Application of Certification Management Information Systems at LSP Engineering Hospitality Indonesia

Kadek Indah Melanie Dewi[1*], I Wayan Gede Narayana[2], Rifky Lana Rahardian[3]

[1,2,3]Faculty Information and Computer, Institute of Technology and Business (ITB) STIKOM Bali, Indonesia

e-mail: 190030066@stikom-bali.ac.id [1*], nara@stikom-bali.ac.id[2], rifky@stikom-bali.ac.id[3]

*corresponding author

Author Notification
15 January 2023
Final Revised
08 March 2023
Published
15 March 2023

Abstract

One of the problems that exist in the Hospitality Engineering Indonesia Professional Certification Institute is in terms of administration management which still uses conventional data and is inefficient in time, effort and cost in filling out the APL form and also the frequent loss of participant competency certificate archives because there is no specific system for managing data certification. The purpose of conducting this research is to help the management of the Engineering Hospitality Indonesia Professional Certification Institute find solutions to existing problems by building and implementing a Professional Certification Management Information System at the Indonesian Hospitality Engineering Professional Certification Institute which has a website platform. This research was conducted using the Waterfall Software Development Life Cycle (SDLC) method. This system is designed using Context Diagrams, Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD) and also this system is built with a website platform that uses the php programming language with the Laravel framework. In testing the system is done by black box testing and also distributing questionnaires to respondents as measured by a Likert scale to determine user acceptance of the information system. This system gets an average value of 85.8% based on measuring user acceptance of the system and it can be concluded that the Professional Certification Institute Certification Management Information System has been designed with "Very Good".

Keywords: Management Information Systems, Professional Certification Institutions, Certifications, Assessments

1. Introduction

The Indonesian Hospitality Engineering Professional Certification Institute is a certification body that is sheltered and licensed by the National Professional Certification Agency. The Hospitality Engineering Indonesia Professional Certification Institute has several types of activities including competency certification test activities, competency assessor training, scheme development, and competency test materials[1][2]. In managing the competency certification test, the Engineering Hospitality Indonesia Professional Certification Institute is managed by the manager and administrative staff, where the administrative staff will record participant registration, manage information on the Indonesian Hospitality Engineering Professional Certification Institute, validate competency certification test forms and print competency certificates for certification participants[3].

From the results of interviews with the management of the Indonesian Hospitality Engineering Professional Certification Institute, it was found that problems that often arise in

administrative management still uses conventional data, such as filling out the competency certification APL form, recording participant registration and activity reports per certification which are still recorded in a book[4][5][6]. Errors in filling out and recording data reporting can lead to misunderstandings in the data received by administrative staff, thereby hindering the evaluation process. And also when filling out the APL form, it only takes time for assessors, admins and participants who come to the competency test site (TUK) to fill out the form and verify data on the APL form[7]. Another problem is the frequent loss of participant certificate archives at the secretariat of the Indonesian Hospitality Engineering Professional Certification Institute[8][9]. For this reason, a system is needed that can be used by all management of the Indonesian Hospitality Engineering Professional Certification Institute in facilitating the management process, storing certification data, and also facilitating the process of evaluating certification activities in reports per certification activity which will be presented in graphical form. a burden on the company because several forms of competency certification have become paperless and are also more time efficient in the process of filling out and validating the APL forms[10]. Previously, research related to this information system had been carried out, the research was carried out by Fuad Hasan Perdana Putra in 2017 with the research title "Administrative Information System of the STIKI Malang Professional Certification Institute for Management of ICT Certification"[11].

This information system is useful for processing information for management functions[12][13] which is used by all management of the Indonesian Hospitality Engineering Professional Certification Institute to facilitate registration of participants, manage information on the Indonesian Hospitality Engineering Professional Certification Institute, validate competency certification test forms and print participant competency certificates. This system is built using a website platform where the entire page consists of a domain that contains information [14][15][16] making it easier for certification participants and management of the Indonesian Hospitality Engineering Professional Certification Institute to access this system anywhere and anytime while still connected to the internet network.

