

The Development of an Application for OTOP Marketplace with Android Smartphones: A Case Study of OTOP Products from Khok Khian Subdistrict

Wiyuda Phetjirachotkul¹, Chonthisa Rattanachu¹
and Kronsirinut Rothjanawan^{1*}

Received: December 24, 2023; Revised: February 10, 2024;

Accepted: February 16, 2024; Published Online: March 5, 2024

Abstract

The objectives of this research composed of i) to design and develop an application for OTOP products, ii) to evaluate the efficiency of the applications for selling OTOP products, and iii) to evaluate the system performance of an application for OTOP products. The target groups for system evaluation composed of 3 specialists and 30 peoples of application user. Using the System Development Life Cycle (SDLC) consisted of 7 main steps problem definition analysis, design and development, testing an implementation and maintenance by visual studio code and firebase as the tools of this research application for OTOP products. Evaluation of the satisfaction of the system has been found that the efficiency of the application for selling OTOP products in overall applications performance is at the very good level (\bar{X} =4.53, S.D.=1.04) and the satisfaction application in terms of practical use is at the good level (\bar{X} =4.17, S.D.=0.88).

Keyword: Applications, System Development Life Cycle, OTOP, Smartphones

Introduction

Recently, the world has entered into the digital era of economy and society. Digital technology is not just a tool to support work but it will truly be integrated into people's lives and will change the structure of economic activities, production processes, trade, and services. Therefore, Thailand needs to accelerate the adoption of digital technology as an important tool to drive national development in the context of the country. By applying the digital transformation, the country can increase the opportunities and challenging the economic and business capabilities development in the agriculture sector, production and services, especially among SMEs and community enterprises, to be able to compete in the digital era (Khamwong et al., 2014). The One Tambon One Product (OTOP) project is an important part in bringing local wisdom to be developed into the products, with the government supporting knowl-

edge and management to connect the products from communities to markets in both domestic and abroad with the network store and the internet.

Narathiwat Province is one of the provinces that has the One Tambon One Product Project. The Community Development Office of Narathiwat Province is responsible for the project and supports the community products by pushing and leveling up of the standards that the community can generate the income from their own local wisdom. Thus, gradually increase of the community enterprise and products in the province. However, the OTOP products were not available in the general market only at the local area shop thus bring about low income of the community enterprise (Khan et al., Z.,2020). If the customer is interested, they must travel to the area, which wastes the time for traveling. Khok Khian Subdistrict Administrative Organization, Narathiwat Province needs an application

* Corresponding author; Department of computer engineering, Faculty of Engineering, Princess of Naradhiwas University, 9600, Thailand. kornsirinut.r@pnu.ac.th

¹ Department of computer engineering, Faculty of Engineering, Princess of Naradhiwas University, 9600, Thailand.

that can be purchased through an uncomplicated on-line system (Khok Khian Subdistrict Administrative Organization, 2022). Therefore, increasing sales of the OTOP products in order to increase the channels for accessing and purchasing various products and services conveniently and quickly. Also promote OTOP products in the area by develop the purchasing OTOP products application. The application has been divided the users into 3 groups composted of i) general user group, ii) group of OTOP product center, and iii) staff administrator group. The functionality of the application includes purchasing products, purchasing report, products list, shopping cart, order information, etc. Under these specific criteria, this study aimed to clarify as follow:

- 1) to design and development of an application for purchasing OTOP products using a smartphone.
- 2) to evaluate the efficiency of the application for purchasing OTOP products with a smartphone.
- 3) to evaluate the satisfaction of the user group by using the Likert method.

Materials and Methods

Conceptual framework

The data information has been collected based on user needs in order to analyze and determine the scope of functionality of the developed application that can meet the requirement of users. The conceptual framework and working process as shown in Figure 1.

System Development Life Cycle: SDLC

The application development is a process of performing tasks in order to work efficiently within a specified period of time. Therefore, a clear sequence of operating procedures from the start of the project until the end of the project called the SDLC system development cycle. This is a cycle used to represent the activities of the system in each stages of development that consisted of 7 steps as follows (Pattharawongthana et al., 2017).

