i-RIC 2024

INTERNATIONAL RESEARCH & INNOVATION CONFERENCE

PROCEEDING

"HARMONY IN DIVERsITY: FOsTERING UNITY
SUsTAINABLE REsEARCH AND INNOVATION SOCIETY"

24 & 25 JULY

2024

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Published by:

Politeknik Nilai Negeri Sembilan (PNS)
Kompleks Pendidikan Bandar Enstek,
71760, Bandar Enstek,
Negeri Sembilan

2024

eISBN 978-967-2742-35-7

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PREFACE

It is a great privilege for us to present the proceedings of the International Research and Innovation Conference (i-RIC 2024) to the authors and delegates. We hope that you will find it useful, exciting, and inspiring. The International Research and Innovation Conference (i-RIC 2024) was held online from 24 to 25 July 2024, organized by Politeknik Nilai in collaboration with Universitas Logistik dan Bisnis Internasional (ULBI) with the theme, “Harmony in Diversity: Fostering Unity Sustainable Research and Innovation Society.”

i-RIC 2024 aims to gather more researchers, students, government agencies, and private sectors in an event with a larger international impact. The organization of this program also serves as a platform for sharing research findings, ideas, and knowledge among members of polytechnics, community colleges, higher education institutions, public universities, as well as government and private agencies involved. Researchers, academics, and experts from various sectors will have a global stage at i-RIC 2024 to discuss the latest findings and research that support sustainable development goals. The conference aims to generate knowledge to make our world greener and better for us and our future generations.

There were 4 keynote speeches covering different areas of the conference. The first day started with Associate Professor Dr. Ir. Agus Purnomo (ULBI Indonesia) talk on "How to Boost Green Supply Chain Resilience?" and Professor Dr. Mohamed Kchaou (University of Bisha, Saudi Arabia; University of Sfax, Tunisia) on "Latex Based Membrane for Oily Wastewater Treatment Technology Process and Perspectives". The second day featured Professor Dr. Recai Kus (Selcuk University, Turkey) on "Load Optimization of AISI 1040 and AISI 5140 Joint" and Dr. Umawathy a/p Technamurthy (Universiti Kebangsaan Malaysia) with her talk on "Harnessing the Potential of Maker Education in Enhancing Student Learning Outcomes".

A total of 124 presenters participated in the parallel presentation sessions, which ran smoothly over the two-day event supported by 109 i-RIC 2024 organizing committees. This included 16 online presentation moderators, 42 reviewers, 19 judges, and all participants who took the time to attend the online sessions. A total of 124 research papers and 56 innovations were presented in this program across 7 fields, namely:

A. Engineering and Technology
B. Business Management
C. Education, Teaching, and Learning
D. Health and Life Sciences
E. Social Sciences
F. Information Communication Technology
G. Logistics and Supply Chain

Information regarding i-RIC 2024 can be accessed through the Program Book at https://heyzine.com/flip-book/521619ef82.html and overall results can be found at http://iric.polinilai.edu.my/.../confe.../results-innovation.

We would like to express our heartfelt thanks and sincere appreciation to all the authors for their contributions to this publication. We also express our gratitude and appreciation to all of the reviewers for their constructive feedback on the papers. Warmest thanks to the members of the organizing committee for their hard work and dedication in ensuring the success of the event.

Congratulations to everyone involved in making this conference a success.

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LOGISTICS AND SUPPLY CHAIN MANAGEMENT

"HARMONY IN DIVERsITY: FOsTERING UNITY
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Analysis and Implementation of the User-Centered Design Method in Designing a Web-Based Bidding Participation Information System: A Case Study at PT Pos Indonesia (PERSERO)

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Abstract

This research aims to design a web-based information system for monitoring PT Pos Indonesia's bidding participation activities using the User-Centered Design (UCD) methodology. The UCD approach ensures that the system is tailored to meet the needs and preferences of its users, thereby enhancing usability and user satisfaction. The study begins with a detailed analysis of the current bidding management processes at PT Pos Indonesia, identifying key challenges and requirements. Through iterative design and continuous user feedback, the proposed system is developed to streamline the bidding participation workflow, improve data accuracy, and facilitate better decision-making. The findings indicate that implementing a UCD-based information system significantly improves the efficiency and effectiveness of managing bidding activities. Users reported higher satisfaction levels due to the system's intuitive interface and enhanced functionality. Moreover, the system's ability to provide real-time data and analytics supports better strategic planning and operational decision-making. In conclusion, the study demonstrates that a user-centered approach to system design can lead to substantial improvements in both user experience and organizational performance. The web-based bidding information system developed for PT Pos Indonesia serves as a model for other organizations looking to enhance their bidding management processes through technology.

