
Mobile Platform for Building Permit Applications at the Integrated Services Office Medan City

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ABSTRACT

The advancement of computer technology has developed rapidly and has been applied in various aspects of life. At that time, computers were considered one of the most efficient tools in supporting technological development. At the Office of Investment and One-Stop Integrated Services (OI-OIS) in Medan City, the process of applying for Building Permits (BP) was still conducted manually and had not been computerized, resulting in slow and inefficient licensing processes. Applicants were required to fill out forms manually and deliver physical documents to the village and sub-district offices, which extended processing times. Furthermore, application reports were often piled up, hindering prompt and accurate handling. The lack of efficiency in managing applicant data further exacerbated the situation and slowed down the completion of applications. Therefore, an integrated digital system was needed to expedite and facilitate the submission and management of IMB applications. This research aimed to develop an Android-based Information System for Building Permit Applications at DPMPTSP in Medan City using the R&D (Research and Development) method. It was hoped that this application would make it easier for staff to manage IMB application data. The research results indicated that the development of the Android-based Information System for Building Permit Applications successfully addressed the issues encountered in the previously manual IMB application process. This application expedited and simplified the filling out and submission of applications, eliminating the need for applicants to deliver physical documents. Additionally, the management of applicant data became more efficient and computerized, reducing the backlog of reports and speeding up the verification process.

Keywords: Android, Building Permit (BP), Computer Technology, Data Management

INTRODUCTION

Modern civilization was significantly influenced by advances in science and information technology (Tamimi & Munawaroh, 2024). To improve performance standards, it was important to understand these developments (Margolang & Fakhriza, 2024). The use of computer technology has progressed rapidly and is considered essential in various aspects of life (Batubara & Nasution, 2023). Computers were one of the results of technological advancements that proved to be highly efficient (Prabowo, 2020).

At the Office of Investment and One-Stop Integrated Services (OI-OIS) of Medan City, the process of filling out and submitting applications for Building Permits (IMB) was still conducted manually and had not yet been computerized. This resulted in a slow and obstructed licensing process, compounded by a backlog of disorganized application reports. The submission of building permit approval applications was still carried out manually by filling out forms provided by the DPMPTSP of Medan City. After that, applicants were required to deliver the forms along with other necessary requirements to the village office, and then to the sub-district office in the area where the building permit was applied. In this process, reports from the village and sub-district offices were necessary to verify the building permit. The manual management of applicant data and building permit applications further exacerbated the situation.

The Investment and One-Stop Integrated Services Agency of Medan City, affiliated with the government, was responsible for establishing the authority of regional autonomy in managing matters related to investment and licensing services in Medan City (Hsb & Lubis, 2023). Before implementing the information system, all licensing services were managed by the licensing division at the DPMPTSP of Medan City in a conventional manner, which had not yet been computerized.

After conducting interviews with the managers of building permit applications, the researcher provided a solution to develop a system for the building approval application process, in the form of an Android-Based Building Permit Information System. This information system was designed so that applicants could access information related to

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types, application requirements, licensing, and the administrative process of permit completion. The researcher used an Android-based system to ensure easy access through mobile devices for the managers of building permit data. This system was equipped with a database to store the data of Building Permit Approvals (BPA) in a more organized manner and to facilitate data retrieval. With the implementation of the Android-based digital system, it was expected to resolve the identified problems.

LITERATURE REVIEW

Based on previous research conducted by (Hasnah, 2019) on the Licensing Management Information System at the Office of Investment and One-Stop Integrated Services (OI-OIS) in Gowa Regency, it was found that the management information system-based services at OI-OIS Gowa Regency had generally operated well. However, there were still some weaknesses in other processes. The technology used in the system was not yet fully optimal, as the available devices and supporting facilities were insufficient and did not fully meet the needs.

Subsequently, research conducted by (Kurniawan et al., 2021) focused on the development of an Android-Based Licensing Submission Information System and Application (Case Study: Office of Investment and One-Stop Integrated Services in Ponorogo Regency). The study began with validation testing to assess the alignment of the predefined features with the developed features. However, during the design phase, which used the object-oriented paradigm, there were challenges in implementing the framework using Laravel, as the paradigm was supposed to reference object class usage.

This research presented several differences and innovations compared to previous studies. In (Hasnah, 2019) research, although the licensing management information system in Gowa Regency was functional, there were still issues with the availability of suboptimal devices. Meanwhile, (Kurniawan et al., 2021) study developed an Android-based system in Ponorogo Regency but faced technical difficulties in implementing the object-oriented paradigm with the Laravel framework.