- 1) Problem definition: In this step, the system integrator needs to clarify the problem from the previous work in various facts and solutions including activity plans.
- 2) Analysis: After the approval of the manager, the system integrator needs to clarify the weak point of the former system in order to develop the new system using a logical model including i) Data flow diagram, ii) Process model, and iii) Data model (Salama et al.,2022).
- 3) Design; The information system design will be developed into account of the identified needs in the analysis phase by taking the logical model and developing it into a physical model that needs to be done in the system in order to achieve the desired results. The system design consists of hardware, software, network systems, report design, data import display, receiving format data design, operational system design, flow-chart database system design, prototype and program

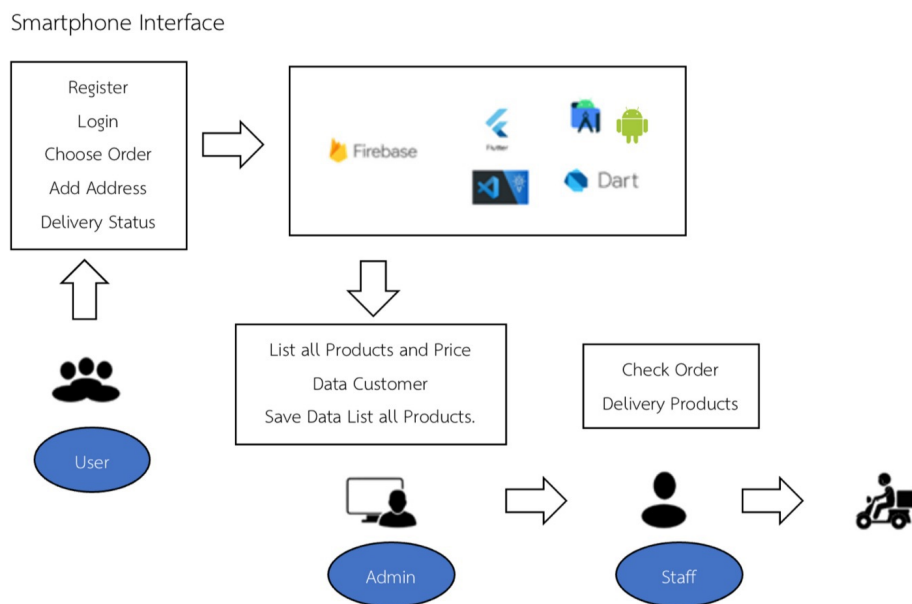


Figure 1. Research conceptual framework

development design.

4) Development: Reviewing the conceptual of system design by programable development in accordance with the system design involved instructions manual for future review and modification of the system. The Flutter program has been used for writing and to design the structure of the application page using the commands in the Dart language. For the database has been used the firebase to store the data collection and this database is free of charge.

5) Testing: The system has been tested before practical use. If the system has some malfunction, its need to re-correct. The assessment has been divided into 2 parts as follows.

5.1) Efficiency evaluation of the application for purchasing OTOP products using a smartphone. 3 selected specialists have been evaluated the complete application issues: i) Functionality testing and evaluation included the accuracy of each part of the system, and ii) Usability testing and evaluation of the web application in terms of difficulty and easy to use with 5 levels ranking according to the Likert scale (Hongsibsong, 2022).

5.2) Evaluation of user satisfaction of the application. The questionnaire has been divided into 2 main parts. The first part was the information about the respondents, such as gender, age, equipment used for using the product ordering application, etc. The second part is the satisfaction in using the application that divided scores into 5 levels using the Likert method for 30 people.

6) Installation: When the developed system is ready to installation for practical use in real situations from previous system to the new system. For the case of the previous system, the customer will place an order in various offline documents format whereas the new system that is operated online through an online application. The users may not be familiar with the new system. Therefore, selected the right method for installation is recommended.

