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User Experience Evaluation on Production Performance Monitoring System Using Honeycomb Method

Moh. Sofyan Sauri [1], Arie Hidaya Putra [1], Emny Harna Yossy [1,*]

* Corespondence Author: e-mail: emny.yossy@binus.ac.id

[1] Computer Science Department, BINUS Online Learning, Bina Nusantara University; Jakarta 11480, Indonesia; telp: +62215345830/+62215300244; e-mail: moh.sauri@binus.ac.id, arie.putra002@binus.ac.id, emmy.yossy@binus.ac.id

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Abstract

In the era of digitalization in industries, companies are implementing the Digital Factory Operating System in various aspects, including monitoring production performance on the sachet line. Previously, operators manually carried out the production performance monitoring process using paper forms, and admins re-entered the data into the system. Although the monitoring process has begun to be carried out digitally using available tablets, its usage still needs improvement. Therefore, it is necessary to evaluate the user experience of the Production Performance Monitoring Information System to determine user satisfaction. The Honeycomb method is used in this study, which assesses seven aspects, namely accessible, credible, desirable, findable, usable, useful, and valuable. The results show the average final score of each aspect assessed, and the highest score of 66.45% is for the accessible and useful aspects. The study shows that the user experience evaluation of the Production Performance Monitoring Information System using the honeycomb method is generally good, but improvements are still needed in some aspects, such as accessibility and desirability.

Keywords*: digital factory operating system, honeycomb, monitoring, production line, user experience*

1. Introduction

The rapid advancement of information technology has had a significant impact on various aspects of life, from individuals to organizations, and has moved them towards progress. This development should bring benefits to organizations by allowing them to obtain required information quickly, thereby assisting managers in making informed decisions. It is expected that changes in business processes, brought about by advancements in technology and communication, will encourage organizations to have better management (Ayu & Permatasari, 2018).

UNVR is involved in the production, marketing, and distribution of various consumer goods, which include soap, detergents, margarine, dairy-based food items, ice cream, cosmetic products, tea-based beverages, and fruit juices. The company has an extensive portfolio of popular and highly recognized brands in Indonesia, such as Pepsodent, Pond's, Lux, Lifebuoy, Dove, Sunsilk, Clear, Rexona, Vaseline, Rinso, Molto, Sunlight, Wall's, Blue Band, Royco, Bango, and many more.(Unilever, 2022).

The Digital Factory Operating System (DFOS) is implemented in factories or production sites to improve process control, traceability of operations, and OEE (Overall Equipment Effectiveness) improvement. The Digital Factory Operating System enables automatic machine performance tracking. PT UNVR has implemented information technology in almost all of its business processes, including the monitoring of production performance on the sachet line.

Previously, production operators recorded machine performance data manually, which was then checked by the production team leader and re-entered into an Excel form by the admin. This process was time-consuming and inefficient, and the use of paper was not practical due to its susceptibility to damage, tearing, or loss. To address these issues, DFOS was implemented on the sachet line, allowing for digital recording of machine performance via tablets. Despite this improvement, there are still obstacles in the digitalization of engine performance recording, necessitating a User Experience (UX) evaluation of the production performance monitoring system on the PT UNVR sachet line.

User Experience (UX) is an experience that users feel directly in using a particular technology, such as the internet and websites. In other words, User experience is a person's perception, response, view, or response based on using a product, system, or service (Nurhayati et al., 2019). User Experience (UX) encompasses all aspects of a user's interaction with technology, including their perception, response, and overall experience using a product, system, or service. The results of the evaluation will provide insights and recommendations for the development of future systems. There are several methods for measuring UX, including the Questionnaire for User Interaction Satisfaction

(QUIS), System Usability Scale (SUS), Software Usability Measurement Inventory (SUMI), User Experience Questionnaire (UEQ), and the Honeycomb Method. Among these methods, the Honeycomb method is advantageous as it provides comprehensive measurements of UX through seven aspects. Therefore, the research will use the Honeycomb method to evaluate the User Experience of the production performance monitoring system on the PT UNVR sachet line.