Keywords: User-Centered Design, Bidding Management, Bidding Participation, System Information, Procurement

1. Introduction

Procurement, or the procurement of goods and services, is an important process in supply chain management that involves purchasing goods and services needed by an organization to carry out its operations (A. Malik, 2017). From the perspective of goods and services providers, this procurement process does not only mean selling products or services but also acting as a strategic partner in meeting needs and ensuring the client's operations run smoothly. Providers of goods and services have a crucial role in ensuring that the goods or services required by the organization are available at the appropriate quality, quantity, price, and time. They must be able to understand the specific needs of customers and offer the most effective solutions (Tukimun, 2024).

PT Pos Indonesia, a large company operating in the field of postal and logistics services, is often involved in project tenders, both from the government and the private sector as a courier and logistics service provider. The participation of PT Pos Indonesia in the procurement process of goods and services is not only carried out by the Central Post. Headquarters in Jakarta or Bandung but also by all its branches throughout Indonesia. Because all branches can participate in the procurement of goods and services, of course, PT Pos Indonesia must supervise the participation in the procurement of goods and services/tenders to win the tenders that are followed and also ensure the suitability of the services offered.

Table 1 PT Pos Indonesia Tender Participation in 2023

No	Region	Description	Number of Tenders	Project Value (Billion)
1	Head Office	National	55	2.296,90
2	Reg 01 Medan	Sumatera	11	1,26
3	Reg 02 Jakarta	DKI Jakarta & Banten	150	141,90
4	Reg 03 Bandung	West Java	4	0,30
5	Reg 04 Semarang	Central Java & DI Jogjakarta	13	15,46
6	Reg 05 Surabaya	East Java, Bali, NTT & NTB	6	177,70
7	Reg 06 Makassar	Kalimantan, Sulawesi, Maluku & Papua	4	160,81
		Grand Total	243	2.794,33

Source: Bidding Department of PT Pos Indonesia (Persero)

However, the process of supervising tender participation by PT Pos Indonesia is currently still facing various obstacles because it is still done manually. Some of them are errors in data recording, delays in document collection, and inaccuracies in information. This not only has an impact on operational efficiency but can also reduce the chances of PT Pos Indonesia winning the tender. In an era of increasingly fierce business competition, having an effective system to manage tender participation activities is very important (K. Agustian et al., 2023).

The use of web-based information systems is considered the right solution to overcome this problem (C. Barry, 2003). The web-based information system allows for wider and real-time access, facilitates data integration, and supports collaboration between divisions involved in the tender process (M. Salahuddin & B. Maulana, 2023). However, the development of an effective information system depends not only on the technology used but also on how well the system meets the needs of the end user. The User-Centered Design (UCD) method is an approach that puts the user at the center of the system design process. By using UCD, system designers will focus more on the needs, preferences, and limitations of the end user (M. Agarina & A. Suryadi Karim, 2019). The UCD process involves users at every stage of development, from requirements gathering to system testing and evaluation. Thus, the resulting information system is not only effective from a technical point of view but also easy to use and according to the needs of users.

Various studies have shown that the application of UCD can improve the quality and acceptance of information systems by users. For example, research by Abran et al., (2003) shows that systems designed with UCD principles tend to be easier to use and accept by end users. Another study by Gould and Lewis (1985), emphasized the importance of user involvement in the design process to ensure that the system developed is truly tailored to their needs. In addition, a study by Beyer and Holtzblatt (1998) underlines that understanding the user's working context through methods such as direct observation and in-depth interviews can result in a more relevant and useful system design.