This system is designed using a Context Diagram which describes the flow of data information that will be carried out by the system globally[17], Data Flow Diagrams (DFD) explain the flow of information data flow and information changes that are used as data flowing from input to output[18][19] and Entity Relationship (ERD) which are used for relational database modeling [20]. Then this system was built using the Hypertext Preprocessor (PHP) programming language which is a server side programming language[21] as well as one of the programming languages used for website development[22][23] to create dynamic web pages and uses the Laravel framework to speed up application creation[24] where the Laravel framework already has various features[25] that are ready to be used. This system uses the MySQL database which is one of the most well-known databases and MySQL belongs to the Relational Database Management System (RDBMS)[26][27] which is designed to manage a database such as storing, manipulating, and retrieving data stored in a relational database[8]. In testing this system the authors used the black box testing method where testing focused on the software both in terms of functional specifications[28] and also distributed questionnaires to administrative staff, directors, assessors, and participants using a Likert scale with a 5-point scale. With the existence of this Information System, it is hoped that it will make it easier for administrative staff to manage and recap data and convey competency certification information to certification participants.

2. Research Method

In developing this research using the Waterfall Software Development Life Cycle (SDLC) method. The Waterfall Software Development Life Cycle (SDLC) method uses a classical approach to software development that describes a linear development method as well as sequences [29]. The Software Development Life Cycle (SDLC) Waterfall method consists of several paths that describe the software life cycle. In the first stage the researcher conducted a needs analysis, then made a system design to describe how the system would run and produce the desired architecture that fits the needs. After that it is continued with the implementation of the system where the system is started to be made, then the system testing process will be continued. The following is an overview of the flow of the research methods used by researchers [30]:
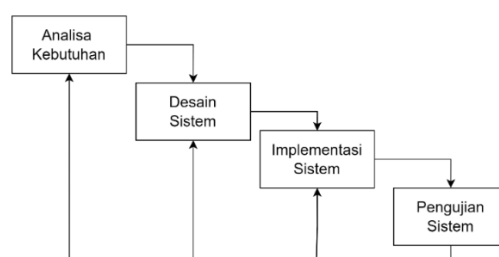
Figure 1. Alur Metode Penelitian

3. Result

3.1 System planning

Functional requirements are the overall requirements of the functions in the software to be built [31]. Functional requirements also cover all the features that will be made on the system. In this study, there will be several functions in the system that will be created, namely:

1) User Data Management Function
   This function is a function where the master admin can manage all user data either adding, changing, storing or deleting user data that uses this system.
2) Registration Validation Function
   In this function, administrative staff can validate registration by participants. Administrative staff will check proof of payment and will provide information on scheduling APL-01 and APL-02 filling in the system.
3) APL Validation Function
   This function is a function where the administrative staff will validate the APL-01 and the assessor will validate the APL-02 that has been filled in by the participants. Administrative staff and assessors will later determine whether the participant can continue the certification process or not, if the participant is deemed fit to continue the certification process, the administrative staff will provide information on the certification schedule in the system.
4) TUK Data Management Function
   This function is found on the admin staff dashboard page as well as the director. Administrative staff can manage TUK data such as adding, changing, saving, and deleting TUK data, while the director can only view TUK data on the system.
5) Certification Scheme Manage function
   This function is a function where the director can manage certification scheme data such as adding, changing, storing, or deleting certification scheme data that has been licensed or given a license by the National Professional Certification Agency.
6) Assessor Data Management Function
   In this function the administrative staff can manage assessor data such as changing, deleting, storing and also adding licensed assessor data to the system.
7) Function Manage Certification Schedule Data
   This function is found on the admin staff dashboard page, assessors, directors, and participants. Administrative staff can add, change, save, and delete certification schedule data, while assessors, directors, and participants can only display certification schedule data on the dashboard page.
8) Certificate Data Manage function
   This function is found on the administrative staff dashboard page, and participants. Administrative staff can add, change, save and delete certificate data, while on the dashboard page participants can only display the certificates provided.
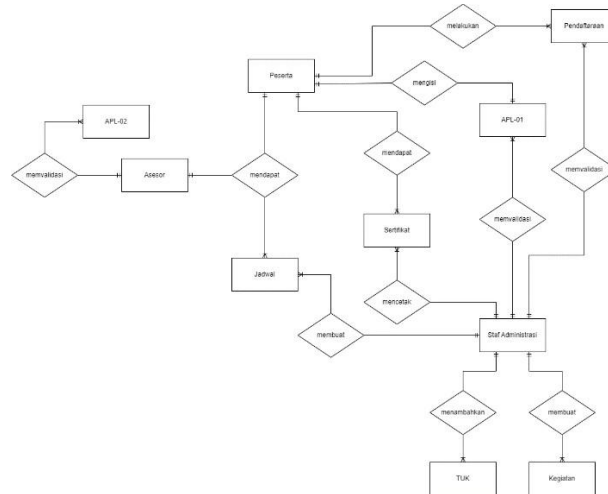
9) Activity Information Management Function
In this function, administrative staff can add information on activities carried out at the Engineering Hospitality Indonesia Professional Certification Institute and this information will be published on the system.