The UX Honeycomb is an indicator developed by Peter Morville in 2004 to measure the User Experience of a product. It consists of seven aspects: useful, usable, desirable, findable, accessible, credible, and valuable. "Useful" refers to the product or system's ability to fulfill the user's needs (Sukma et al., 2018). If a system cannot fulfill the user's needs, it is useless. "Usable" refers to the user interface being simple and easy to use (Wicaksono, 2020). The product or system should be designed in a way that is simple and easy to understand. "Desirable" means that the visual display of products, services, and systems must be attractive and easy to understand. The design should be minimal and to the point. "Findable" means that the system should be easily navigable, so that users can easily find what they need. "Accessible" means that the system is designed so that users with disabilities can have a good user experience like ordinary people. "Credible" means that products or services in a company must be trustworthy. Finally, "Valuable" means that the system must be able to provide value or satisfaction to users. The UX Honeycomb is a comprehensive measurement tool that provides more advantages compared to other UX measurement methods (Rahmadiansyah et al., 2020).

Related research has also been conducted by (Suseta et al., 2019) entitled "User Experience Evaluation of the Tapp Market E-Commerce Application Using UX Honeycomb Parameters". This study focuses on evaluating the credible, valuable, useful, and usable aspects of the Tapp Market application, with a sample size of 60 respondents who are either current or new users. Data was collected through a combination of online and offline questionnaires, providing both qualitative and quantitative data. Descriptive statistical formulas were used to analyze the data, including mean and standard deviation. Results indicate that the average scores for credible, valuable, useful, and usable aspects were 64.45%, 69.27%, 77.19%, and 64.93%, respectively. Eight indicators require maintenance, while 12 require improvement.

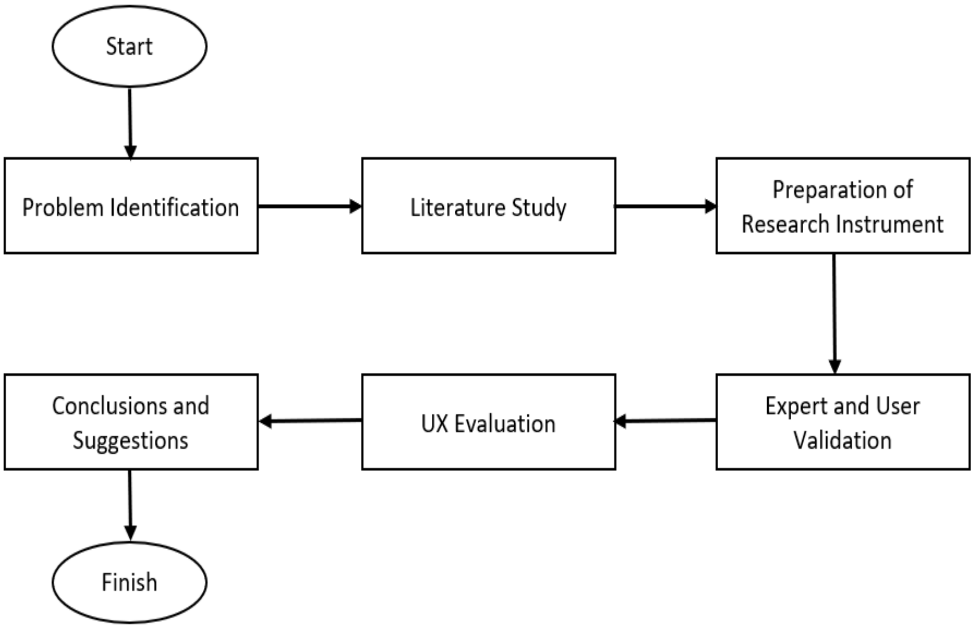
Related research regarding user experience evaluation has been carried out before (Prasida et al., 2021), including research conducted by (Langgawan Putra et al., 2021) that analyzes the effect of user experience on the level of understanding of students using academic information systems in higher education using the Honeycomb method. The study aims to identify problems agreed upon by users and to determine whether UX affects the level of user understanding when using the system. The study found that 321 out of 350 respondents agreed that the credible aspect of UX Honeycomb was a problem, with an approval rate of 91.71%. The credible aspect refers to inaccessible information or pages that do not display any information. The study also found that UX affects the level of user understanding in using the system, indicating that a better UX leads to better user understanding of the system.