7) Maintenance: After the newly developed system has been successfully in practical used, if some

malfunctions are found in the new system, the systems integrator needs to monitor and re-correct that malfunction. The mutual agreement regarding the additional scope of the development of the system needs to prepare before system modification in the future.

Visual studio code

Visual studio code or VS Code is a code editor program used to edit and customize code from Microsoft. It has been developed in the form of open source, so it can be used for free that requires professionalism (Michael, 2014). Visual studio code is suitable for program developers who want to use it across the supported platforms on Windows, macOS and Linux in both JavaScript, TypeScript and Node.js languages. This code can be connected to Git and easy to use. There are many different programs including i) C++, C#, Java, Python, PHP or Go, ii) Themes, iii) Debugger, and iv) Commands.

Firebase database file

Firebase is a project designed to be an API and Cloud Storage of real-time developing applications for multiple supported platforms. Recently, there are 3 available platforms for development: iOS App, Android App, and Web App (Siricharoen et al., 2014). Firebase real-time database is a NoSQL cloud database that stores data in JSON format and syncs data in real-time with all connected devices automatically in seconds for supports working when offline (The data will be stored locally until it comes back online and the data will be synced automatically). There are also security rules that allow us to design the data access conditions for both reading and writing as desired in Android, iOS and Web.

Android operating system

Android operating system is a popular operating system that reveals the original software (Open Source) by Google Inc. Because there are many devices using the Android operating system in different levels of devices and able to run on devices with any screen size with different resolutions. In the Programmer sight, developing programs use on the Android Operating System is not difficult due to this system has the development information including the Android SDK (Software Development Kit) prepared for developers for publish or sell the completed developed program. Android

still has a market for distributing programs through the Android market, but for the language structure used in development, the Android SDK is based on the structure of the Java language programmable (James et al., 2023). Because the developed program must run under the Dalvik Virtual Machine, like Java programs must run under the Java Virtual Machine. Android can be divided into 3 types as follows:

- 1. Android Open Source Project (AOSP)
- 2. Open Handset Mobile (OHM)
- 3. Cooking or Customize

Experimental design and system evaluation

This research study has been conducted for designed and analyzed an application for purchasing OTOP products using a smartphone to increase sales channels with 2 steps operational planned as follows.

1) The sample group used in this research were 30 targeted customer users in purchasing OTOP products. The research data for this study was collected using the Likert type method questionnaire.

2) Evaluation of the efficiency of the application using Likert method for 3 targeted customers. The application performance evaluation composed of i) testing and evaluation of the functionality and accuracy of each part of the system, ii) testing and evaluation of the usability of web applications in terms of difficulty or easy to use by specifying criteria with 5 levels of rating, and iii) satisfaction assessment of the target user application for 30 persons using Likert method. Overall picture of the working relationships in the system of the program as shown in Figures. 2-4. And the application design has been demonstrated in Figure 5.

