A Case Study of Psp's Lean Management: The eISO PSP Mobile Application

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ABSTRACT

The main challenge that Seberang Perai Polytechnic (PSP) is dealing with is the lack of an application for online quality document recording. Therefore, the case study leads to the implementation of the ADDIE model to plan the development of eISO PSP mobile applications (Gustafson & Branch, 2001) and further analyse savings, efficiency, and results by using Lean Management tools (JPPKK, 2012). This study also analysed the factors influencing the perception of the Ease of Use of eISO PSP according to the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003). The main focus of this study is to determine the Perceived Ease of Use dimension as the study conducted by Venkatesh et al (2003). This study aims to determine a significant influence on the intention to actually use the eISO PSP mobile application. The 18 PSP staff who use the application represent the study's sample. Sampling using purposive sampling and data analysis using GNU software, PSPP. The data is interpreted based on percentage values, mean, and standard deviation. The results of the study show that the use of this application has minimized waste, increased efficiency, and achieved good results in the quality document record process. This study also shows that PSP staff have a significant high influence on the actual use intention of this application for all factors and significant effects on the actual use of this application.

1.0   Introduction

Mobile applications based on the Internet of Things (IoT) can improve management efficiency and user experience where data from these applications are stored in cloud databases or used in more complex applications (Jabbar et al. 2024). With this rapid increase in the use of the Internet of Things (IoT), researchers take advantage of this IoT by exploring applications in the management of quality document records in line with achieving the PSP's Key Performance Index (KPI) which targets one of the three Lean Management projects in 2023 (JPPKK, 2023). The need to improve the record management process and communication among PSP staff and management is important to improve operational efficiency and provide the best educational services to stakeholders. The eISO PSP project was launched in an attempt to enhance the management of high-quality document records in response to the growth of the IoT and the

requirement for the use of mobile applications in the management ecosystem. The researcher identified PSP staff who are directly involved in using the eISO PSP application as stakeholders in the implementation of the eISO PSP project. They use this application to manage letter or memo records, quality procedure documents, guidelines, and quality forms. PSP staff are also responsible for reporting any problems or maintenance needs, as well as giving feedback on the application. (International Organization for Standardization, 2018).

Nevertheless, PSP had a challenge before implementing eISO PSP: there was no online application for capturing high-quality documents. The lack of development in designing online applications is due to the lack of sufficient application development knowledge. As a result, the process of recording quality documents online cannot be implemented which results in the recording process using manual records that lack accessibility, incomplete data, and inefficient manual recording. The objective of this study is to implement the ADDIE model to plan the development of eISO PSP mobile applications and analyze savings, efficiency, and success by using Lean Management tools. In addition, this study also identified the factors of performance expectancy, effort expectancy, and facilitating conditions that influence the perception of Ease of Use of eISO PSP according to the perception of PSP staff based on the Theory of Acceptance and Use of Technology (UTAUT) model.

This study's justification is to compare the effect and effectiveness of the eISO PSP application-based online quality document recording process to the manual approach used by PSP staff to manage physical files using Lean Management. The PSP Quality Assurance Committee staff are the one PSP stakeholders whose duties and responsibilities are the subject of this study. The findings and recommendations applied are specific to the quality record documentation management establishment and the challenges that PSP faces. The importance of this study is to minimize waste in the document management process in PSP. Therefore, reducing the time, resource, and energy waste that usually occurs throughout the document management process is one of the reasons for this.

1.1 Technology Acceptance and Use Theory (UTAUT)

Perceived Ease of Use is one of the important factors in Technology Acceptance Theory that plays an important role in the use of technology (Davis et al., 1989). The evolution of this theory has triggered the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003). In the context of the eISO PSP application, the perception of Perceived Ease of Use is closely related to how the PSP staff sees the extent to which the application can be easily and easily integrated. The success of the introduction and implementation of the eISO PSP application in the PSP is not only dependent on usability factors but also on the extent to which the PSP staff believe that the application is easy to use. PSP staff is likely to accept the application with greater ease if they believe it is straightforward to use and understand.

