COSTCAL
Accounting Application to Compute Product Costs and Provide Accounting Information to Support Entrepreneurs Decision – Making

Phatteera Phengphit[1*], Supawat Phongwatcharawat[2], Wanussuda Kamput[1], Phanee Thipwong[1], and Paweeya Raknim[1]

[1]College of Integrated Science and Technology Lanna, Rajamangala University of Technology Lanna Chiangmai, Thailand
[2]Faculty of Business Administration and Liberal Arts, Rajamangala University of Technology Lanna Chiangmai, Thailand
*Corresponding Author E-mail: phatteera@rmutl.ac.th

(Received: January 9, 2025; Revised: February 18, 2025; Accepted: February 20, 2025)

Abstract

This research aims to develop an accounting application (COSTCAL) to compute product costs and provide accounting information to support entrepreneurs in decision-making. The research has the following objectives: 1) to research and develop an accounting application to compute product costs and provide accounting information to assist entrepreneurs in decision-making; 2) to present and impart knowledge about product cost computation and the usage of accounting data to support business decision-making via a practical application that can be effectively used; and 3) to investigate user satisfaction regarding the qualities of the accounting application's ability to calculate product costs and provide accounting information that support entrepreneurs in decision-making.

The system's effectiveness was evaluated by three experts, while user satisfaction was assessed by 50 application users. The application was developed using the Flutter framework, with Firebase as the database management program. Descriptive statistics, including mean, standard deviation, frequency and percentages were employed for data analysis.

The research findings revealed that user satisfaction with the application demonstrated a high level of suitability and effectiveness, with an overall mean score of 4.73 and the standard deviation was 0.48. Additionally, satisfaction in terms of design and user-friendliness

had an average score of 4.68 and the standard deviation was 0.52, while the ability to calculate product costs received an average score of 4.76 and the standard deviation was 0.44. Finally, satisfaction with the application's provision of accounting information to support decision-making had an average score of 4.75 and the standard deviation was 0.48.

Keywords: Cost, CVP, Accounting, Information, Application, Digital

Introduction

The Cabinet's policy, which was submitted to the Thai Parliament on July 25, 2019, was part of the main administration policy focused on promoting, supporting, and developing small and medium enterprises (SMEs) on the main policy in Section 5, Thailand's economic development and competitiveness, and an urgent policy focusing on small and medium enterprises. It is divided into two sections: Section 3, which addresses the policy of supporting global economic volatility, and Section 6, which lays the groundwork for the national economic system in Thailand in the future (Office of the National Economic and Social Development Board, 2017).

There are currently a considerable number of entrepreneurs, including start-ups, small and medium-sized enterprises (SMEs), and social enterprises. So, if these corporate groupings, which account for the vast majority of the country's customers, are well-off, it will have an impact on the country's economic development. These entrepreneurs play an important role in the nation's overall economy. However, it turns out that in the past, these entrepreneurs were rooted in economics and faced challenges and risks from quickly changing global business, technology, and communication, which had a detrimental influence on their businesses.

This research aims to develop an accounting application to calculate product costs and provide accounting information that supports decision-making in business operations. Its goal is to promote and support local businesses, particularly community enterprises, in sectors such as agriculture, trade, and services. These businesses play a crucial role in uniting local entrepreneurs in each area to strengthen their capabilities and expand business opportunities, including micro-SMEs and small and medium-sized enterprises (SMEs). This research focuses on promoting the integration of technology to support business operations, as well as sending

specialized experts to diagnose and provide in-depth consulting. This will lead to the promotion and development of business operations in line with government policies and the university's policies mentioned earlier. Although there has been research and development of applications for recording income and expenses (Dechraksa & Thipwimon, 2017), keeping household accounts (Sriyom & Buangam, 2018), and using applications to record accounting transactions (Ariya-pim, 2022). But currently, no application for calculating product costs and providing accounting information that supports decision-making has been developed.

The researchers conducted a survey on the statistics of new entrepreneurs and small enterprises and discovered that there are 3,008 entrepreneurs in Chiang Mai's manufacturing sector (Department of Business Development, 2023). Initial field inquiries and discussions with new entrepreneurs and small businesses in Chiang Mai revealed that there is still a lack of knowledge and understanding among entrepreneurs at the upstream level regarding product cost calculation and the use of accounting data to support decision-making. As a result, the midstream level suffers from a lack of mechanisms for gathering data on product costs, which in turn affects the downstream level, preventing entrepreneurs from properly understanding their product costs and accurately setting selling prices. Therefore, the researcher is interested in studying and developing an application for calculating product costs and providing accounting information to support decision-making. It is hoped that this research will yield academic benefits and contribute to improving the operational processes of local businesses by applying specialized knowledge in cost accounting, management accounting, and technological innovations to enhance business operations. This will also elevate the competitive capabilities of new entrepreneurs and small businesses at the local level by enabling them to accurately calculate product costs and set appropriate selling prices.