A study conducted by (Barifah et al., 2020) focused on evaluating the user experience in digital libraries. The traditional approach of analyzing behavioral queries extracted from log files and conducting usability tests only partially assesses the quality of user experience. However, UX has become a crucial factor for guiding user-centric designs and evaluating system success in recent years. To address this issue, the study explored how the Mahlke UX framework can be adapted to the DL context. The research involved a laboratory user study with 65 students and used a combination of data collection tools, including a questionnaire, screen recording, and pick-a-mode scale. The results showed that considering UX in evaluating digital libraries provides valuable insights into user interaction, perception, and affective variables. However, there is still a need to improve the DL system and simplify the interface. Applying visualization techniques to revisit the interface could be a potential solution.

Based on the description above, this study aims to design a model for evaluating the user experience of the Production Performance Monitoring Information System using the Honeycomb method. The study will focus on evaluating the User Experience of the Production Performance Monitoring Information System in the sachet line division of PT UNVR, by distributing questionnaires to operators and team leaders. The results of this study will provide input for future research related to user experience evaluation and will help PT UNVR to improve their system on the sachet line to meet the needs of its users.

2. Research Method

This research uses the Honeycomb method. The stages of the research conducted are shown in Figure 1.

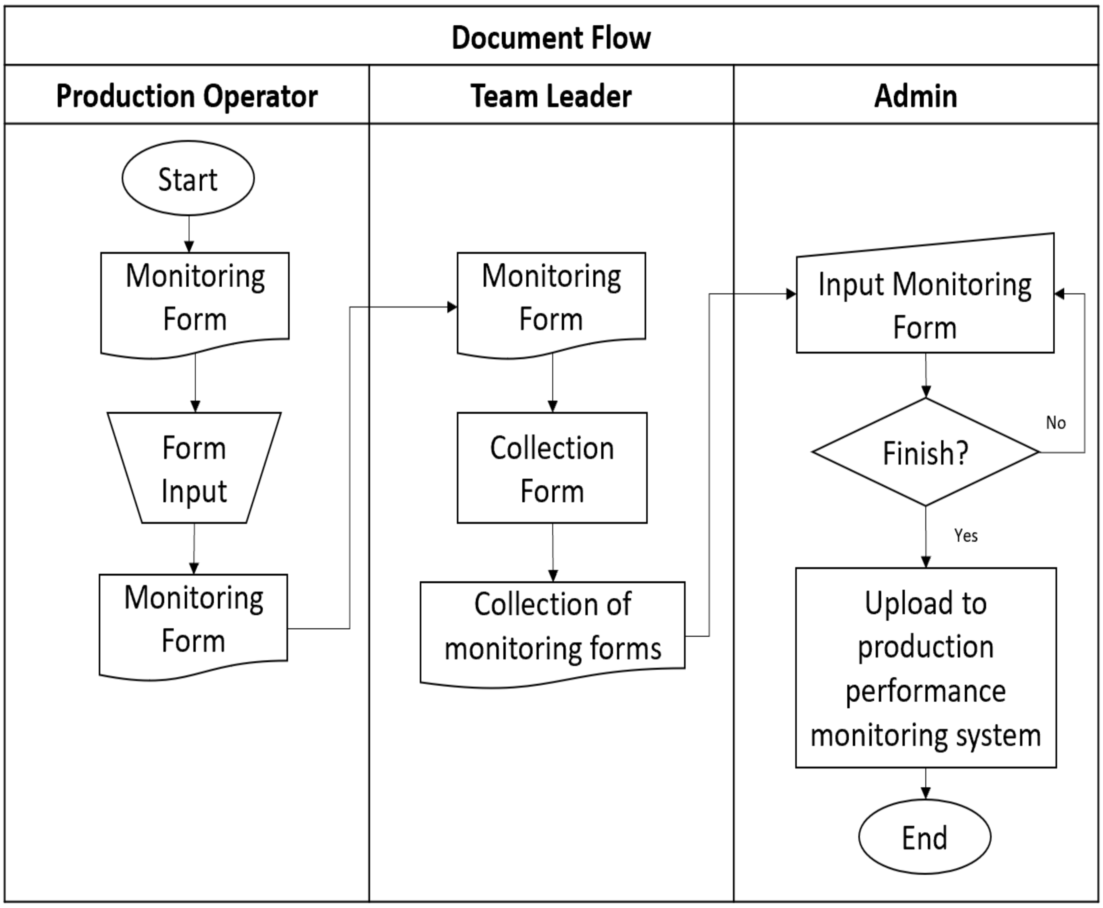


Source: Research Result (2023)