Therefore, the construction of the items in this research questionnaire is based on the perception of Ease of Use by using the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003). This theory explains the perception and intention of a user to use information systems in human behavior. In this theory, 3 main constructs are presented in this study, which are performance expectancy, effort expectancy, and facilitating conditions that determine user intentions and behavior (Venkatesh et al., 2003) as shown in Figure 1.1.
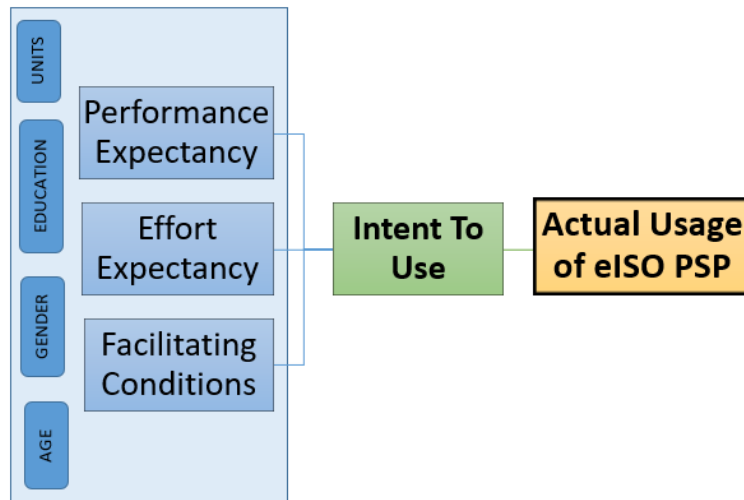
Theory:Technology Acceptance and Use Theory (UTAUT)
Figure 1.1 Conceptual Framework

2.0 Literature review
2.1 Implementation of Lean Management

Lean management is a method practiced in the private sector and even in some public sectors (Hamid & Ismail, 2016; Nanade & Lal, 2019). Previous researchers have revealed that Lean Management can improve quality, work efficiency, and customer service (Tracey & Knight, 2008; Taj & Morosan 2011). Achanga, Shehab, Roy, and Nelder (2006) stated that Lean Management can be the best practice to eliminate waste and reduce costs. In the implementation of the eISO PSP project, Lean Management principles have been carefully applied to minimize waste, increase efficiency, and achieve good results in the quality document record process by referring to the Lean Management Implementation Guidelines of the Department of Polytechnic Education and Community College (JPPKK, 2012).

The Communication Cycle is a tool used to detect waste in the communication process within the organization. It helps to identify weaknesses in the flow of information and communication. In the eISO PSP project, the Communication Cycle has been used by identifying all parties involved in the communication process. Analyze how information flows between the parties involved. This helps the researcher identify any errors, delays, or repetitions in communication. Through analysis, researchers can identify the causes of waste such as delays in letter approval, unnecessary email exchanges, and lack of understanding of communication (JPPKK, 2012).

Work Flow Charts are used to eliminate waste in operational processes. It helps to visually depict the steps involved in a process and identify places where waste occurs. In the eISO PSP project, Work Flow Charts have been used to model the existing processes related to record management and communication in the form of a work flow chart. This helps the researcher to better understand these processes. Through the modeling of workflow charts, researchers identify steps that do not add value in the process, such as delays, deficiencies in processing, and repeated authorization requirements (JPPKK, 2012).

2.2 Application Performance Expectancy of eISO PSP Application

In this study, the performance expectancy is the level of trust of a PSP staff to believe that the use of mobile applications will meet the main needs of carrying out daily tasks in the management of correspondence records and can even reduce the time required to complete correspondence record matters. Next, this application helps in finding documents more easily compared to the previous method of tracking the status of the director's signature. Finally, this application provides an easy way to communicate and collaborate among PSP staff in matters related to correspondence records (Venkatesh et al., 2003).

2.3 Effort Expectancy of eISO PSP Application

Effort expectancy in this study refers to the desire of PSP staff to use mobile technology. Self-efficacy is the real determinant of individual behavior for absolute use and creating the desire to use a mobile application. PSP staff believe that this application successfully solves the main problems encountered in the management of correspondence records by reducing the delay in the correspondence record management process and reducing the printing of letters or memos. Next, this application provides flexibility, accessibility, and technical support in the management of correspondence records. In addition, this application has improved the process of distributing letters or memos that may have previously taken a long time and tracking letters or memos that are being processed more efficiently. Finally, this application facilitates the communication process among PSP staff to comply with the established rules (Venkatesh et al., 2003).