This study differed from previous research by developing an entirely Android-based system designed specifically to facilitate the process of applying for Building Permits (BP) in Medan City. The innovations offered included features for monitoring application status, computerized applicant data storage, and online payment options for administrative fees through the application. This system was expected to address the problem of manual report backlogs and speed up the previously slow licensing process.

METHOD

Research Methodology

This study employed the Research and Development (R&D) method as the primary reference for the research approach. R&D served as a tool to test and develop products or services to determine their effectiveness in business within specific industries (Syhranitazli & Samsudin, 2023). R&D, as one of the most rapidly growing research categories, focused on creating or refining products, which did not always refer to physical hardware (Syahputra et al., 2024).

The stages of Research and Development (R&D) included (Hasibuan et al., 2024): first, research and information gathering through literature reviews, interviews, and observations at the DPMPTSP office in Medan City. Second, system design planning for an Android-based information system to assist with Building Permit (BP) applications. Third, the system development process was undertaken. Fourth, initial testing to evaluate the system architecture. Fifth, revisions were made based on evaluations from DPMPTSP. Sixth, feasibility testing was conducted to assess the system's effectiveness. Seventh, final product revisions were made based on feedback from the feasibility test. Lastly, implementation took place to publish and use the developed product.

System Development Methodology

The system was developed using the waterfall technique, which follows a systematic, step-by-step process from requirements gathering to implementation, verification, and maintenance (Zufria et al., 2022). The stages of the waterfall method were as follows (Usla & Ikhwan, 2023):

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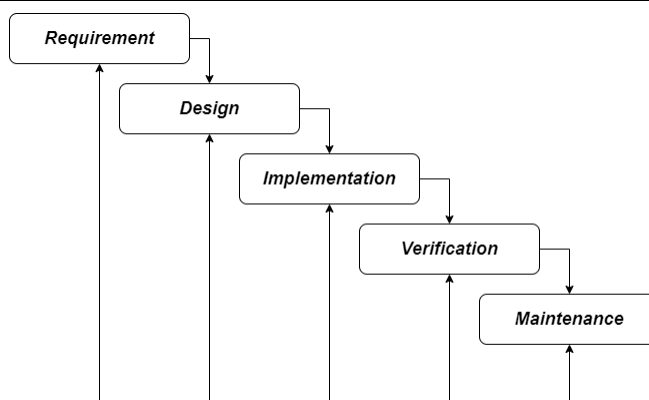


Fig. 1 Waterfall Methode (Siagian et al., 2024)

Requirement Analysis: Data collection was conducted through direct observation of relevant institutions, interviews with related personnel, and literature studies to gather the necessary information.

System Design: At this stage, the researcher designed the system using UML to create flow diagrams and other design elements.

Implementation: The system design was implemented according to the previously developed plans.

Verification: In the final stage, the system was tested to identify any failures or inconsistencies.

Maintenance: Ensured that the implemented system continued to function properly and met user needs. The system was adjusted to accommodate external changes such as technological updates, regulatory changes, or business requirements.

RESULT

Requirements Analysis

Based on the observations and interview with Mr. Feri, the Head of the DPMPTSP Medan, it was found that the conventional method of licensing services prior to the implementation of an information system faced several challenges. The process of applying for a Building Permit (BP), which required applicants to submit physical documents, resulted in slower services, decreased efficiency, and increased risks of document accumulation and administrative errors. Additionally, the management of applicant data, which had not yet been computerized, made the verification process more complicated as it involved multiple parties, ultimately prolonging the licensing process. The lack of integration between related agencies, such as the local district offices and DPMPTSP, further complicated coordination and potentially lowered the quality of service. It was concluded that the application process within the agency remained manual, requiring applicants to complete forms and meet requirements in physical form, as well as visit the office to submit applications, which were still handled in printed paper format.

In the proposed system analysis, applicants were first required to complete the necessary requirements and forms provided, as well as pay the required fees. Applicants could either access the requirements through the website or visit the office in person. Afterward, they were asked to be present for a field inspection. Upon completion of the inspection, applicants proceeded with payment as the final step towards obtaining approval. The staff was responsible for processing the submitted forms, generating reports, conducting field inspections, and determining whether the application for the permit was approved or rejected. If approved, the staff would issue the Building Permit Decision Letter (SK). The Head of the Department would then review the completeness of the application documents, issue the SK, and sign it as the final approval for the licensing process.

System Design

The system design utilized UML as a visual modeling method, which was used as a tool for designing object-oriented systems (Kamil et al., 2024). In this study, the author employed use case diagrams to illustrate the system design.

The diagram below represented a use case diagram illustrating the activities performed by the actors and the admin within the developed system. The diagram depicted the roles of the actors, namely the applicant, staff, and department head.