In the context of PT Pos Indonesia, this study aims to design a web-based tender participation activity information system using the UCD method. With this approach, it is hoped that the information system developed can overcome existing problems and improve the efficiency and accuracy of the tender participation process. In addition, this research is expected to contribute to the development of science, especially in the field of information system development with the UCD approach. This research can be a reference for the development of similar information systems in other fields, and a reference for further research on the application of UCD in different contexts.

2. Methods

This study uses a qualitative approach with a type of descriptive research which is research based on the philosophy of postpositivism used to research on the condition of natural objects where the researcher is the key instrument (Sugiyono, 2021). The approach in this study was taken because the researcher wanted to describe and get an overview of the tender participation activities that are being researched by observing and interviewing the parties involved in the tender process directly and also collecting the data and information needed as the basis for designing a web-based tender participation information system. The population in this study is all regional and central Bidding champions totaling 21 people. For samples using the Proportionated Stratified Random Sampling method with a sampling error rate of 10%, with the formulation of Slovin, the sample taken amounted to 20 people according to the details of their position level.

The analysis model of this study uses the User-Centered Design (UCD) model which is a design process that emphasizes the importance of understanding the needs of the end-user and integrating this understanding into each stage of product or system development. Figure shows the stages of UCD according to ISO (2010).

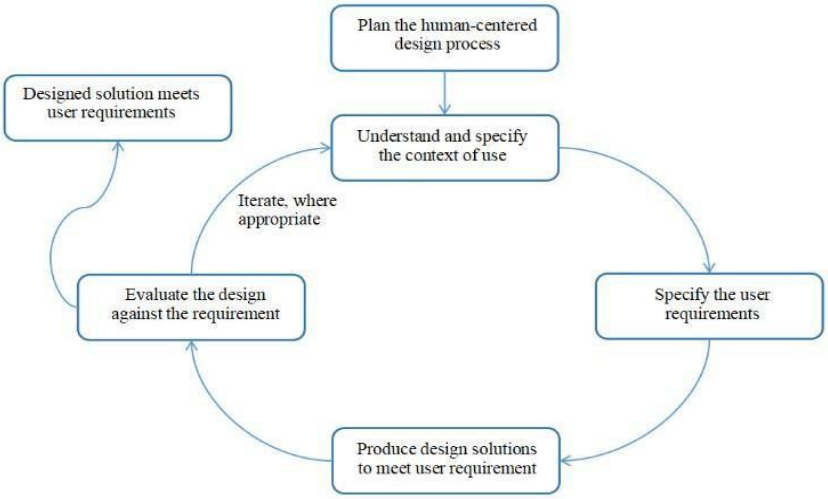


Figure 1 Stages of UCD
Source: ISO 9241-210

3. Result and Discussion

Plan the Human-Centered Process

The stages will be carried out by collecting data on information system stakeholders with interviews to find out who the users of the system are and determine the goals and tasks of the system users. Interview questions can be seen in Table 3.1 below:

Table 2 Results of Bidding Stakeholder Interviews

No	Question	Answer
1	What must be collected in the system?	This system is used to collect data on potential offers. Then the data will be updated in the bidding activity process until the final result is win or lose. If you win, the data must be updated again to find out the realization of the bid won. Apart from that, the system is also a storage place for documents for tender purposes.
2	Who will be involved in using the system?	System users will consist of Super admin, Senior Manager/bidding manager and bidding champion.
3	Before the system was created, How to collect data the?	The bidding section uses Google forms and Excel files which are shared on Telegram groups and other media to collect data. The speed of response to each other depends on the busy conditions of each person.

No	Question	Answer
4	What is the level of information which can be accepted by each user system?	super admin is the highest level who has access rights to the entire system menu. super admin can also manage users, references and access to upload documents for tender purposes. The senior manager/Bidding Manager has the task of approving potential bidding data submitted by the bidding admin. Apart from that, you also have access to view reports on bidding potential, bidding activity and the realization of won projects. Bidding Champions have access to increase bidding potential, update bidding activity and access all reports.
5	What is the environment in which the system will be implemented?	The environment where it is implemented consists of people who are experienced and in an environment where many information systems are implemented.
6	In the system that will be designed, what processes can the system carry out?	The system is able to store data on potential bids and can accommodate bidding activities starting from registration, meeting/not fulfilling the requirements, explanation/aanwijzing, proposal submission to winning/losing. The system is also expected to be able to present data reports in graphical form from the collected data.
7	In the system to be designed, what needs to be displayed on the system?	The system displays data on bidding potential, bidding activity, realization of won projects as well as updated documents for bidding purposes. The system also displays reports from each of these activities and also provides a dashboard that displays the winning ratio of bidding, project realization versus project value obtained and control of each bidding activity.