Objectives

1. Research and develop an accounting application to compute product costs and provide accounting information to support entrepreneurs' decision-making.

2. Present and impart knowledge about product cost computation and the usage of accounting data to support business decision-making via a practical application that may be effectively used.

3. Investigate user satisfaction in terms of the qualities of the accounting application's ability to calculate product costs and provide accounting information that support entrepreneurs in decision – making.

Materials and Methods

This quantitative research was characterized as developmental research. It involves the development of an application in the field of accounting to calculate product costs and provide accounting information that supports decision-making for entrepreneurs through the SDLC (Software Development Life Cycle) process.

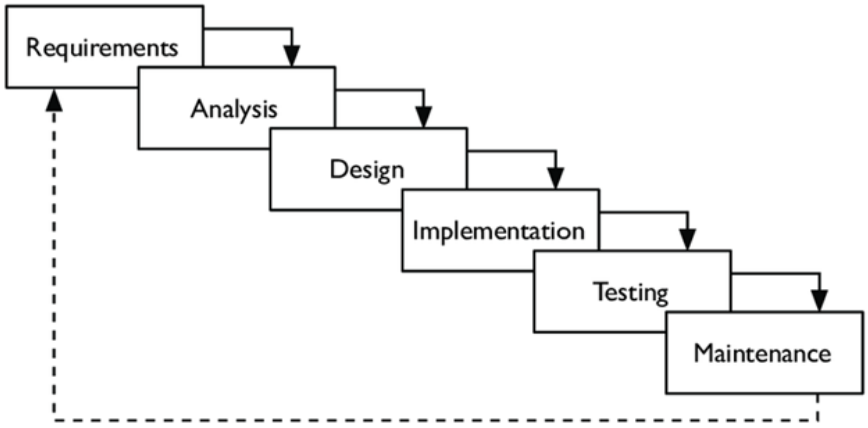

Figure 1 System Development Life Cycle or SDLC

Source: Royce, 1970

Requirements Gathering and documenting the needs of the end-users, which in this case are entrepreneurs who need to compute product costs and generate accounting information

Analysis The feasibility of developing the COSTCAL application is thoroughly assessed from technical, operational, and financial perspectives. In-depth data analysis ensures that the system can handle the necessary data types and accurately compute product costs.

Design Focuses on creating the overall architecture of the COSTCAL application, including the system's database (Firebase), user interface, and core functionalities (Flutter Framework). Detailed designs of the database and user interface ensure that the application is both technically sound and

	user-friendly. This stage is crucial for laying out the blueprint of the system before moving to development, ensuring that all components will integrate seamlessly.
Implementation	Coding, integrating necessary functionalities such as cost calculation and reporting, and ensuring smooth data flow between different components. The application is built according to the specifications outlined in the design stage, and documentation is provided to guide both developers and end-users. This stage is vital for turning the project into a working application.
Testing	Unit testing, integration testing, and user acceptance testing, are conducted to identify and fix bugs, ensure that the system functions as expected, and verify that it meets the end-users' requirements. By thoroughly testing the application, this stage ensures that it is ready for deployment and use.
Maintenance	Ongoing support to address any issues that arise post-launch. This includes bug fixes, system updates, and continuous monitoring to ensure optimal performance

Application

Accounting application to compute product costs and provide accounting information to support entrepreneurs' decision-making.