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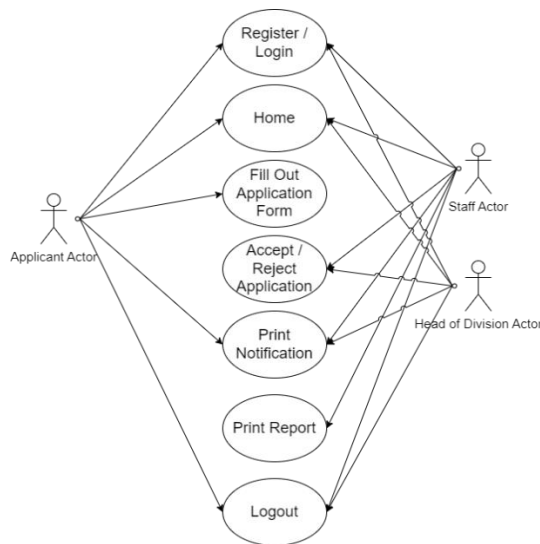


Fig. 2 Use Case Diagram

Implementation

User Homepage Display

The image below represented the applicant's homepage for submitting application.

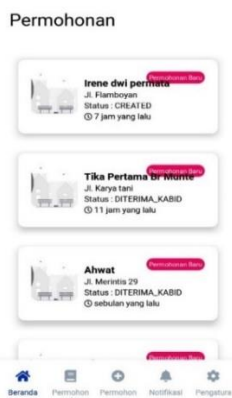


Fig. 3 User Homepage Display

My Applications Menu Display

The display below represented the homepage of the application menu, where the data that had been submitted was stored in the "My Applications" menu.



Fig. 4 My Applications Menu Display

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Application Menu Display

The image below represented the application menu display for submitting applications or types of applications, where the user filled out the form provided in the designated field. The data was then saved to submit the application.

Fig. 5 Application Display

Implementation of Admin as Staff

Approval Menu Display

The image below represented the approval menu display for the staff, which was used to review the completeness of the data.

Fig. 6 Approval Menu Display

Implementation of the Head of Division

Home Display

The image below represented the home display of the head of the division, which featured several menus.

Fig. 7 Home Display of the Head of Division

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Approval Menu Display

The image below represented the approval display for the Head of Division to either accept or reject the application.

Menunggu Persetujuan



Fig. 8 Approval Display for the Head of Division

Verification

At this stage, the system was tested to determine whether it functioned properly. Below are the results of the tests that were validated by the validator. The testing was conducted by Muhammad Nurul Al-Amin, who served as the Spatial Planning Analyst.

Table 1 System Testing Table

Design Plan	Desired Outcomes	Validation
Access Application	Access Main Page	√
Register (Sign Up)	Access Registration Page (Sign Up)	√
Open Application	Login Screen	√
Main Page Dashboard	Successful Registration Displays the Dashboard	√
View Applicant Data List	Display Stored Data	√
Submitting Application	Displays Application Data Form	√
Open Notifications	Display Notifications	√
Applicant Approval	Responding to Applications	√
Received Files are Stored	Printing Report	√
Responding to Files	Incoming Notifications Display	√
Granting Approval	Responding to Application Accepted/Rejected	√
Response Notification	Notification Display	√
Logout	Access the Logout Page	√

In software testing, the Black Box Testing method was an approach where testing was conducted without examining the internal structure or logic of the program or system (Pratiwi et al., 2024). Based on the results of the testing, the system operated effectively; the user interface and buttons functioned as expected.

DISCUSSIONS

The development of the fully Android-based system was designed to facilitate the process of applying for Building Permits (IMB) in Medan City. The innovations offered by this system included several important features, such as monitoring application status, computerized storage of applicant data, and online payment options for administrative fees through the application. With these features, the system addressed the issues of manual report backlogs and expedited the previously slow licensing process.

The recommendations that could be derived from this research were based on the findings, analysis, and conclusions obtained during the study process. Although the methods used at that time had several limitations and had not achieved perfection, the author believed that there was significant potential for improvement and development in the future. One proposed recommendation was the addition of a complaint submission feature within the system. With

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this feature, applicants or relevant parties who experienced issues or obstacles during the application process could report them easily. It was hoped that this feature would enhance user satisfaction, accelerate problem resolution, and create a more responsive and efficient service system. Furthermore, the author encouraged conducting regular reviews to continue developing and adjusting the system in accordance with the needs and challenges that might arise in the future.