The design of this system uses Context Diagrams, DFD Level 0, and Entity Relationship Diagrams. In the Professional Certification Management Information System at the Engineering Hospitality Indonesia Professional Certification Institute that was built, the author designed an interface system consisting of 5 main parts, namely the admin master page, administrative staff page, assessor page, director page, and participant page.

1) Context Diagram

Figure 2. Context Diagram

The Context Diagram of the Professional Certification Management Information System at the Engineering Hospitality Indonesia Professional Certification Institute explains who are the users or users who can access the system and also explains the flow of data that can be given or received by the system to users or users[31]. Figure 2 describes the context diagram of the system to be built, where there are five entities namely Master Admin, Administrative Staff, Assessors, Directors, and Participants who can carry out the process according to the needs of each user.

2) DFD (Data Flow Diagram)
DFD (Data Flow Diagram) Level 0 is a derivative diagram of a context diagram that is used to describe interactions between systems to be built in more detail and the input output on the context diagram must also be in accordance with DFD Level 0 [32][33]. In the Professional Certification Management Information System at Certification Institutions The Indonesian Hospitality Engineering profession has five entities including master admin, assessors, directors, administration and participants. Next there are four processes including login, manage master data, manage certification data as well as print reports, then there are eight datastores including tb_user, tb_registration, tb_schedule_certification, tb_skema_ tb_form_01, tb_form_02, tb_activity, and tb_certificate.

3) ERD (Entity Relationship Diagram)
ERD is a diagram that describes the entities and their attributes that are used in the database as well as functions as a data container for the system to be created.

Figure 3. *Entity Relationship Diagram*

3.2 Implementasi Sistem

System implementation is a combination of design materials that have been done before so as to produce a system that is in accordance with the design that has been made. And the following are the results of the Certification Management Information System at the Indonesian Hospitality Engineering Professional Certification Institute.

1) Display User Login Page

On this page all users can log in by entering the registered username and password. Figure 4 below describes the display of the user login page.

Figure 4. Login Page

2) Administrative Dashboard Page Display

On the dashboard page the system administration staff will display registration validation, APL-01 validation, manage TUK, manage certification implementation schedules, manage certificate data and manage information on certification implementation activities. Figure 5 below describes the appearance of the administrative staff dashboard page.
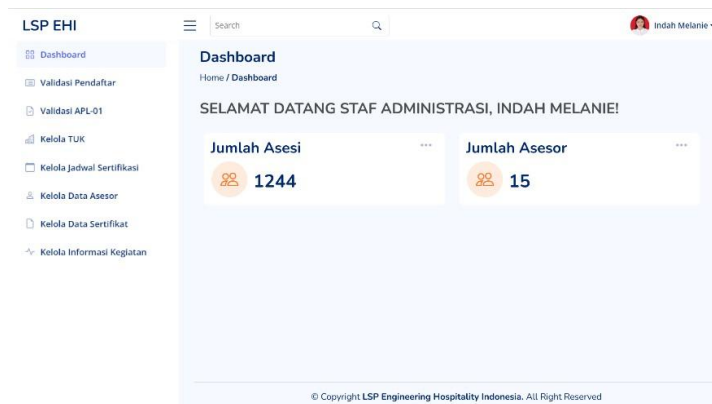
Figure 5. Administrative Staff Dashboard

3) Display of TUK Data Management (Competency Test Place)
On this page administrative staff can enter and delete data on the place where the competency certification test is carried out. Figure 6 below describes the appearance of TUK Data Management.
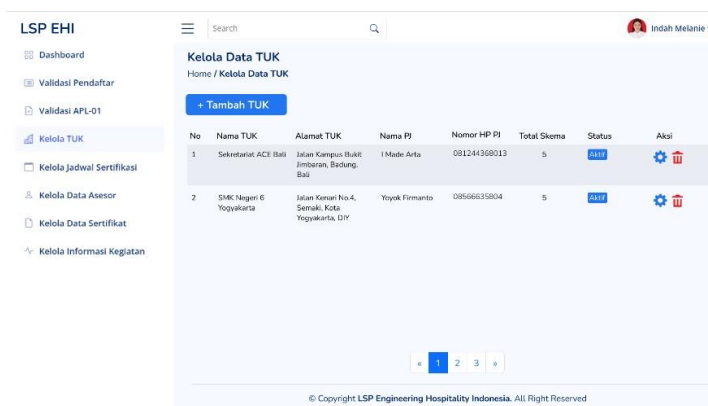