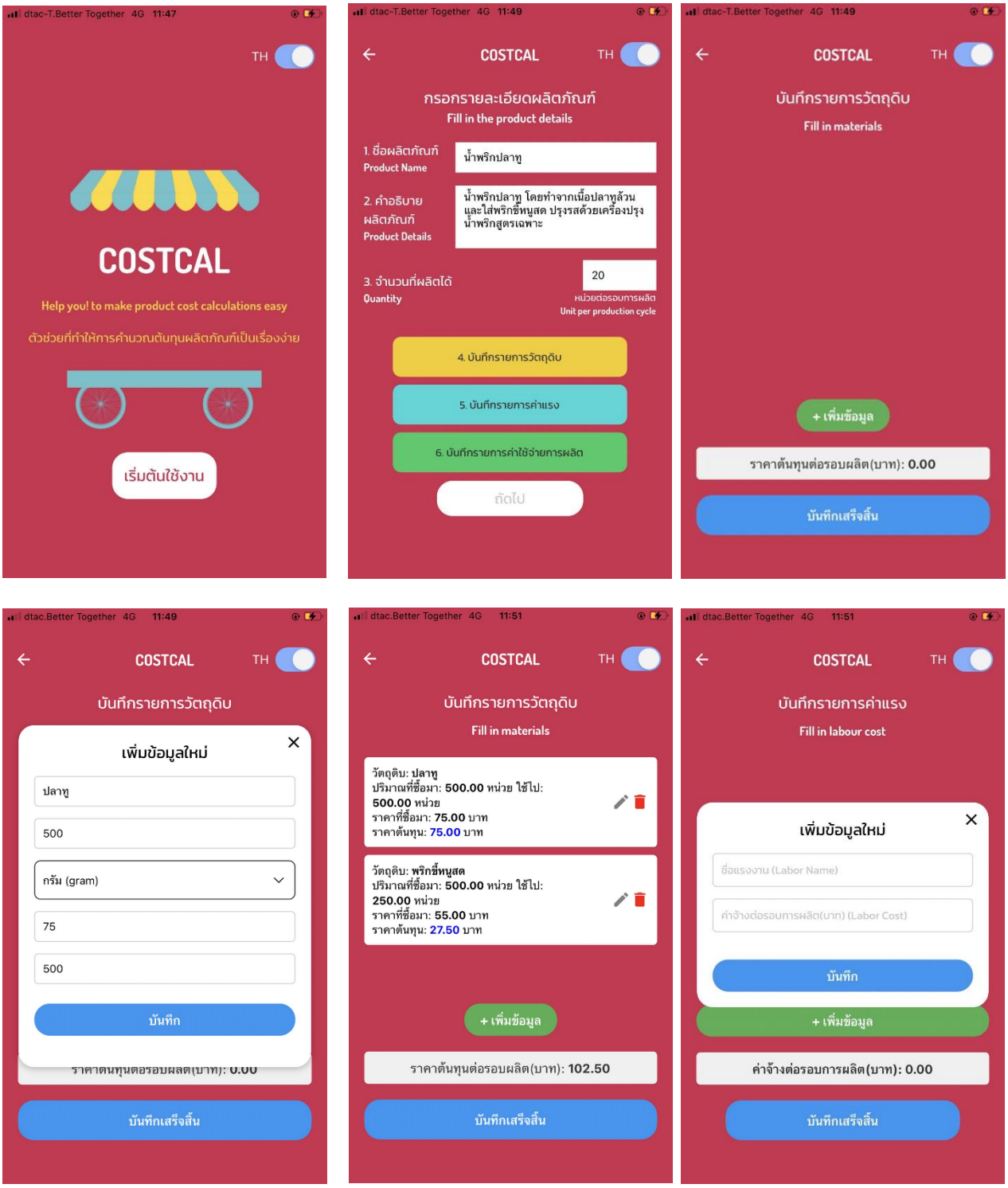

Figure 2 Accounting application to compute product costs and provide accounting information to support entrepreneurs' decision-making