Figure 1. Research Stages

The research was conducted through various stages, including problem identification, literature review, expert and user validation, UX evaluations, conclusions, and recommendations. The data for this study was gathered through a questionnaire, and the questionnaire was prepared by compiling questions that correspond to each aspect being assessed. Before distributing the questionnaire, the instrument was validated by experts and users to ensure the clarity and legibility of the questions. Subsequently, the user experience was evaluated by distributing the validated questionnaire (Pranatawijaya et al., 2019). Furthermore, validity and reliability tests were conducted to ensure the accuracy and consistency of the questionnaire items. The validity test used Product Moment Correlation, while the reliability test used Cronbach's Alpha. The responses from the questionnaires were calculated using a Likert scale ranging from 1-5, based on the Honeycomb method's assessment aspects, which include Useful, Usable, Desirable, Findable, Accessible, Credible, and Valuable.

This study focuses on addressing issues in the DFOS section of PT. Unilever Indonesia's Production Performance Monitoring Information System in the Sachet Line division. The Sachet Line was selected as it is a relatively simple technology compared to other production lines. The main problem identified in this study is related to data collection for monitoring production performance on the Sachet Line, as shown in Figure 2.



Source: Research Result (2023)

Figure 2. Problem Analysis

Figure 2 reveals that the current problem with the Sachet Line is the manual data collection for monitoring production performance, which requires operators to use a paper form that is later inputted by the admin. Despite the implementation of the DFOS system, the user experience still needs improvement, as many users have complaints about using the production performance monitoring software (Silva et al., 2020). Therefore, the purpose of this research is to evaluate the DFOS system in PT. UNVR, including its technical capabilities, operational implementation, and system utilization. The evaluation aims to determine the system's effectiveness and provide insights for future system improvements, ensuring that the existing systems on the Sachet Line meet the needs of its users.

3. Results and Analysis

3.1. Expert dan User Validation

In the expert and user validation phase, four active users of the DFOS system were involved, namely Assistance Continuous Improvement Manager, Asst. Engineer Manager, Assistance Engineer Manager, and Assistance SHE Manager. The experts evaluated each question item to determine the meaning and clarity of the instrument and to ensure the questionnaire's legibility from the user's perspective. This step was done by presenting the research instrument through a questionnaire to the experts. The user also evaluated the questionnaire, and the result was that each question item could represent each aspect to be assessed. This phase aimed to ensure that the validated questionnaire was easy to understand for the respondents.

3.2. Responden Demographics

Respondents in this study were 31 respondents who were staff and non-staff who worked at company. UNVR. Several of the 31 respondents in this study had never been trained to use the DFOS system. Of the 31 respondents, they can be grouped by position, consisting of 5 respondents at the assistant manager level, four at the team leader position level, and 22 at the operator position level.

3.3. Validity and Reliability Test

A validity test was conducted to determine whether the instrument used can accurately measure the intended variables. In this study, the value of N, or the number of respondents, was 31, and the R-table was consulted to obtain a value of 0.35. The validity test results indicated that each question item was valid.

The reliability test, on the other hand, was conducted to assess the consistency and stability of the research instrument. The results of the reliability test indicated a value of 0.954, which is considered very high. This suggests that the questionnaire used in this study is reliable and consistent in measuring user experience.

Table 1. Validity Test Results.

Summary of Validity Test Results				
Aspek	**Item**	**r (calculate)**	**r table**	**Status**
Accessible	1	0.741	0.355	valid
	2	0.620	0.355	valid
Credible	3	0.798	0.355	valid
	4	0.798	0.355	valid
Desirable	5	0.773	0.355	valid
	6	0.865	0.355	valid
Findable	7	0.883	0.355	valid
	8	0.803	0.355	valid
Usable	9	0.870	0.355	valid
	10	0.775	0.355	valid
Useful	11	0.868	0.355	valid
	12	0.868	0.355	valid
Valuable	13	0.764	0.355	Valid
	14	0.764	0.355	Valid

Source: Research Result (2023)

Table 1 above is a table of the results of the validity test that has been carried out, the data in the table shows that the r-calculated value of each aspect of the assessment gets a more excellent value than the r table, so it can be concluded that each question item is valid.