2.4 Facilitating Conditions of eISO PSP Application

The facilitating conditions is a situation where PSP staff and technical facilities will exist to support him using a system or environment in implementing the work process through a mobile application. good, flexible, and additional features required correspondence record management and effective letter or memo distribution process. In addition, PSP staff are also comfortable using this application because it has technical, analytical innovative, and creative support (Venkatesh et al., 2003).

3.0 Methodology

The design of this study is based on mixed research. The development study is carried out through a qualitative approach to the development of mobile applications that use the ADDIE instructional design model which is the earliest model and is the basis for other instructional system design models (Gustafson & Branch, 2001). The ADDIE model stands for Analysis, Design, Development, Implementation, and Evaluation. In addition, this study also implemented a quantitative approach, this was also implemented based on survey research to obtain information related to each variable. The data analysis procedure for this study uses GNU Software, SPSS. This software was used to analyze descriptive data (Gay et al., 2012). Descriptive data is used in this study because the data produced can be considered relevant to describe the level of PSP staff's perception and acceptance of the eISO PSP application. In addition, it is also able to provide information directly and easily (Pallant, 2007). Descriptive data used are percentage frequency, mean, and standard deviation. To determine whether performance expectancy, effort expectancy, and facilitating conditions have a positive and significant influence on the intention to use eISO PSP or inversely, this analysis was used to show the demographic composition of study respondents and mean score interpretation. Interpretation of the Mean Score based on Pallant (2007) is such that a mean score of 0.00-1.66 is at a low level, a mean score between 1.67 - 3.33 is at a medium level while a mean score between 3.33 to 5.00 is at a high level.

4.0 Discussion of analysis and findings
4.1 Implementation of Lean Management

The researcher established an initial small team made up of subject matter specialists to begin project implementation. Next, identification of stakeholders in the implementation of Lean Management. In this project, the stakeholders are PSP staff. Information about these parties has been collected through interviews, surveys, and feedback to understand their needs. After stakeholder identification, stakeholder needs become the main focus. This includes the requirements of PSP staff to implement an efficient and effective work process. Next, PSP staff can communicate effectively and collaborate between staff. Besides, the value of stakeholders in the context of the eISO PSP application is ease of use, accessibility, effectiveness, and efficiency. The goal of Lean Management in this project is to minimize waste, increase efficiency, and achieve good results in the quality document record process.

In the implementation of the eISO PSP project, several problems have been identified that require immediate action, namely that there is a lack of sufficient integration between the letter or memo record system in the eISO PSP application with the existing system. This makes it difficult to access information quickly and can cause delays in document management. Second, the process of preparing letters or memos involves the use of different forms and formats, causing confusion among users. This also results in a waste of time and resources. Finally, the process of checking the signature status by management is slow because it involves many stages of physical approval. To achieve the Lean Management objective of this project, the researcher has analyzed the communication cycle and modelling of the workflow chart to overcome this problem. Based on this problem, Communication Cycle Analysis is an important process in the context of eISO PSP application development before the application is realized. It involves an in-depth understanding of how information and communication flow within an existing organization or process. This includes how information moves between PSP departments and units. This helps to identify points where communication may be slow, interrupted, or need better understanding.

The comparison table below compared several key elements of PSP's correspondence record management process before and after it implemented the eISO PSP application. Table 4.1 shows that this comparison explains the significant changes in the management of correspondence records at PSP after the use of eISO PSP Application. Here is a reduction in communication waste as a result of this improvement. Based on the results of the analysis, the researcher succeeded in reducing waste in the communication process. This includes simplifying the flow of information and improving communication between the parties involved (JPPKK, 2012).