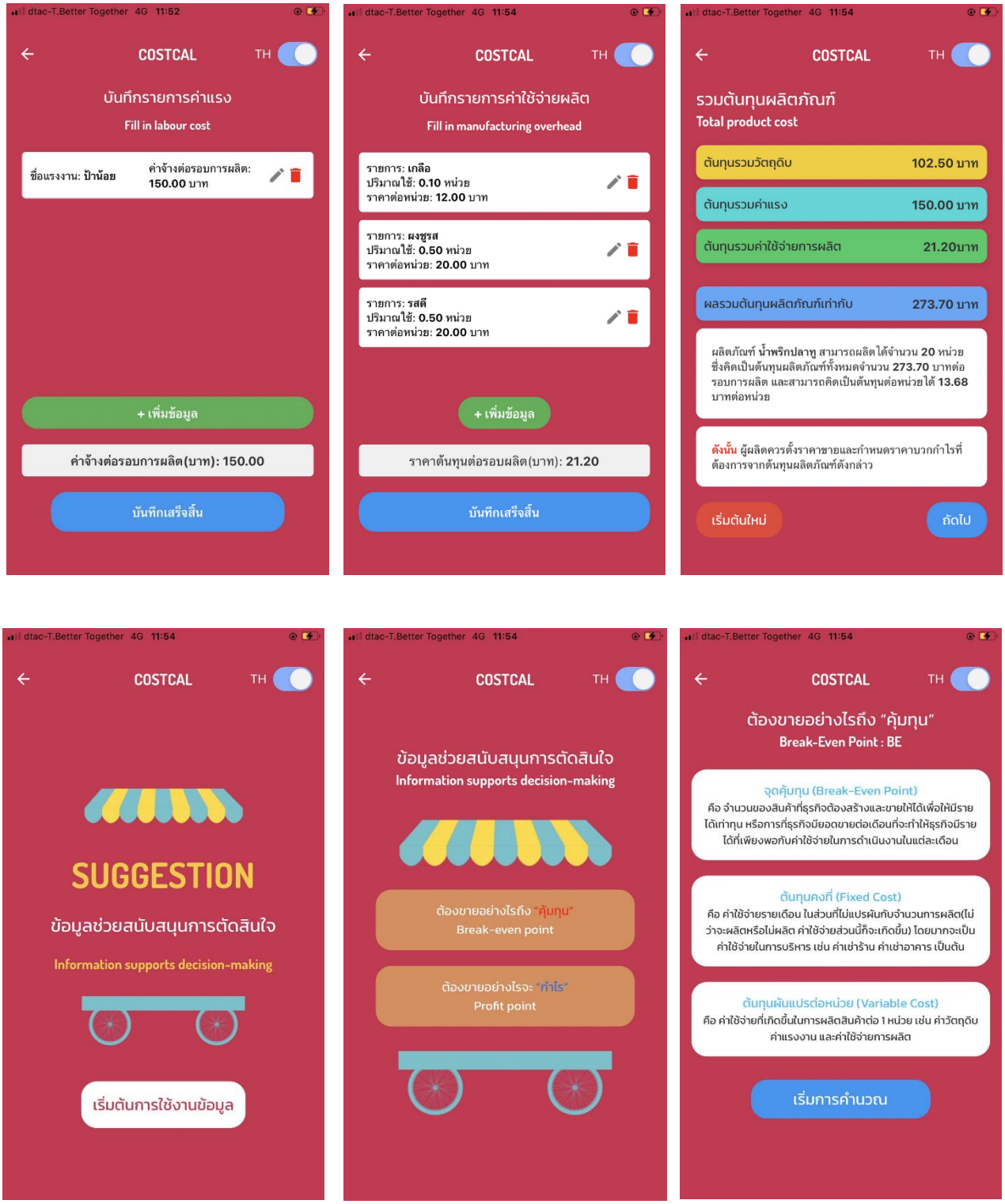

Figure 2 Accounting application to compute product costs and provide accounting information to support entrepreneurs' decision-making (continued).