Table 2. Reliability Coefficient Category

Guilford reliability coefficient category	
0.80< alpha < 1.00	Very high reliability
0.60< alpha < 0.80	High reliability
0.40< alpha < 0.60	Middle reliability
0.20< alpha <0.40	Low reliability
-1< alpha < 0.20	Very Low reliability (not reliability)

Source: (Darsini et al., 2020)

Table 3. Reliability Test Results

Cronbach Alpha	N of Item	Interpretasi
0.954	31	Very high reliability

Source: Research Result (2023)

Table 3 shows the reliability test results, where an alpha value of 0.954 is obtained. When seen from Table 2, the test results can be interpreted that the reliability obtained is very high.

3.4. UX Evaluation

UX evaluation in this study used the honeycomb method, with a research instrument in the form of a questionnaire filled out by 31 respondents. The test results of the UX evaluation can be seen in Table 4.

Table 4. Results of Data Processing.

		Average value	
Aspect	**Item**	**Index (%)**	**Average**
Accessible	1	69.03	62.26
	2	55.48	
Credible	3	66.45	66.45
	4	66.45	
Desireable	5	65.16	62.26
	6	59.35	
Findable	7	64.52	62.59
	8	60.65	
Usable	9	62.58	59.36
	10	56.13	
Useful	11	66.45	66.45
	12	66.45	
Valuable	13	65.81	65.81
	14	65.81	

Source: Research Result (2023)

In the accessible assessment aspect, there are two questions. When viewed from the data in Table 4, item 2 has a lower index value than item 1. However, from the two questions on the accessible aspect, respondents agree that the DFOS application or system is easily accessible. The respondents also agree that sometimes they experience difficulties when accessing the system. From the comments of several respondents, this is due to needing thorough training and problems related to the internet network.

The credible aspect obtained an average percentage value of 66.45%, indicating that the respondents believe that the system can provide reliable services. The desirable aspect, which has two question items, showed that item 5 received a higher index value compared to item 6. Some respondents agreed that the application's design is attractive, but some suggested that the application's appearance could be more transparent and complex. On the other hand, respondents agreed that the use of the application is easy to understand, but they found that there were some discrepancies between the application and the written report. The findable aspect also has two question items, with a total average percentage of 62.59%, indicating that respondents generally agree that the website or application design should be easy to navigate. However, some respondents commented that some items in the system do not match the machine's specifications..

The functional aspect receives an average percentage value of 59.36% in the agreed category. The usable aspect consists of two question items, where item 10 has a lower index score than item 9. Respondents agree that the DFOS system should be easy to use. However, some respondents still have differing views on the system's ease of use, citing less efficient filling and the absence of operator name and NIP for production premium. The useful aspect has the highest average percentage score compared to other assessment aspects, which is 66.45%. Respondents agree that the DFOS system can assist users according to their functions and needs. The last assessment aspect is valuable, where products or services should provide value to businesses and users. This aspect receives an average percentage score of 65.81% in the agreed category, indicating that respondents agree that this application adds value to users.

From the explanation regarding the assessment of each aspect, the overall user experience of the DFOS system is quite good. However, there is still a need for improvements to the system. There are still several obstacles related to the DFOS system: network problems, training, and application problems. Constraints that occur on average at the operator level, the manager level, and the team leader of the DFOS system can be understood and benefited. Details of the problem responses can be seen in Table 5.

Table 5. Problem Summary.

Problem	Details
Network	The signal is sometimes slow, and the network is often disconnected.
Training	It was difficult at the start of the operation, but after three briefings, I got used to it. In addition, the training has yet to be carried out thoroughly.
Application	There are no operator names and NIPs for production premiums, there are several items that are not specific to the machine, there are many different terms with written reports, and the appearance is complicated and not simple.

Source: Research Result (2023)

Recommendations for improvements that can be given based on the results of the questionnaire and comments given by respondents can be seen in Table 6.

Table 6. Improvement Recommendations.

Aspect	Item	Improvement Recommendation
Accessible	2	Provide thorough training to staff and non-staff who will later use the system. Furthermore, improvements in terms of network
Desireable	5 6	Adjust the display according to user needs and use terms usually used when reporting in writing to help users who are not yet able to use this system understand easily when the system is used.