CONCLUSION

Based on the results of testing using the black box testing method, the system functioned well and aligned with the initial design. This research demonstrated that the development of the Android-based Building Permit Application Information System successfully addressed the issues encountered in the previous manual BP application process. The application expedited and simplified the submission process, eliminating the need for applicants to deliver physical documents. Additionally, the management of applicant data became more efficient and computerized, reducing report backlogs and speeding up the verification process.

REFERENCES

- Batubara, M. Z., & Nasution, M. I. P. (2023). Sistem Informasi Online Pengelolaan Dana Sosial Pada Rumah Yatim Sumatera Utara. *Jurnal Teknologi Dan Sistem Informasi Bisnis*, 5(3), 164–171.
- Hasibuan, N. F., Putri, R. A., & Harahap, A. M. (2024). E-Commerce Application with Web Engineering Method Website Based. *Journal Of Computer Networks, Architecture and High-Performance Computing*, 6(1), 179–190.
- Hasnah. (2019). *SISTEM INFORMASI MANAJEMEN PERIZINAN PADA DINAS PENANAMAN MODAL DAN PELAYANAN TERPADU SATU PINTU DI KABUPATEN GOWA*.
- Hsb, N. S. R., & Lubis, A. W. (2023). Menganalisis Efektifitas Sistem Pengendalian Internal terhadap Pelayanan Publik pada Bidang Perizinan di Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu Kota Medan. *VISA: Journal of Vision and Ideas*, 2(3), 47–55.
- Kamil, M. A., Suendri, S., & Alda, M. (2024). PENGEMBANGAN SISTEM INFORMASI MANAJEMEN DATA PRODUK TOKO SECONDARYSHOE DENGAN PENERAPAN METODE EOQ BERBASIS WEB. *Jurnal Responsif: Riset Sains Dan Informatika*, 6(1), 103–113.
- Kurniawan, A. D., Purnomo, W., & Kariyoto, K. (2021). Pengembangan Sistem Informasi dan Aplikasi Pengajuan Izin berbasis Android (Studi Kasus: Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu Kabupaten Ponorogo). *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer (J-PTIIK)*, 5(10), 4602–4611.
- Margolang, R. S., & Fakhriza, M. (2024). Penentuan Desa Terbaik dengan Menerapkan Kombinasi Metode ROC dan SMART. *Journal of Computer System and Informatics (JoSYC)*, 5(4), 1097–1107.
- Prabowo, A. (2020). Aplikasi E-Commerce Seragam Olahraga Pada Koperasi Hasanka Berbasis Web. *Jurnal Sains Komputer Dan Teknologi Informasi*, 3(1), 123–127.
- Pratiwi, E., Triase, & Sinaga, I. A. (2024). Integrating Augmented Reality and Simulation Game for Flower Board Design. *Journal Of Computer Networks, Architecture and High-Performance Computing*, 6(2), 522–532.
- Siagian, Y. B., Santoso, H., & Irawan, M. D. (2024). Scheduling Inmate Learning: Implementation of Genetic Algorithm at LPKA Class I Tanjung Gusta Medan. *Journal of Information Technology*, 4(1), 132–142.
- Syahputra, M. D. A., Santoso, H., & Sibarani, F. H. (2024). Implementasi Sistem Pengelolaan Persediaan dengan Algoritma FIFO Pada Gudang Sparepart Sepeda Motor. *Jurnal Teknologi Dan Sistem Informasi Bisnis (JTEKSIS)*, 6(1), 168–176.
- Syahrani, S., & Samsudin, S. (2023). Sistem Informasi Geografis Persebaran Pondok Pesantren Kabupaten Langkat dan Binjai Menggunakan Leaflet. *Jurnal Pendidikan Teknologi Informasi (JUKANTI)*, 6(1), 124–138. <https://doi.org/10.37792/jukanti.v6i1.925>
- Tamimi, F., & Munawaroh, S. (2024). Teknologi Sebagai Kegiatan Manusia Dalam Era Modern Kehidupan Masyarakat. *Saturnus : Jurnal Teknologi Dan Sistem Informasi*, 2(3), 66–74.
- Usla, J. U., & Ikhwan, A. (2023). Web Based Social Assistance Distribution Monitoring System Using Waterfall Method. *Journal Of Computer Networks, Architecture and High-Performance Computing*, 5(1), 120–128.
- Zufria, I., Harahap, A. M., & Wardani, D. A. (2022). Sistem Informasi Objek Pajak Bumi Dan Bangunan Sektor Pedesaan Dan Perkotaan Pada Badan Pengelola Pendapatan Daerah Kabupaten Asahan. *J-SAKTI (Jurnal Sains Komputer & Informatika)*, 6(1), 148–160.

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