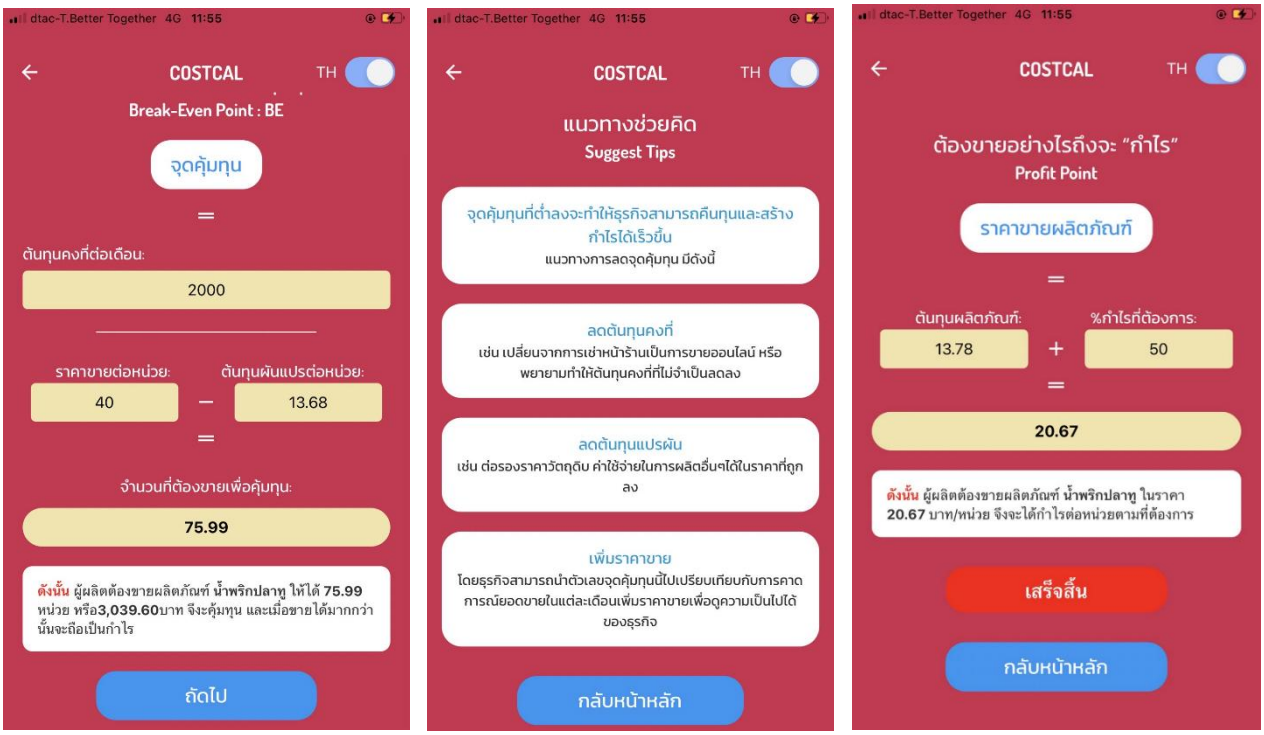

Figure 2 Accounting application to compute product costs and provide accounting information to support entrepreneurs' decision-making (continued).

Population and Sample

The population for this study consists of manufacturing entrepreneurs in Chiang Mai province in the year 2567 BE. Although the exact population size is not available, statistical data from the Department of Business Development indicates that there are 3,008 entrepreneurs in Chiang Mai's manufacturing sector (Department of Business Development, 2023). The calculated sample size is 341 cases (Krejcie & Morgan, 1970); however, due to limitations in budget and research time, a specific random sample of 50 cases was selected for this study.

Research Instruments

1) The index of item-objective congruence (IOC) (Rovinelli & Hambleton, 1977) using for assess the satisfaction questionnaire in terms of the qualities of the accounting application's ability to calculate product costs and provide accounting information that support entrepreneurs in decision - making for sampling underwent content validity testing using the index of item objective congruence (IOC), evaluated by three experts: one expert in computer

science and two experts in accounting. Consisting of a total of three topics as follows: (1) In terms of design and user-friendliness of the application. (2) In terms of ability to calculate product costs and (3) In terms of providing accounting information to support decision-making.

The index of alignment between the questions and the objectives of the content is scored by experts as follows:

+1 when the question aligns with the objectives

0 when unsure if the question aligns with the objectives

-1 when the question does not align with the objectives

Questions with an alignment index of 0.50 and above are selected to create a high-quality questionnaire.

2) Cronbach's Alpha Coefficient (Cronbach, 1990)

Cronbach's alpha coefficient was employed to evaluate the reliability of the satisfaction questionnaire using the SPSS program. An alpha coefficient of 0.70 or higher for each set of satisfaction items is considered indicative of acceptable reliability.

3) An electronic satisfaction questionnaire

The satisfaction questionnaire, designed to assess the qualities of the accounting application's ability to calculate product costs and provide accounting information to support entrepreneurs in decision-making, is divided into three sections: Section 1 collects general demographic data; Section 2 includes an evaluation of satisfaction and quality assessment based on the use of the application, which covers three areas: (1) design and user-friendliness of the application, (2) ability to calculate product costs, and (3) provision of accounting information to support decision-making. Section 3 gathers suggestions for improvement. The data is interpreted according to the following criteria (Likert, 1932):

Mean	Level of satisfaction
4.51-5.00	Highly suitable and effective
3.51-4.50	Suitable and generally effective
2.51-3.50	Neutral or neither suitable nor unsuitable
1.51-2.50	Marginally unsuitable or somewhat ineffective
1.00-1.50	Unsuitable or ineffective

Statistic for research

The descriptive statistics used in the research include mean, standard deviation, frequency, percentage, and IOC (Bacon-Shone, 2020).

1) Mean : $\bar{x}$ represents the mean (or average) in statistics. It is the arithmetic average of a set of values, calculated by summing all the values and then dividing by the number of values using the following formula for the calculation:

$$\bar{x} = \frac{\sum x_i}{N}$$

Where; $\bar{x}$ = the number of values in the data set

$\sum x_i$ = the sum of all values in the data set

N = the number of values in the data set

2) Standard Deviation : S.D. represents a statistical measure of the spread or dispersion of a set of data points. It shows how much individual data points deviate from the mean (average) of the dataset using the following formula for the calculation:

$$S.D. = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

Where; N = total number of data points

x_i = each individual data point

μ = population mean

3) The index of item-objective congruence : IOC represents question aligns with the intended objectives or the overall goal of the test. It is a tool for evaluating the relevance and appropriateness of individual test items in relation to what they are meant to measure using the following formula for the calculation:

$$IOC = \frac{\sum R}{N}$$

Where; IOC = the index of item-objective congruence

$\sum R$ = number of experts who rated the item as relevant

N = total number of experts

4) Percentage used to calculate the percentage of general data from the survey respondents, using the following formula for the calculation:

$$P = \frac{F}{N} x\ 100$$

Where; P = the percentage
F = the frequency to be converted into a percentage
N = the total frequency