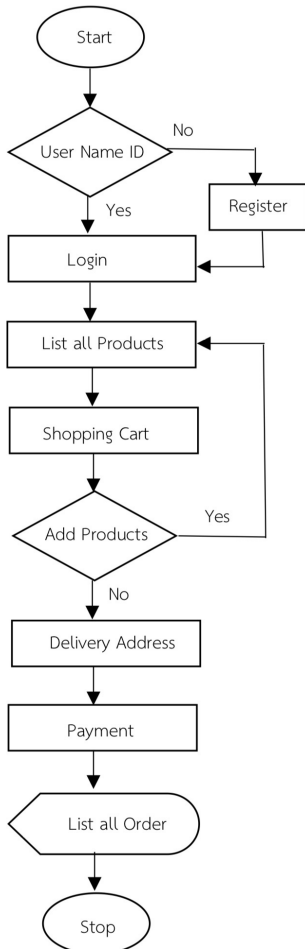


Figure 2. Working diagram of targeted customers

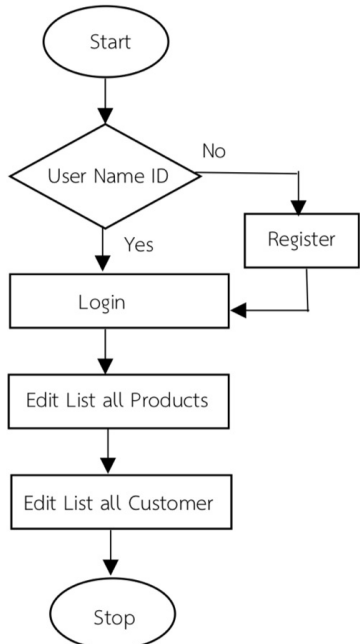


Figure 3. Working diagram of the system administrator

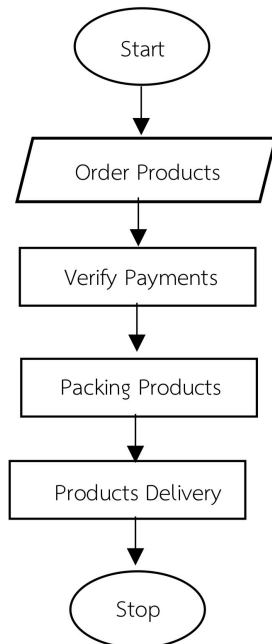


Figure 4. Staff operational diagram



Figure 5. Application design for selecting OTOP products with a smartphone

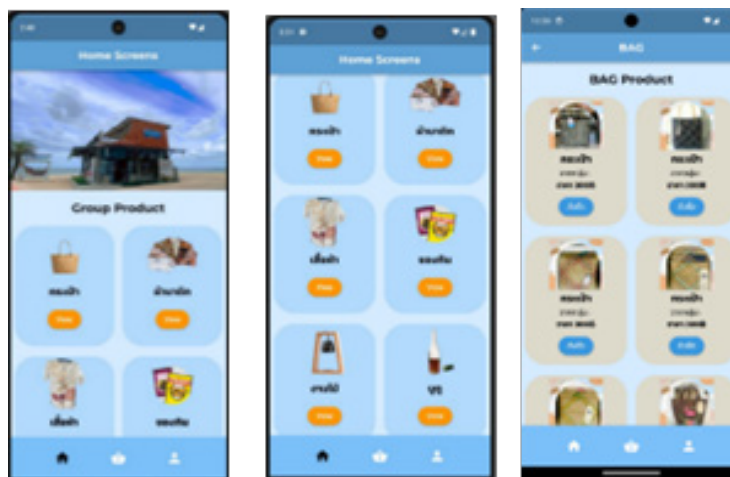


Figure 6. Application for selecting OTOP products with a smartphone

Then, statistical analysis has been used to describe the results to determine the performance of the developed application in terms of the average rating score with 5 levels. And the evaluation of the user satisfaction of the application with the average rating score with 5 levels using the Likert method for 30 persons.

Results and discussions

Under this particular research, 3 specialists on application development and 30 targeted customers have been selected for the evaluation of the devel-

oped application that divided into 3 parts as follows.

Part 1: Results of the designing and developing an application for purchasing OTOP products using a smartphone has been divided into 3 main parts: Part 1, targeted customers, Part 2, system administrators, and Part 3, official staffs. The design concept of the application has been focused on the satisfaction of the user, UX and UI design, easy to use and maintenance including the speed of application as shown in Figures. 6-7.