Table 4.1: Comparative Analysis Before and After Using the eISO PSP Application

Aspect	Before eISO PSP Application	After eISO PSP Application	Reduction of Communication Waste
Document Distribution	Manual distribution is time-consuming and involves the risk of error.	Automatic distribution to appropriate recipients based on rules.	100%
Document Storage	Documents are stored in physical files, requiring large physical storage space.	Documents are stored in a secure digital format, reducing the need for physical storage space.	100%
Use of Paper	Paper consumption is high because documents are often printed.	The use of paper is significantly reduced as documents are managed in digital form.	100%
Document Processing	The document processing process takes a long time because it depends on physical delivery and physical approval.	The document processing process becomes faster due to electronic processing and electronic authentication.	100%
Document Preservation	Physical files require frequent maintenance and can be time-consuming.	Data in the application is easy to maintain and propose, reducing maintenance complexity.	100%
Monitoring and Reporting	Performance monitoring and process compliance are difficult.	The application provides performance and compliance monitoring tools, enabling management to identify and address waste and improve processes.	100%

The Workflow Chart Modelling emphasises that planning the development of applications such as the eISO PSP is an essential first step. It involves visualizing and understanding existing workflows or processes used in the management of correspondence and communication records before the application is created. Table 4.2 is a comparison showing significant changes in the management of correspondence records at PSP after the use of the EISO PSP Application. This change proves that this application has eliminated unnecessary steps and sped up the process flow to eliminate waste in various aspects of management. This application also speeds up the processing of quality document records and reduces reliance on manual processes (JPPKK, 2012).

Table 4.2: Comparison Before and After the eISO PSP Application is implemented

Aspect	Before eISO PSP Application	After eISO PSP Application	Workflow Waste Reduction
Document Distribution	Manual distribution is time-consuming and involves the risk of error.	Automatic distribution to appropriate recipients based on rules.	100%
Document Storage	Documents are stored in physical files, require large physical storage space and are vulnerable to loss or damage.	Documents are stored in a secure digital format, reducing the need for physical storage space and the risk of loss or damage.	100%
Use of Paper	Paper consumption is high because documents are often printed and distributed physically.	The use of paper is significantly reduced as documents are managed in digital form.	100%
Document Processing	The document processing process takes a long time and depends on physical delivery and physical approval.	The document processing process becomes faster due to electronic processing and electronic authentication.	100%
Document Preservation	Data in physical files requires frequent maintenance and can be time-consuming.	Data in the application is easy to maintain and propose, reducing maintenance complexity.	100%
Monitoring and Reporting	Performance monitoring and process compliance are difficult and less transparent.	The application provides monitoring and compliance data, enabling PSP management to identify and address waste and improve processes more transparently.	100%

4.2 Demographics

The data distribution of the study respondents is described in Table 4.3 about age, gender, education, and units using the eISO PSP application in PSP. The results of the study found that the majority of respondents to the factor analysis of the Perceived Ease of Use eISO PSP were aged 35-44 years (61.1%) and the majority were female (77.8%). The results of this study show that most of the staff have a Master's Degree (44.4%) and the majority are in the PSP Quality Assurance Unit (66.7%).

Table 4.3: Demographics Respondent

	Number	Percent
Age		
25-34 years old	1	5.6
35-44 years old	11	61.1
45-54 years old	5	27.8
55 years and above	1	5.6
Gender		
Men	4	22.2
Female	14	77.8
Position		
Doctor of Philosophy (Ph.D.) or equivalent	3	16.7
Master's Degree	8	44.4
Bachelor's Degree	7	38.9
Units		
Internal Audit Unit	3	16.7
Quality Assurance Unit	12	66.7
Strategic, Performance and Risk Management Unit	3	16.7

4.3 Performance Expectancy Factors That Influence Perceived Ease of Use eISO PSP

Based on the findings of the study in Table 4.4 below, it can be concluded that the PSP staff has the eISO PSP performance expectancy factor which has a significantly high influence on the intention to actually use this application (mean = 4.56, SP = 0.62).

