



Vehicle Warranty Data Information System at PT. Capella Dinamik Nusantara In Banda Aceh

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Abstract

This research aims to analyze the weaknesses and shortcomings of the current information system in motorcycle warranty management at PT. Capella Dinamik Nusantara, as well as design and propose a new information system that is more efficient and effective. The research methods used include observation, interviews, and document analysis. The results show that the current information system faces several obstacles, such as inadequate application systems, lack of motorcycle warranty data availability, and insufficient human resources, especially in the field of Information Technology. Therefore, this research proposes a new integrated information system for motorcycle warranty management, with features such as user creation and approval settings by administrators, motorcycle warranty document creation, and motorcycle warranty certificate processing by administrators. Additionally, this research also designs a data structure that includes admin, customer, and motorcycle warranty tables. With the implementation of this new information system, PT. Capella Dinamik Nusantara is expected to improve the efficiency and effectiveness of motorcycle warranty management and enhance the accuracy of warranty data reports.

Keywords

Information System; Motorcycle Warranty; Efficiency; Effectiveness; Data Management.

1 | INTRODUCTION

In the rapidly evolving era of digital transformation, the role of information technology has undergone fundamental changes in business and management. The development of information technology systems is no longer merely a trend but has become an urgent necessity for companies to remain competitive and survive in an increasingly competitive market. Information systems now serve as a primary pillar in decision-making processes across various management levels rather than just functioning as support tools. With appropriate information technology support, management can obtain relevant, accurate, and up-to-date information to perform various company functions more effectively and efficiently. The use of computers as the primary tool in data processing has become commonplace, enabling companies to store, manage, and analyze data more quickly and accurately. The concept of a "system" refers to a unified entity consisting of interrelated elements working together to achieve specific objectives. Etymologically, the word "system" originates from the Greek word "systema," meaning unity or entirety of interconnected parts. This definition indicates that a system not only consists of interacting components but also exhibits dependencies among them. A system can be disrupted if one of its parts or subsystems fails to function properly. As Jogiyanto HM states, a system is a unity consisting of two or more components or subsystems that interact to achieve a goal. Additionally, Jerry Fitzgerald defines a system as a network of interconnected procedures united to perform an activity or achieve a specific goal.

Information, within the context of information systems, represents the result of data processing that holds value and meaning for its recipients. Jogiyanto HM explains that information is data processed into a more useful and meaningful form for its recipients, beneficial for decision-making in the present or future. In an information system, information is processed from less meaningful data forms into more meaningful and useful forms. The information system itself is an integrated and systematic set of components that support or perform operational functions, management, and information presentation to support company management. System analysis is the process of detailing an information system into its component parts to identify, evaluate, and understand problems, opportunities, obstacles, and expected needs to propose improvements. McLeod defines system analysis as the investigation of an existing system to design a new or updated system. The basic steps in conducting system analysis include problem identification, understanding the existing system's operation, system analysis, and reporting analysis results. Despite many companies transitioning to computerized information systems, challenges remain in optimizing their use. One common problem is related to the complexity and limitations of the systems employed. Many companies, including PT. Capella Dinamik Nusantara in Banda Aceh, still face obstacles in accessing required information quickly and efficiently. The information systems used remain rudimentary, causing slow and inefficient processes for searching, processing, and presenting data.

In the context of PT. Capella Dinamik Nusantara, a company engaged in vehicle sales, the issue of vehicle warranty data management becomes crucial. In its operations, PT. Capella Dinamik Nusantara is required to obtain information about vehicle warranties quickly and accurately to support various business activities. However, the data collection system, which is still manual and inadequately computerized, hinders the company's effectiveness and efficiency in managing this information. Therefore, this research aims to address this problem by designing and implementing a more sophisticated and efficient vehicle warranty data information system. Using Microsoft Visual Basic .NET as the application development platform, the designed information system is expected to provide an appropriate solution for PT. Capella Dinamik Nusantara in optimizing the vehicle warranty data collection process. Vehicle warranty is a promise given by manufacturers to consumers regarding the quality, service, and repair of their products. Blischke and Murthy explain that warranty is a contractual agreement between manufacturers and consumers, where manufacturers agree to repair or replace products that experience damage during a specified warranty period. Vehicle warranties play an important role in ensuring consumer satisfaction and building trust in the products sold. Motor vehicles are any vehicles driven by mechanical equipment, except those running on rails. Types of motor vehicles include motorcycles, passenger cars, and buses. Each type of motor vehicle has different specifications and characteristics, requiring different maintenance and upkeep. Spare parts are items consisting of several components that form a unity and have specific functions in motor vehicles. Spare parts can be new or used components, used to replace or repair vehicle parts that experience damage or wear. Each spare part has its own function and can be related to or separate from other spare parts.