Figure 6. Manage TUK Data

4) Display of Certification Implementation Schedule
On this page the administration can manage the certification implementation schedule for all certification participants. Figure 7 below describes the display of the manage certification schedule page.
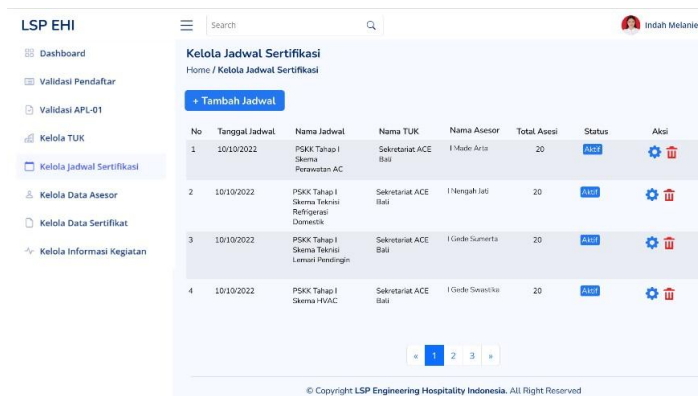
Figure 7. Manage Certification Schedule

5) Registration Validation Display
On this page the administration can validate registration of certification participants where administrative staff can validate all proof of payment and data requirements for competency certification. Figure 8 below describes the appearance of the registration validation page.

Figure 8. Registrant Validation

6) APL-01 Form Validation Display
On this page the administrative staff can validate the participant's self-assessment assessment form (APL)-01 where the administrative staff can recommend participants to continue carrying out competency certification. Figure 9 below describes the appearance of the APL-01 Form Validation.

Figure 9. Validasi Form APL-01

3.3 System Testing
The testing phase in this study was to use the blackbox testing method and to use a Likert scale measurement to test user acceptance of the application by distributing questionnaires to 15 (five) respondents consisting of assessors, admins, and assessors. The purpose of testing the system and measuring user acceptance is to determine the feasibility of the system applied to the Indonesian Hospitality Engineering Professional Certification Institute.

1) Blackbox Testing
Blackbox testing is a system testing phase that focuses on the functional specifications of the software. The results of blackbox testing are summarized in Table

1 below:

Tabel 1. Blackbox Testing

Test Items	Expected results	Test result	Conclusion
Button Login 01	Login access is successful and the system will bring the user to the user dashboard page	The system will display an alert message "logged in successfully" and display the user dashboard page	Success
Button Login 02	Login access failed and the system will still display the login page	The system displays an alert message "incorrect username or password" and the system still displays the login page	Success
Button Manage TUK	The system will display the Competency Certification Test Place page	The system will go to a list of Competency Certification Test Sites that have been filled in by the administration	Success
Registration Validation Button	The system will display all incoming registrations	The system displays all incoming registrations where the administration can validate registration data for certification participants	Success
Button Validation APL- 01	The system will display the APL-01 data sent by the certification participant	The system displays the APL-01 data sent by the certification participant and after that the administration can validate the certification participant's ability	Success
Certification Schedule Button	The system will display all implementation of competency certification	The system displays all competency certification implementations where the certification schedule will be input by the administration according to the number of registered participants	Success

Certificate Data Button	The system will display certificate data that has been issued	Participants can access certificates that have been issued by the administration	Success

In total, there were 7 software function tests carried out where the login function was tested 2 times, the TUK management function was tested 1 time, the registration function was tested 1 time, the validation function of app 01 was tested 1 time, the certification schedule function was tested 1 time and the certificate data function is tested 1 time. No error found function and 7 functions found no error.