Table 4.4: Performance Expectancy Factors

No	Statement	Min	SP
NEE1	This application fulfills my main needs in the management of correspondence records in PSP.	4.56	.70
NEE2	This application helps me in finding documents more easily compared to the previous method.	4.67	.49
NEE3	This application facilitates the process of distributing letters/memos.	4.67	.49
NEE4	This application has reduced the time required to complete correspondence record matters.	4.67	.49
NEE5	This application helps in tracking the status of the director's signature.	4.72	.49
NEE6	This application provides important features to help me carry out daily tasks more efficiently.	4.39	1.04
NEE7	This application provides an easy way to communicate with other staff in matters related to correspondence records.	4.50	.71
NEE8	The eISO PSP application has reduced time wastage.	4.50	.71
NEE9	I have felt an increase in cooperation among PSP staff.	4.50	.71
NEE10	I need this application to fulfill the responsibilities that have been entrusted to me.	4.44	.86
	Overall	4.56	.62

This table shows the level of Perceived Ease of Use of eISO PSP according to PSP staff using the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003) for the performance expectancy factor. The findings of this factor have a significant high influence on the intention for the actual use of this application and a significant effect on the actual use of the eISO PSP application. This is because this application is easy to use in recording quality documents. In addition, the application needs to provide an organized quality document storage system to facilitate users to retrieve documents quickly and efficiently. The final focus is to ensure that the application provides sufficient information for quality document management and to improve overall management efficiency in PSP. A mobile application is a program installed on a mobile phone to allow staff to access it anywhere and anytime (Md. Rashedul, Md. Rofiqul & Tahidul Arafhin, 2010)

4.4   Effort Expectancy Factors That Influence Perceived Ease of Use eISO PSP

Based on the findings of the study in Table 4.5 below, it can be concluded that the PSP staff has an eISO PSP effort expectancy factor that has a significantly high influence on the intention to actually use this application (mean = 4.47, SP = 0.67).

Table 4.5: Effort Expectancy Factor

No	Statement	Min	SP
SOL1	This application successfully solved the main problem I faced in the management of correspondence records before.	4.44	.70
SOL2	This application has reduced delays in the correspondence record management process.	4.39	.70
SOL3	This application has improved the process of distributing letters/memos which may have taken a long time before.	4.44	.70
SOL4	This application helps me in tracking letters/memos that are being processed more efficiently.	4.44	.70
SOL5	The use of this application has reduced the printing of letters/memos.	4.61	.50
SOL6	This application facilitates the communication process among PSP staff.	4.39	.85
SOL7	This application helps me follow the rules.	4.44	.70
SOL8	This application provides technical support to me to deal with problems that may arise.	4.44	.86
SOL9	There is increased accessibility of information through this application.	4.50	.71
SOL10	This application provides technical support to me to deal with problems that may arise.	4.61	.61
	Overall	4.47	.67

This table shows the level of Perceived Ease of Use of eISO PSP according to PSP staff using the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003) for the effort expectancy factor. The findings of this factor have a significant high influence on the intention for the actual use of this application and a significant effect on the actual use of the eISO PSP application. This application provides a user-friendly solution to record quality

documents online more accurately and efficiently. The perception of PSP staff has stated that the use of this application has reduced the printing of letters or memos (Venkatesh et al., 2003).

4.5   Facilitating Conditions Factors Affecting Perceived Ease of Use of eISO PSP

Based on the findings of the study in Table 4.6 below, it can be concluded that the PSP staff has a facilitating conditions factor of eISO PSP that has a significantly high influence on the intention to actually use this application (mean = 3.89, SP = .98).

Table 4.6: Facility Condition Factors

No	Statement	Min	SP
CIM1	Do you agree that the user interface (UI) of this Application should be improved to make it easier to use?	4.00	0.97
CIM2	Do you agree that additional features should be included in this application to make it more useful in correspondence record management?	4.22	1.00
CIM3	Do you agree that I have problems using this application?	2.83	1.25
CIM4	How much do you agree that technical support should be improved in this application if I have problems?	3.83	1.15
CIM5	To what extent do you agree that this application should comply with the rules related to correspondence records?	4.00	1.19
CIM6	Do you agree that analytics features should be added in this application to help users better monitor compliance?	3.94	1.16
CIM7	To what extent do you agree that this application needs to be more flexible in dealing with changing needs?	4.00	1.14
CIM8	Do you agree that the letter/memo distribution process in this application needs to be improved?	3.89	1.13
CIM9	Do you agree that eISO PSP Applications need to innovate to meet future needs?	4.11	1.08
CIM10	Do you agree that eISO PSP needs to improve with more creative ideas to further improve this application?	4.06	1.26
	Overall	3.89	.98