The basic concept of information systems refers to the organized collection of data along with procedures for its use, which goes beyond mere data presentation. Tafri D. Muhyuzir describes an information system as a collection of data that is gathered, grouped, and processed in such a way that it becomes a unified, interconnected, and supportive body of information that is valuable to its recipients. Tata Sutabri adds that an information system is a system within an organization that combines the needs of daily transaction processing that supports the operational functions of the organization with the strategic activities of the organization to provide necessary reports. Visual Basic .NET is one of the programming languages included in Microsoft Visual Studio. Visual Basic .NET has various user interface

components that facilitate the development of Windows-based and web applications. These components include menu bars, toolbars, toolboxes, form windows, code windows, solution explorer windows, and property windows. By using Visual Basic .NET, developers can create applications with attractive interfaces that function according to user needs, as outlined by Wali (2017) in his work on building Windows applications with Visual Basic .NET. This research is supported by various previous studies in related fields. Ramadhany (2017) developed a decision support system for determining the purchase of Mitsubishi brand cars at PT. Mahakam Berlian Samjaya Samarinda using the Simple Additive Weighting method. Nofiyani (2020) focused on improving service and accountability through information system development in motor vehicle service administration. Supriatna and Rima (2022) designed an equipment information system using Object Oriented Analysis and Design with the Rational Unified Process model. These studies provide valuable insights and methodologies that can be applied to the development of the vehicle warranty data information system at PT. Capella Dinamik Nusantara. Additionally, studies by Eriska (2022) on the implementation of Khiyār ta'yin in used car transactions, Ranjani (2022) on the design of a sales information system at PT DKSH based on Java Netbeans, and Khasanah (2017) on the evaluation of accounting information systems at SIS Motor Srengat Blitar provide practical perspectives on information system implementation in automotive-related businesses. Hawadah (2021) evaluated the Community Health Center Management Information System (SIMPUS) in improving the quality of health services, which offers insights into information system evaluation methodologies applicable to our study.

Furthermore, research by Erni, Sriwana, and Karisa (2013) on improving service quality using the Servqual method and Quality Function Deployment, Ansyah and Saragih (2021) on designing a web-based preventive maintenance information system in manufacturing companies, and David (2016) on developing a web-based doctor consultation registration administration information system to facilitate queuing provide valuable frameworks for enhancing service quality through information systems. Ripana (2020) and Toyib and Hasugian (2022) offer additional perspectives on information system implementation in different contexts. Technical references for the development of the proposed system include works by Crouch (2002), Morrison and Cornell (2008), Blair *et al.* (2004), and Kauffman *et al.* (2004), which provide comprehensive guidance on programming with VB.NET and ASP.NET, essential technologies for developing the proposed vehicle warranty data information system. Through this research, we hope to contribute positively to the company in improving its operational performance and addressing challenges in facing increasingly fierce market competition. The implementation of a more efficient and effective vehicle warranty data information system is expected to enhance PT. Capella Dinamik Nusantara's ability to manage warranty information, improve customer service, and ultimately strengthen its position in the competitive automotive market in Banda Aceh.

2 | BACKGROUND THEORY

In the context of information systems development, a solid theoretical foundation is essential to guide the design, implementation, and evaluation processes. The development of a vehicle warranty data information system for PT. Capella Dinamik Nusantara requires a comprehensive understanding of various theoretical concepts spanning information systems, software development methodologies, decision support systems, service quality, and programming technologies. Information systems serve as the backbone of modern business operations, enabling organizations to efficiently collect, process, store, and retrieve data to support decision-making processes. As highlighted by Wali (2017), information systems have evolved from simple data processing tools to sophisticated platforms that integrate various business functions and provide actionable insights. The vehicle warranty data information system being developed for PT. Capella Dinamik Nusantara aims to transform the company's warranty management processes by replacing manual procedures with a computerized system that enhances efficiency, accuracy, and service quality.

Decision support systems (DSS) represent a specialized category of information systems designed to assist management in making informed decisions. Janarko *et al.* (2022) emphasize the importance of DSS in supplier selection using the Simple Additive Weighting method, which provides a structured approach to evaluating alternatives based on multiple criteria. This methodology can be adapted to the warranty management context, particularly in assessing warranty claims and determining appropriate responses. Similarly, Ramadhany (2017) demonstrates the application of decision support systems in the automotive sector, specifically for determining vehicle purchases, which shares conceptual similarities with warranty management decisions. Service quality is a critical dimension in warranty management, as it directly impacts customer satisfaction and loyalty. Budiarto and Santoso (2020) analyze service quality using Service Performance, Lean Service, and Importance Performance Analysis methodologies, providing valuable insights into measuring and improving service delivery. These approaches can be integrated into the warranty data information system to ensure that the system not only manages data efficiently but also enhances the overall service experience for customers. This aligns with Nofiyani (2020) findings on improving service and accountability through information system development in motor vehicle service administration, highlighting the potential of well-designed information systems to elevate service quality.