Results

This research aims to develop an accounting application to calculate product costs and provide accounting information that support entrepreneurs decision - making. The results of the research are as follows:

1) The results of the satisfaction questionnaire, which assessed the qualities of the accounting application's ability to calculate product costs and provide accounting information to support entrepreneurs in decision-making, underwent content validity testing using the Index of Item Objective Congruence (IOC). This evaluation was conducted by three experts: one expert in computer science and two experts in accounting. The questionnaire addressed three main areas: (1) design and user-friendliness of the application, (2) ability to calculate product costs, and (3) provision of accounting information to support decision-making. The assessment results revealed that all questions had IOC values ranging from 0.67 to 1.00, with an overall value of 0.89, which exceeds the threshold of 0.50. This indicates that the questions possess content validity (Lawshe, 1975). As such, the questionnaire is considered valid for use in collecting data from the sample group.

The index of alignment between the questions and the objectives of the content is scored by experts as follows:

+1 when the question aligns with the objectives

0 when unsure if the question aligns with the objectives

-1 when the question does not align with the objectives

Questions with an alignment index of 0.50 and above are selected to create a high-quality questionnaire.

Table 1 Shows the result of IOC consistency index values of the questionnaire as follows:

	Assessment Topics	by experts			IOC	Interpreting
		1	2	3		
1	**In terms of design and user-friendliness of the application.**					
1.1	The convenience of installing applications.	1	1	1	1	Accepted
1.2	The application is not complicated, convenient, and easy to use.	0	1	1	0.67	Accepted
1.3	The design of the application is suitable for use.	1	1	1	1	Accepted
1.4	The colors within the application is appropriate.	1	0	1	0.67	Accepted
1.5	The presentation of information is presented continuously and without confusion.	1	1	1	1	Accepted
				Total	**0.87**	Accepted
2	**In terms of ability to calculate product costs.**					
2.1	Records related to product costs are comprehensively documented.	1	1	1	1	Accepted
2.2	The overall product cost can be accurately calculated.	1	1	1	1	Accepted
2.3	The per-unit product cost can be accurately calculated.	1	1	1	1	Accepted
2.4	The break-even point can be accurately calculated.	1	1	1	1	Accepted
2.5	The target profit point can be accurately calculated.	1	1	1	1	Accepted
				Total	**1**	Accepted
3	**In terms of providing accounting information to support decision-making.**					
3.1	The information provided can be used to appropriately support pricing decisions.	0	1	1	0.67	Accepted
3.2	Accounting information and analysis related to the break-even point are provided appropriately to support economic decision-making analysis.	0	1	1	0.67	Accepted
3.3	Accounting information and analysis related to the target profit point are provided appropriately to support economic decision-making analysis.	0	1	1	0.67	Accepted

Table 1 Shows the result of IOC consistency index values of the questionnaire as follows: (continued)

Assessment Topics		by experts			IOC	Inter preting
		1	2	3		
3.4	Appropriate guidance is provided for utilizing the information to support decision-making.	1	1	1	1	Accepted
3.5	The information can be appropriately used to support economic decision-making analysis.	1	1	1	1	Accepted
				Total	**0.80**	Accepted
				Overall Total	**0.89**	**Accepted**

And the reliability of the satisfaction questionnaire was assessed using Cronbach's Alpha coefficient. The results indicated that the alpha coefficient for each set of satisfaction items was 0.70 or higher, thus meeting the acceptable level of reliability.

Table 2 Shows the reliability of the satisfaction questionnaire was assessed using Cronbach's Alpha coefficient as follows:

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.975	0.976	15

2) The results from the satisfaction questionnaire regarding the qualities of the accounting application's ability to calculate product costs and provide accounting information to support entrepreneurs in decision-making, based on data from 50 sample groups, are as follows:

The general information of the sample group, consisting of 50 participants, indicates that the majority of the sample are female, with 33 individuals (66%). The age range of the participants is 20–29 years. In terms of education, 37 individuals (74%) hold a bachelor's degree. Regarding the type of business ownership, 43 individuals (86%) operate sole proprietorships.