2) Questionnaire Testing
This test is carried out to see the opinion of the user's acceptance response to this information system. Calculation of the results of the questionnaire using a Likert scale with 5 scales, namely:
1 Point = Strongly Disagree
2 Points = Disagree
3 Points = Neutral
4 Points = Strongly Agree
5 Points = Strongly Agree
The total score is obtained from the total value per scale where there are 5 scales with different points so that there are 5 scale values which are calculated using the following formula:

$$NP \times JD \qquad \square 1 \square$$

Description :
> NP is the point value per scale
> JD is the number of respondent data per scale

After getting the total value per scale, the total value per scale is added up to find the total score. After the total score is found, proceed with finding the maximum score value with the formula:

$$JR \times ST \times JP \qquad \square 2 \square$$

Description :
> JR is the total number of respondents
> ST is the highest scale score
> JP is the number of questions

After getting the total score and maximum score then proceed to find the index value with the formula:

$$(Total\ Score / Maximum\ Score) \times 100$$

The user acceptance questionnaire for this information system was distributed to 15

respondents consisting of administrative staff, directors, assessors, and participants at the Indonesian Hospitality Engineering Professional Certification Institute. The percentage adaptation of the questionnaire testing for 15 respondents is shown in Figure 10 below:
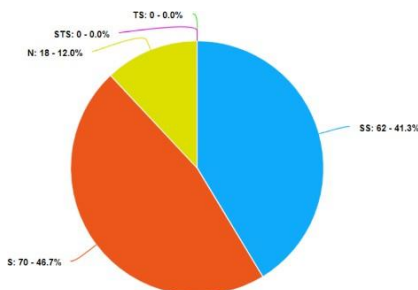

Figure 10. Questionnaire Results Diagram

From the results of the questionnaire testing that was carried out on 15 respondents with 10 questions and obtained index results with a percentage of 85.8% using a Likert scale. The results of the user acceptance questionnaire test for the Likert scale information system are shown in table 2 below:

Tabel 2. Summary of Questionnaire

No	Question	Respondent Results				
		SA	A	N	D	SD
1	Is the interface of the LSP Engineering Hospitality Indonesia Certification Management Information System clear and understandable?	10	5	0	0	0
2	Is the LSP Engineering Hospitality Indonesia Certification Management Information System easy to use?	7	8	0	0	0
3	Is the LSP Engineering Hospitality Indonesia Certification Management Information System easily accessible?	4	9	2	0	0
4	Is the LSP Engineering Hospitality Indonesia Certification Management Information System easy to operate?	5	6	4	0	0
5	Does the LSP Engineering Hospitality Indonesia Certification Management Information System make it easy to fill out and validate the APL form?	6	9	0	0	0
6	Does the LSP Engineering Hospitality Indonesia Certification Management Information System help in searching for certificate archives?	4	11	0	0	0
7	Does this system help in saving paper consumption (paperless)?	9	5	1	0	0
8	Does using the LSP Engineering Hospitality Indonesia Certification Management Information System increase time and effort efficiency in the certification registration process?	5	6	4	0	0
9	Does using the LSP Engineering Hospitality Indonesia Certification Management Information System increase time and effort efficiency in the pre-assessment certification process?	6	7	2	0	0

10	Is the LSP Engineering Hospitality Indonesia Certification Management Information System as a whole useful in the certification process?	6	4	5	0	0
	Total	62	70	18	0	0

Based on the data from the questionnaire testing results using the quantitative method taken from 15 (fifteen) respondents consisting of administrative staff, directors, assessors and participants with a total of 10 questions, the value calculation is obtained using the formula shown in table 3 below:

Tabel 3. Questionnaire Test Result Value

Calculation of the Likert Scale	Total Value
Total Score per scale: SA A N D SD	 310 280 54 0 0
Total Score	644
Maximum Score	750
Indeks	85,8%

From the calculation results above, an index value of 85.8% is obtained with the Strongly Agree category, so it can be concluded that the Professional Certification Institute Certification Management Information System has been designed with "Very Good" in delivering information according to needs, the accuracy of the function of each menu and display comfort system in use and system functionality is easy to understand.