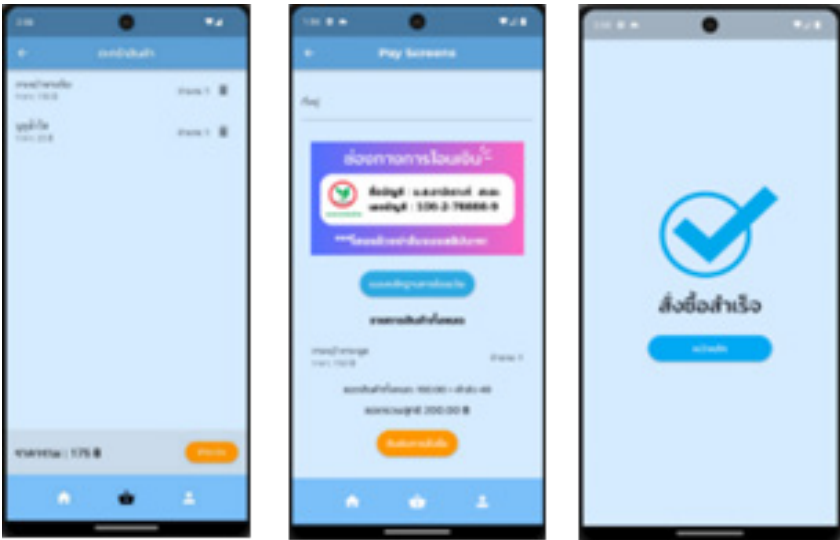


Figure 7. Application for purchasing OTOP products using a smartphone.

Table 1. summarized from the expert results evaluation

Evaluation Items	(\bar{X})	(S.D.)	Level of Efficiency
1. Functional Requirement Test			
Part 1 System administrators			
Add, delete, edit products list	4.33	1.68	Good
Add, delete, edit user group	4.33	1.63	Good
Record products list information	4.67	1.74	Excellence
Display report results in purchasing summary format	4.33	1.54	Good
Categorize product types	4.66	1.65	Excellence
Part 2 Officials			
Checking products of purchasing list	4.66	1.36	Excellence
Checking the status of products items	4.66	1.32	Excellence
Part 3 Target customer			
Available products viewing in the application	4.66	0.91	Excellence
Categorize products selection in the application	4.66	0.87	Excellence
2. Usability Testing			
Appropriated function in the application	4.66	0.55	Excellence
Appropriateness of using image and text in the application	4.33	0.47	Good
Appropriateness of the design of the application	4.33	0.47	Good
Appropriateness in overall composition	4.33	0.47	Good
The operating speed of the application is at the appropriate level	4.66	0.47	Excellence
Appropriate placement of menu in the application	4.67	0.47	Excellence
Mean avg	4.53	1.04	Excellence

Table 2. Results of the satisfaction evaluation of the target customers

Evaluation Items	(\bar{X})	(S.D.)	Level of Efficiency
1. Accuracy display of the performance of the application	4.16	0.88	High
2. Purchasing display is accurate	4.20	0.95	High
3. The application is easy to use	4.26	0.86	High
4. Font, color, and background selection in application	4.27	0.89	High
5. Text and image selection for products information explanation	4.06	0.93	High
6. Arrangement of various components of the application	4.16	0.86	High
7. Application speed	4.00	0.91	High
8. Overall usability of the application	4.20	0.86	High
9. Overall satisfaction for purchasing product in the application	4.20	0.81	High
Mean avg	4.17	0.88	High

Part 2: Results of the efficiency evaluation of the application for purchasing OTOP products with a smartphone. In terms of evaluating the performance of the developed application, both individual aspects and the overall picture have been reported the mean (\bar{X}) and standard deviation (S.D.) from 3 specialists in the field of the application development, information technology and related context. The evaluation has been focused in 2 areas as follows: i) the functional requirement test, and ii) the usability testing. The results of the efficiency evaluation of the application for purchasing OTOP products using a smartphone can be summarized by the specialist using the overall Likert method as shown in Table 1.

From Table 1, the overall performance evaluation results of the application for purchasing OTOP products with a smartphone are at an excellence level (\bar{X} =4.53, S.D.=1.04).

Part 3: Results of the satisfaction evaluation of the targeted customers in terms of evaluating user satisfaction with the use of the developed application. Both individual aspects and the overall picture has been reported the mean score (\bar{X}) and standard deviation (S.D.) from 30 system users. The results of the evaluation of satisfaction in using the application as shown in Table 2.