Specify the Context of Use

Based on the results of interviews and observations, it was found that the system design process will include 3 Users, namely Super admin, Bidding Manager, and Bidding Champion. Furthermore, the analysis will be described in the form of a use-case diagram which is an overview of the model of system interaction with users used to determine the system's functional needs (O. Fitria et al., 2016).

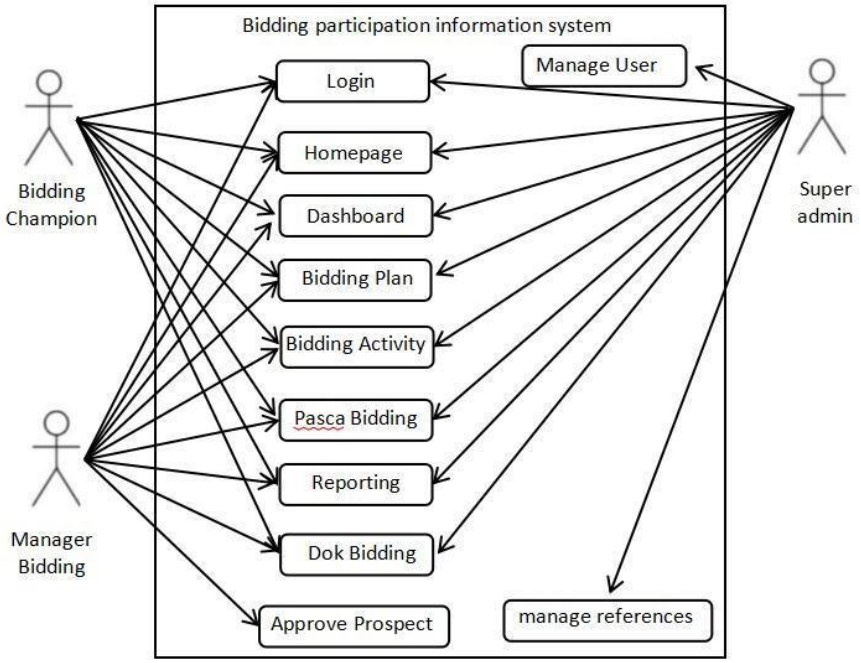


Figure 2 Use Case Diagram Bidding Participation Information System

Specify User and Organization Requirements

Stages that aim to find out the needs and determine the functional requirements for the user's system. The result of the analysis at this stage is how the level of access rights of each system user is the need for system functionality. Of the three users who will operate the system, there are different levels of access to the system depending on the needs and capacity of the user. The following is an explanation of the analysis of the functionality needs of the users:

1. Super admins have access rights in the form of system management, managing user access rights, adding users, managing references, and updating bidding documents.
2. Bid managers have access rights to approve bid lead submissions, view reports and dashboards.
3. Bid Champion has access rights in the form of bidding prospect data input, bidding activity update input, post-bidding data input, bidding document download, viewing reports, and dashboards

Product Design Solutions

The design of the tender participation information system interface is as follows:

Figure 3 Mockup Login Page

Figure 4 Mockup Homepage & dashboard

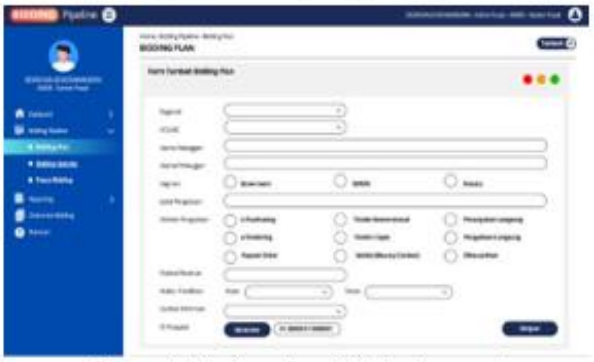


Figure 5 Mockup Input Data Prospect

Figure 6 Mockup Update Bidding Activity

Figure 7 Mockup Input update Pasca Bidding

Figure 8 Mockup Reporting Prospect Bidding

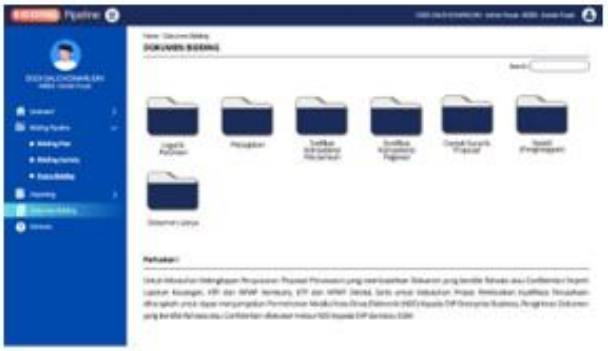


Figure 9 Mockup Download Dokument

Figure 10 Mockup Reporting Project Realization

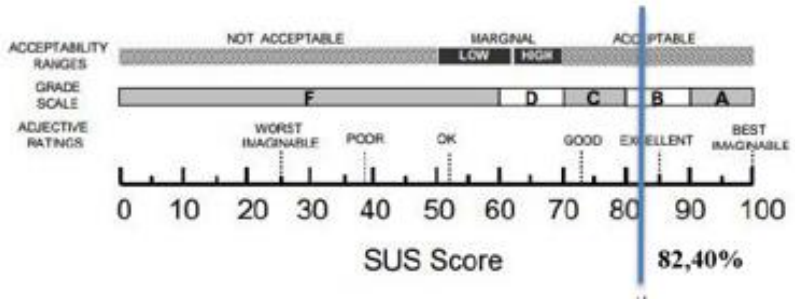
4. Evaluation Design

The design evaluation stage is the testing stage to assess and provide improvements to the interface design that has been created. This stage uses usability testing by providing an assessment of four criteria, namely Understandability, Learnability, Operability, and Attractiveness. The assessment was carried out by distributing a questionnaire to the users of the system, namely the bidding manager and bidding champion.

Table 3 Results of Usability Questioner Calculation

Criteria	Calculation	Percentage
Understandibility	(329/400X100)	82,25%
Learnability	(326/400X100)	81,50%
Operability	(250/300X100)	83,33%
Attractiveness	(165/200X100)	82,50%
Overall System Total	(1070/1300X100)	**82,40%**

From Table 3, it can be seen that the results of the calculation of the percentage index for each criterion with the average value of the entire system were obtained with a value of 882.40%.



Based on Figure 11 Interpretation of SUS scores on calculation results, the tender participation information system built obtained acceptable results for acceptability ranges, meaning that the system was easily accepted by users. For the grading scale, it gets a B value, which means that the value scale for the system is good, while the adjective ratings, it gets excellent results. So, it can be concluded that the system that will be made is quite easy to operate, can be accepted by users, and successfully designs an information system with good usability.

5. Implications and Direction for Future Research

The implementation of the User-Centered Design Method in designing the Web-Based Auction Participation Information System at PT Pos Indonesia has provided many significant implications. First, this approach has improved the overall user experience by ensuring that user needs and

preferences are prioritized at every stage of development. Second, the active participation of users in the design process has allowed for more accurate and efficient identification and troubleshooting, ultimately improving the efficiency and effectiveness of the system. Third, the use of this method also has the potential to increase user adoption and satisfaction rates, as the system is designed to truly match their expectations and needs.

Based on the results of this study, there are several directions that can be used as a focus for future research. First, further research can be conducted to test and evaluate the effectiveness of user-centered design methods in the context of other information systems, in order to generalize these findings. Second, a deeper exploration of the integration of the latest technologies, such as artificial intelligence and machine learning, into auction participation information systems could provide new insights into how they can improve performance and user experience. Third, longitudinal studies that observe the long-term impact of implementing user-centered design on user satisfaction and retention can provide more comprehensive data on the benefits of this method. Finally, research on the adaptation and adaptation of these methods in various cultural and organizational contexts can also provide practical guidance for the broader application of user-centered design.

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