4. Conclusion

From the results of the design and implementation that has been made, there are several things that can be concluded, namely as follows:

1. A Certification Management Information System has been developed at the Indonesian Hospitality Engineering Professional Certification Institute.
2. This system is designed using Data Flow Diagrams (DFD) and using Entity Relationship Diagrams (ERD) as the database design.
3. The Certification Management Information System at the Engineering Hospitality Indonesia Professional Certification Institute has features for registration of certification and implementation of certification so that the administration, directors, assessors and participants know about the implementation of certification.
4. The Certification Management Information System at the Engineering Hospitality Indonesia Professional Certification Institute can display reports on the implementation of certification every month and every year in graphical form.
5. The software function of this system has been tested using the black box testing method.
6. Testing user acceptance of the information system using a questionnaire with a Likert scale calculation gets an average result of 85.8% in the Strongly Agree category and it can be concluded that the Certification Management Information System for this Professional Certification Institute has been designed with "Very Good

References

[1]   S. Acai and J. S. Mutaaqin, Muttaqin, Ramen A. Purba, Alexander Wirapraja, Leon A. Abdillah, Fajrillah Fajrillah, Fatimah Nur Arifah, Julyanthry Julyanthry, Ronal Watrianthos, *Sistem Informasi Manajemen*. Yayasan Kita Menulis, 2020.

[2]   M. Sah and A. Chugh, "Performance Analysis of LTE system for 2x2 Rayleigh and Rician Fading Channel," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 3, no. 1, pp. 13–22, 2021.

[3]   Saifudin K. M. D. Maharani, " Sistem Informasi Pemesanan Tiket Shuttle Berbasis Web Pada PO. Sumber Alam Purwokerto", Indonesian Journal on Networking and Security, vol. 7, no. 3, 2017

[4]   A. Kumar, P. Bhandari, and K. S. Rawat, "Numerical simulation of solar air heater using paraffin wax-aluminum compound as phase changing material," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 3, no. 2, pp. 49–55, 2021.

[5]   H. Kenta, Y. Shino, D. Immaniar, E. P. Harahap, and A. D. A. R. Ahmad, "Gamification based blockchain tournaments between Miners," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 3, no. 1, pp. 91–114, 2021.

[6]   F. N. Hasanah and R. S. Untari, *Rekayasa Perangkat Lunak*. UMSIDA Press, 2018. doi: 10.21070/2018/978-602-5914-09-6.

[7]   U. Rahardja, Q. Aini, P. A. Sunarya, D. Manongga, and D. Julianingsih, "The use of TensorFlow in analyzing air quality artificial intelligence predictions PM2.5," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 4, no. 3, pp. 313–324, 2022.

[8]   Q. Aini et al., "Security level significance in DApps blockchain-based document authentication," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 4, no. 3, pp. 292–305, 2022.

[9]   M. Y. Effendy, E. Nurninawati, and A. Ari Setiyawan, "Design and build A web-based asset management information system at pt Thamrin Telekomunikasi Network," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 4, no. 1, pp. 48–58, 2022.

[10]   I. M. Nasution, B. P. K. Bintaro, C. S. Kesumawati, M. Zahruddin, and E. A. Nabila, "Implementation technology for development of a brand communication in company PT. XYZ," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 4, no. 1, pp. 17–25, 2021.

[11]   Rusli, A. S. Ahmar, and A. Rahman, *Pemrograman Website dengan PHP-MySQL untuk Pemula*. Yayasan Ahmar Cendekia Indonesia, 2019.

[12]   U. Rahardja, M. A. Ngadi, R. Budiarto, Q. Aini, M. Hardini, and F. P. Oganda, "Education Exchange Storage Protocol: Transformation into decentralized learning platform," *Front. Educ.*, vol. 6, 2021.

[13]   U. Rahardja, T. Hongsuchon, T. Hariguna, and A. Ruangkanjanases, "Understanding impact sustainable intention of S-commerce activities: The role of customer experiences, perceived value, and mediation of relationship quality," *Sustainability*, vol. 13, no. 20, p. 11492, 2021.

[14]   A. Pratama, *Laravel Uncover*. DuniaIlkom. [Online]. Available: www.duniailkom.com

[15]   N. K. A. Dwijendra et al., "A multi-objective optimization approach of smart autonomous electrical grid with active consumers and hydrogen storage system," *Environ. Clim. Technol.,* vol. 26, no. 1, pp. 1067–1079, 2022.

[16]   F. A. Rahardja, S.-C. Chen, and U. Rahardja, "Review of behavioral psychology in transition to solar photovoltaics for low-income individuals," *Sustainability*, vol. 14, no. 3, p. 1537, 2022.

[17]   T. Hariguna, U. Rahardja, and Sarmini, "The role of E-government ambidexterity as the impact of current technology and public value: An empirical study," *Informatics (MDPI)*, vol. 9, no. 3, p. 67, 2022.