The results from Table 2 showed that the satisfaction evaluation of the target customers in each evaluation items represent the efficiency in high level of satisfaction in the new application system also an evaluation of the target user group represent with overall satisfaction at a high level (\bar{X} =4.17, S.D.=0.88).

Conclusions and recommendations

This research study is to develop an application for purchasing OTOP products using a smartphone to increase the sales channel. There are total of 7 product categories, including i) bags, ii) batik, iii) shirts, iv) food, v) woodwork, vi) budu, and vii) others in total 70 items. The users need to login to view the list of each type of menu item and details of each product that wish to order through the application. From the evaluation of the satisfaction of the 30 user questionnaires found that the satisfaction of fonts, colors, and backgrounds of the application at a high level with an average of 4.27, followed by the easy to use with an average of 4.26 and the accuracy of the purchasing display of 4.20 also with an average of 4.20 for the overall satisfaction, respectively. Also, Promso et al., (2021) studied the development of intelligent application systems to increase sales channels for OTOP products using smartphones in

the digital economy era, and found that the overview application design using the application is at the highest level of satisfaction with an average of 4.56. Considering each item, found that users are satisfied with the use of the application at the highest level followed by design with an average of 4.51 and the overall satisfaction with an average of 4.50, respectively. Therefore, the application development must taking into account of the beauty design and easy to use. In this research, the graphics work has been combined to develop a design in sharpening image editing, adjusting light and color for the benefit of the users. It may be necessary to study

and develop a higher security system in further to increase the efficiency of the application.

Acknowledgements

The author indebted to express their gratitude to the staff members of the Faculty of Engineering, Princess of Naradhiwas University, for fabricating the implementations and conducting the performance tests and evaluation and to Thailand Science Research and Innovation for granted the valuable cooperation in providing the research fund of our research investigation.

References

- Hongsibsong, P. (2022). Management Information System for Community Enterprise of Textile Group in Nan Province. *Journal of Information and Learning*, 33(2), 98-107.
- James, T., Extension, K. P. (2023). An Online Mobile Shopping Application for Uchumi Supermarket in Uganda, 74–82.
- Khamwong, S., Talaluck M. (2014). Promotion of Community Enterprise by using Information System Management in Phuphieng District, Nan Province. *Journal of Community Development and Life Quality*, 2(3), 305-311.
- Khan, M., Shams-E-Mofiz, M., & Sharmin, Z. (2020). Development of E-Commerce-Based Online Web Application for COVID-19 Pandemic. 12(4).113–126.
- Michael Yosep Ricky. (2014). Mobile Food Ordering Application using Android OS Platform. EPJ Web of Conferences. EDP Sciences, 2014.
- Pattharawongthana, J., Thipcharoen, S., Chantaraj, P. (2017). The Development of Management Information System for Support the Community Planning Preparation in Semi-Urban Area at Saraphi Subdistrict, Saraphi District, Chiang Mai Province to Encourage Participation Community Management for Sustainable Development. *FEU Academic Review*, 11(4), 128-146.
- Salama, R., Anam, I. (2022). Developing a Mobile Application to Facilitate Online Shopping. *Global Journal of Information Technology Emerging Technologies: Emerging Technologies*. 12(2), 77–88.
- Siricharoen, W. V., Sukwilai, A., & Khaemwong, V. (2014). The Database Prototyping Development, University of the Thai Chamber of Commerce. *Sripatum Review of Science and Technology*, 6(1), 32-45.
- Sumatapiwat, S. (2019). Consumer Promotion Strategy in Digital Marketing Age. *Santapol College Academic Journal*, 5(1), 172-177.
- Promso, S., Iamprasert, A. (2021). The Development of Intelligent System and Applications to Increase Channel Sales OTOP with Smartphones in the Digital Economy. The 4th National Conference in Science and Technology.198-203p.