This table shows the level of Perceived Ease of Use of eISO PSP according to PSP staff using the Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh et al. (2003) for the facility condition factor. The findings of this factor have a significant high influence on the intention for the actual use of this application and a significant effect on the actual use of the eISO PSP application. This application is recognized to meet the needs of staff with a good and user-friendly user interface (UI). In addition, they were speeding up the quality document record management process and improving the user experience using the online system. According to Ain, Ghazali, and Yusof (2023), the design and development of mobile applications make it easier for staff to record online. This application provides a state of convenience with continuous innovation to adapt to industry trends. This application is also creative in the development of the application in the future. Therefore, increasing application flexibility, increasing creativity in repair, and increasing flexibility in customization are critical steps to ensure the application remains relevant and efficient (Venkatesh et al., 2003).

5.0   Conclusion and future research

This study details the results and impact of the eISO PSP project after the implementation of Lean Management. The researcher examines how the implementation of Lean Management has benefited Seberang Perai Polytechnic (PSP) and measures the achievement of project objectives. One of the most important impacts that has been achieved is the reduction of overall operating costs. With a more efficient process and better use of resources, PSP managed to reduce waste by 100% in less than a year after the implementation of the project. This includes reducing the cost of using paper and increasing the use of technology. In addition, this application shows that the implementation of ADDIE has been successful in achieving the main objective of this application project.

Application users have given high feedback about the increased efficiency of the documentation process. Processes that previously involved many steps and movements have now been simplified, reducing the time required to complete a task. This has increased staff productivity and made processes easier to manage. The use of this application has minimized waste in the document management process. It has reduced the waste of time, resources, and energy that previously often occurred. Consumers gave positive feedback about this reduction in wastage.

PSP's eISO application has improved accessibility and usability by providing fast and integrated access to documents and information. This makes it easier for PSP staff to get the necessary information. Feedback from users indicates a high level of accessibility. This application has helped improve the reliability and quality of documents produced by PSP. With the introduction of standard formats and compliance with quality procedures, human error has been minimized. Users give positive feedback about the high level of reliability and quality of the document. This result shows that the implementation of Lean Management principles is successful in achieving the main objectives of the project.

This study includes recommendations for future improvements in the use of the eISO PSP Application or similar applications in Seberang Perai Polytechnic (PSP) organizations. These recommendations include a plan to continue using Lean Management in application development and also further research to improve the organization's operations. This project has taught the researcher that continuous monitoring and evaluation are essential to achieve the effectiveness of Lean Management. User feedback is a valuable asset in making the necessary improvements in the application. The researcher suggests that continuous monitoring and evaluation continue in the maintenance and development of the eISO PSP application. Further improvements should be based on data and feedback from users to ensure that this application continues to develop and meet the needs of the PSP.

In summary, the results of the study show that the use of the eISO PSP application has minimized waste, increased efficiency, and achieved good results in the quality document record process. This study also shows that PSP staff have a significant high influence on the actual use intention of this application for all factors and significant effects on the actual use of the eISO PSP application. In addition, the three study variables have also been confirmed to have the desired model fit.

Author Contributions
Mohd Hafiz A. H.: Research Framework, Methodology, Application Design, Writing- Original Draft Preparation, Lean Management Project & Supervision; **Suzana Othman**: Lean Management Framework, Data Analysis, Impact Validation, Writing-Reviewing and Editing; **Nur Wahida Janudin**: Lean Management Framework, Application Design Validation, Writing-Reviewing and Editing. This collective effort ensured a comprehensive exploration of the topic and the successful completion of the research.

Conflicts of Interest
The manuscript has not been published elsewhere and is not being considered by other journals. All authors have approved the review, agree with its submission and declare no conflict of interest in the manuscript.

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