[18]   U. Rahardja, "Social Media Analysis as a Marketing Strategy in Online Marketing Business," *Startupreneur Business Digital (SABDA Journal)*, vol. 1, no. 2, pp. 176–182, 2022.

[19]   Miftakul Amin, S.Kom., M.Eng, Adi Sutrisman, S.Kom., M.Kom, Yevi Dwitayanti, S.E., M.Sc., AAP-A, *Bahasa Query Menggunakan MySQL*. Penerbit Ahatek, 2022.

[20]   U. Rahardja, Q. Aini, and S. Maulana, "Blockchain innovation: Current and future viewpoints for the travel industry," *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, vol. 3, no. 1, pp. 8–17, 2021.

[21]   [15]   Z. Kedah, "Use of E-commerce in the world of business," *Startupreneur Business Digital (SABDA Journal),* vol. 2, no. 1, pp. 51–60, 2023.

[22]   W. N. Cholifah, Y. Yulianingsih, and S. M. Sagita, "Pengujian Black Box Testing pada Aplikasi Action & Strategy Berbasis Android dengan Teknologi Phonegap," *STRING (Satuan Tulisan Ris. dan Inov. Teknol.,* vol. 3, no. 2, p. 206, 2018, doi: 10.30998/string.v3i2.3048.

[23]   U. Rahardja, "Skema Catatan Kesehatan menggunakan Teknologi Blockchain dalam Pendidikan," *Jurnal MENTARI: Manajemen, Pendidikan dan Teknologi Informasi*, vol. 1, no. 1, pp. 29–37, 2022.

[24]   A. R. Saulina Panjaitan, U. Rahardja, Q. Aini, N. P. Lestari Santoso, and D. Apriliasari, "Management Innovation of Kuliah Kerja Praktek (KKP)," *APTISI Transactions on Management (ATM),* vol. 6, no. 1, pp. 62–73, 2022.

[25]   G. W. Sasmito, "Penerapan Metode Waterfall Pada Desain Sistem Informasi Geografis Industri Kabupaten Tegal", Jurnal Informatika:Jurnal Pengembangan IT (JPIT), vol. 2, no. 1, 2017.

[26]   H. S. Simarmata and I. R. Widiasari, "Manajemen Bandwidth Menggunakan Hierarchical Token Bucket (HTB) (Studi Kasus: PT. Orion Cyber Internet)," *Technomedia Journal*, vol. 8, no. 2SP, pp. 248–260, 2023.

[27]   A. U. Hasanah, Y. Shino, and S. Kosasih, "The Role Of Information Technology In Improving The Competitiveness Of Small And SME Enterprises," *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, vol. 3, no. 2, pp. 168–174, 2022.

[28]   U. Chotijah, "Sistem Audit Teknologi Informasi Berdasarkan Cobit Untuk Menilai Level Of Maturity Berbasis Web," *Technomedia Journal*, vol. 8, no. 3, pp. 26–49, 2024.

[29]   N. Luh, P. Srinadi, N. Nyoman, and H. Puspita, "Analisis Kebutuhan Sistem Informasi Smart Village Menggunakan Metode Pieces,"STMIK ATMA LUHUR Pangkalpinang, vol. 0, no. 0, pp. 8–9, 2018.

[30]   L. Honesti, Q. Aini, M. I. Setiawan, N. Puji Lestari Santoso, and W. Y. Prihastiwi, "Smart Contract-based Gamification scheme for College in higher education," *APTISI Transactions on Management (ATM)*, vol. 6, no. 2, pp. 102–111, 2021.

[31]   E. Dolan, S. Kosasi, and S. N. Sari, "Implementation of competence-based Human Resources management in the digital era," Startupreneur Business Digital *(SABDA Journal),* vol. 1, no. 2, pp. 167–175, 2022.

[32]   T. Hariguna, Y. Durachman, M. Yusup, and S. Millah, "Blockchain Technology Transformation in Advancing Future Change," *Blockchain Frontier Technology*, vol. 1, no. 01, pp. 13–20, 2021.

[33]   C. Lukita, M. H. R. Chakim, R. Supriati, N. P. L. Santoso, and M. F. Kamil, "Exploration of Perceived Use of Technology Using A Digital Business Perspective," ADI Journal on Recent Innovation, vol. 5, no. 1Sp, pp. 87–96, 2023.