The evaluation of performance to assess the satisfaction of users was conducted by using an electronic questionnaire to measure user satisfaction. The questionnaire was divided into three areas: 1) in terms of design and user-friendliness of the application, 2) in terms of ability to calculate product costs, and 3) in terms of providing accounting information to support decision-making. The following criteria were used to interpret the data (Boonchom, 2010). The results of the study are shown in Table 3.

Mean	Level of satisfaction
4.51-5.00	Highly suitable and effective
3.51-4.50	Suitable and generally effective
2.51-3.50	Neutral or neither suitable nor unsuitable
1.51-2.50	Marginally unsuitable or somewhat ineffective
1.00-1.50	Unsuitable or ineffective

Table 3 Shows the satisfaction questionnaire in terms of the qualities of the accounting application's ability to calculate product costs and provide accounting information that supports entrepreneurs in decision - making as follows:

Assessment Topics			$\bar{x}$	S.D.	Interpreting
1	**In terms of design and user-friendliness of the application.**				
	1.1	The convenience of installing applications.	4.86	0.35	Highly suitable and effective
	1.2	The application is not complicated, convenient, and easy to use.	4.78	0.46	Highly suitable and effective
	1.3	The design of the application is suitable for use.	4.62	0.57	Highly suitable and effective
	1.4	The colors within the application is appropriate.	4.42	0.67	Suitable and generally effective
	1.5	The presentation of information is presented continuously and without confusion.	4.74	0.53	Highly suitable and effective
		Total	**4.68**	**0.52**	**Highly suitable and effective**
2	**In terms of ability to calculate product costs.**				
	2.1	Records related to product costs are comprehensively documented.	4.64	0.56	Highly suitable and effective
	2.2	The overall product cost can be accurately calculated.	4.80	0.40	Highly suitable and effective
	2.3	The per-unit product cost can be accurately calculated.	4.84	0.37	Highly suitable and effective
	2.4	The break-even point can be accurately calculated.	4.76	0.43	Highly suitable and effective
	2.5	The target profit point can be accurately calculated.	4.78	0.42	Highly suitable and effective
Total			**4.76**	**0.44**	**Highly suitable and effective**

Table 3 Shows the satisfaction questionnaire in terms of the qualities of the accounting application's ability to calculate product costs and provide accounting information that supports entrepreneurs in decision - making as follows: (continued)

Assessment Topics		$\bar{x}$	S.D.	Interpreting
3	**In terms of providing accounting information to support decision-making.**			
3.1	The information provided can be used to appropriately support pricing decisions.	4.72	0.45	Highly suitable and effective
3.2	Accounting information and analysis related to the break-even point are provided appropriately to support economic decision-making analysis.	4.76	0.52	Highly suitable and effective
3.3	Accounting information and analysis related to the target profit point are provided appropriately to support economic decision-making analysis.	4.70	0.54	Highly suitable and effective
3.4	Appropriate guidance is provided for utilizing the information to support decision-making.	4.78	0.46	Highly suitable and effective
3.5	The information can be appropriately used to support economic decision-making analysis.	4.78	0.42	Highly suitable and effective
Total		**4.75**	**0.48**	Highly suitable and effective
Overall Total		**4.73**	**0.48**	**Highly suitable and effective**

As shown in Table 3, the results indicate a highly suitable and effective level of overall satisfaction with COSTCAL, the accounting application's ability to calculate product costs and provide accounting information to support entrepreneurs in decision-making, with an average score of 4.73 and the standard deviation was 0.48. Satisfaction in terms of the application's design and user-friendliness has an average score of 4.68 and the standard deviation was 0.52, while the ability to calculate product costs received an average score of 4.76 and the standard deviation was 0.44. Additionally, the application's provision of accounting information to support decision-making garnered an average score of 4.75 and the standard deviation was 0.48.

Discussion

The introduction of this accounting application challenges traditional models of financial management for small businesses. Traditionally, many entrepreneurs rely on manual or semi-automated processes to compute product costs and analyze their financial data, which

can be time-consuming and prone to errors. By providing a digital tool that automates these processes, this application significantly reduces the margin of error and streamlines financial management tasks. This shift toward more sophisticated technological solutions is particularly important in the context of the growing reliance on digital tools in the entrepreneurial space. In accordance with the study of Suhayati and Riandani (2019), the adoption of accounting software and applications by SMEs is a crucial area of research, revealing a complex interplay of factors driving this transition and its consequences. Studies have consistently highlighted the perceived usefulness and ease of use of such software as major drivers of adoption. These applications promise streamlined financial management, reduced manual workload, and improved accuracy in financial reporting and are consistent with the study of Agrawal and Jethy (2024), which found improved financial management through accounting applications can positively impact SME performance, enabling better decision-making and enhanced operational efficiency.

