 226 012090

Maia A.W., Farias P.P.M. 2019. Transactions as a Service. Software Engineering Methods in Intelligent

Algorithms (CSOC 2019). Advances in Intelligent Systems and Computing, vol 984. Springer, Cham.

Holzinger A., Treitler P., Slany W. 2012. Making Apps Useable on Multiple Different Mobile Platforms: On Interoperability for Business Application Development on Smartphones. Multidisciplinary Research and Practice for Information Systems (CD-ARES 2012). Lecture Notes in Computer Science, vol 7465. Springer, Berlin, Heidelberg.

N. C. Kiran and G. N. Kumar. 2011. Building robust m-commerce payment system on offline wireless network. Fifth IEEE International Conference on Advanced Telecommunication Systems and Networks (ANTS), 2011, pp. 1-3.