Source: Research Result (2023)

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Author Contributions

Moh. Sofyan Sauri and Arie Hidaya Putra proposed the topic; Moh. Sofyan Sauri, Arie Hidaya Putra, and Emny Harna Yossy conceived models and designed the experiments; Moh. Sofyan Sauri, Arie Hidaya Putra and Emny Harna Yossy conceived the optimisation algorithms and analysed the result.

Conflicts of Interest

The author declare no conflict of interest.

References

Ayu, F., & Permatasari, N. (2018). Perancangan Sistem Informasi Pengolahan Data PKL (Praktek Kerja Lapangan) di Devisi Humas Pada PT Pegadaian. *Jurnal Intra Tech*, *2*(2), 12–26. https://journal.amikmahaputra.ac.id/index.php/JIT/article/view/33

Barifah, M., Landoni, M., & Eddakrouri, A. (2020). Evaluating the User Experience in a Digital Library. *Proceedings of the Association for Information Science and Technology*, *57*(1), 1–7. https://doi.org/10.1002/pra2.280

Darsini, Aryani, H. P., & Nia, N. S. (2020). Validitas dan Reliabilitas Kuesioner Pengetahuan tentang COVID-19 (SARS-CoV-2. *Jurnal Keperawatan*, *13*(2). https://e-journal.lppmdianhusada.ac.id/index.php/jk/article/view/86

Langgawan Putra, M. G., Yogaswara, R., & Alfani Putera, M. I. (2021). Analysis Effect of User Experience on Understanding Rate of Student Using Academic Information System in Higher Education with Honeycomb Method. *2021 Sixth International Conference on Informatics and Computing (ICIC)*, 1–6. https://doi.org/10.1109/ICIC54025.2021.9632997

Nurhayati, D., Az-Zahra, H., & Herlambang, A. (2019). Evaluasi User Experience pada Edmodo dan Google Classroom Menggunakan Technique for User Experience Evaluation in E-Learning (TUXEL) (Studi Pada SMKN 5 Malang. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, *5*(2), 964. https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/5025

Pranatawijaya, V. H., Widiatry, Priskila, R., & Putra, P. B. A. A. (2019). Pengembangan Aplikasi Kuesioner Survey Berbasis Web Menggunakan Skala Likert dan Guttman. *Jurnal Sains Dan Informatika*, *5*(2), 128–137. https://jsi.politala.ac.id/index.php/JSI/article/download/185/106/821

Prasida, A., Wijoyo, S. H., & Rokhmawati, R. I. (2021). Evaluasi User Experience pada Website Progate.com Menggunakan Indikator UX Honeycomb. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, *5*(7), 2994–3004.

Rahmadiansyah, R., Rokhmawati, R. I., & Az-Zahra, H. M. (2020). Evaluasi User Experience pada Aplikasi Programming HUB Menggunakan Indikator UX Honeycomb. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, *4*(7), 2186–2194.

Silva, S. C., Feitosa, W., Duarte, P., & Vasconcelos, M. (2020). How to Increase Engagement on Social Media using the Honeycomb Model: A Case Study in a Portuguese HR Company. *Revista de Gestao*, *27*(2), 153–167. https://doi.org/10.1108/REGE-02-2019-0030

Sukma, R., Az-zahra, H. M., & Ananta, M. T. (2018). Evaluasi Perbandingan Ranking Antara Proposed Value dan Perceived Value Terhadap E-Commerce Berdasarkan Model UX Honeycomb. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, *2*(2), 7113–7119. https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/3866/1539

Suseta, P., Rokhmawati, R., & Brata, K. (2019). Evaluasi Pengalaman Pengguna pada Aplikasi E-Commerce Tapp Market Menggunakan Parameter UX Honeycomb. *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, *3*(6), 6191–6199. https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/5677/2685

Unilever. (2022). *History & Archives*. Https://Www.Unilever.Com/. https://www.unilever.com/

Wicaksono, D. P. (2020). *Evaluasi User Experience E-Supply Chain pada Area Distribusi Jasa Pengiriman dengan Metode UX Honeycombs*. Universitas Muhammadiyah Malang.