When comparing COSTCAL with other accounting applications, COSTCAL stands out by providing a more specialized focus on calculating product costs and supporting decision-making for entrepreneurs. Unlike many traditional accounting software that mainly offers basic financial reporting. COSTCAL includes decision support tools that simulate financial scenarios, offering entrepreneurs actionable insights. Many other accounting applications may lack such tailored features.

The findings also indicate that the application may serve as a model for expanding the scope of accounting tools available to small businesses; the application's functionality could easily be adapted for other industries. As entrepreneurs in various fields face similar challenges with product cost calculation and decision-making, this application could serve as a valuable tool for a wider range of businesses, enhancing overall business.

Conclusion

In conclusion, this research demonstrates the significant potential of accounting applications to support entrepreneurs in managing product costs and making informed business decisions. The application developed in this study serves as a practical tool that integrates accounting knowledge with modern technology, enabling entrepreneurs to compute product costs accurately and access critical financial data for decision-making. By achieving the

three key objectives —developing a functional application, educating entrepreneurs on its use, and assessing user satisfaction.

The study highlights the value of such applications in enhancing business operations. Future research may focus on expanding the application's features, incorporating additional financial metrics, and further exploring its impact on long-term business success. Additionally, addressing the needs of users with varying levels of accounting knowledge could help enhance the application's accessibility and usability.

Acknowledgements

I would like to express my sincere gratitude to the Thailand Science Research and Innovation Organization (TSRI) for providing the financial support that made this research possible. Their generous funding and belief in the importance of this study have been invaluable throughout the research process.

Additionally, I would like to thank all the individuals who contributed their time, expertise, and guidance to this project. Without their collaboration and support, this research would not have been successful.

Lastly, I am deeply grateful to my family and colleagues for their encouragement and continuous support during the course of this work

References

Agrawal, S., & Jethy, J. (2024). An Analysis of Cloud-based Accounting Software: A Literature Review on Features, Performance, and User Satisfaction. *International Journal For Multidisciplinary Research, 6*(2), 1-12. https://doi.org/10.36948/ijfmr.2024.v06i02.15692

Ariya-pim, N. (2022). Accounting with applications for new generation entrepreneurs in the Thailand 4.0 era: A case study of community enterprises in the food sector, Mueang district, Khon Kaen Province. *Journal of Academic and Research*, *12*(1), 303-314.

Boonchom, S. (2010). *Fundamentals of research* (8th ed.). Bangkok: Suveeriya.

Cronbach, L. J. (1990). *Essentials of psychological testing* (5th ed.). New York: Harper & Row.

Dechraksa, S., & Thipwimon, C. (2017). Development of a personal finance management application on Android operating system. *Journal of Computer Science and Information Technology Projects*, *3*(1), 1-7.

Department of Business Development. (2023). *Analysis of Upper Northern Business Group 1*. Retrieved from https://www.dbd.go.th/

Gamkhet, W. (2008). *Research methodology in social sciences* (2nd ed.). Bangkok: Chulalongkorn University.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample sizes for research activities. *Educational and Psychological Measurement, 30*(3), 607-610.

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, *28*(4), 563–575. https://doi.org/10.1111/j.1744-6570.1975.tb01393.x

Likert, R. (1932). A technique for measurement of attitudes. *Archives of Psychology, 140*, 5-55.

Office of the National Economic and Social Development Board. (2017). *Summary of the Twelfth National Economic and Social Development Plan (2017-2021)*. Retrieved from https://www.nesdc.go.th/ewt_dl_link.php?nid=9640&filename=index

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Dutch Journal of Educational Research, 2*(2), 49–60.

Royce, W. W. (1970). Managing the Development of Large Software Systems. *Proceedings of IEEE WESCON*, *26*, 328-388.

Sri-phon, P. (2021). Development of application for use food delivery services in Khon Kaen. *Journal of Buddhist Education and Research: JBER*, *7*(1), 1-12.

Sriyom, U., & Buangam, P. (2018). Development of an Android operating system application for household accounting in Nakhon Si Thammarat Province. *Far Eastern University Academic Journal*, *12*(2), 57-69.

Suhayati, E., & Riandani, I. (2019). Accounting Application for Small Medium Enterprises. *IOP Conference Series Materials Science and Engineering, 662*(3), 032056. https://doi.org/10.1088/1757-899X/662/3/032056