The technical implementation of the vehicle warranty data information system relies heavily on programming technologies, particularly Visual Basic .NET and ASP.NET. Crouch (2002) provides a comprehensive guide to ASP.NET and VB.NET web programming, outlining the fundamental concepts and techniques for developing web-based applications. Morrison and Cornell (2008) offer insights for experienced programmers transitioning to VB.NET, emphasizing the language's capabilities for building robust business applications. Blair *et al.* (2004) present a beginner's perspective on VB.NET, making it accessible for developers with varying levels of expertise, which is valuable for ensuring that the system can be maintained and enhanced by different team members over time. Database integration is a crucial aspect of the warranty data information system, as it determines the system's ability to store, retrieve, and analyze warranty-related data effectively. Kauffman *et al.* (2004) explore the integration of ASP.NET with databases using VB.NET, providing practical guidance on creating data-driven applications. This knowledge is essential for developing a system that can handle the complex data requirements of warranty management, including customer information, vehicle details, warranty terms, and claim histories. The web-based nature of modern information systems necessitates a solid understanding of web programming principles. Harris and Macdonald (2002) discuss the transition to ASP.NET for web development with VB.NET, highlighting the advantages of this platform for creating interactive and user-friendly web applications. Cazzulino *et al.* (2005) provide a comprehensive guide to visual web programming in VB.NET, covering aspects from basic concepts to advanced techniques, which is valuable for designing an intuitive user interface for the warranty data information system.

The development of a robust and maintainable system requires adherence to software engineering principles and best practices. Wali (2020) outlines these principles in the Software Engineering Practicum Module, emphasizing the importance of systematic development processes, thorough testing, and comprehensive documentation. These practices ensure that the warranty data information system not only meets the immediate needs of PT. Capella Dinamik Nusantara but also remains adaptable to future requirements and technological changes. Advanced programming concepts and language features are essential for developing a sophisticated warranty data information system. Evjen and Hollis (2004) delve into professional VB.NET programming, covering advanced topics that enable the creation of high-performance applications. Roman *et al.* (2002) provide a concise reference to VB.NET language features, which is invaluable for developers implementing complex business logic within the system. These resources ensure that the system can handle the intricate processes involved in warranty management, from initial registration to claim processing and reporting. The integration of Microsoft Office applications with the warranty data information system can enhance its functionality and user acceptance. Wali (2018) explores Microsoft Office Add-ins, demonstrating how custom functionality can be added to standard Office applications. This capability is particularly relevant for generating warranty documents, reports, and analyses that can be easily shared and understood by various stakeholders within and outside the organization.

The legal and compliance aspects of vehicle ownership and taxation, as studied by Atmoko (2020), provide important context for the warranty management system. Understanding the knowledge and awareness factors that influence taxpayer compliance with motor vehicle taxes can inform the design of the warranty system, particularly in terms of data collection, verification, and reporting requirements. This ensures that the system not only serves the operational needs of PT. Capella Dinamik Nusantara but also facilitates compliance with relevant regulations and legal obligations. The evaluation of existing information systems, as demonstrated by Khasanah (2017) and Hawadah (2021), provides valuable methodologies for assessing the effectiveness of the warranty data information system once implemented. These approaches can be incorporated into the project plan to ensure continuous improvement and alignment with business objectives. Similarly, the design methodologies employed by Supriatna and Rima (2022), particularly Object Oriented Analysis and Design with the Rational Unified Process model, offer structured approaches to system development that can enhance the quality and maintainability of the warranty data information system. The implementation of e-commerce systems, as explored by Toyib and Hasugian (2022), provides insights into online transaction processing that can be adapted for warranty registration and claim submission processes. This can enhance the accessibility and convenience of the warranty system for both customers and staff, potentially leading to improved service delivery and customer satisfaction. The development of a vehicle warranty data information system for PT. Capella Dinamik Nusantara draws upon a rich tapestry of theoretical concepts and practical methodologies from information systems, software engineering, service quality management, and programming technologies. By integrating these diverse perspectives, the system aims to transform warranty management processes, enhance operational efficiency, improve service quality, and ultimately contribute to the company's competitive advantage in the automotive market.

3 | METHOD

The research methodology employed in this study aims to develop and design a vehicle warranty data

information system at PT. Capella Dinamik Nusantara in Banda Aceh. This methodology encompasses systematic steps for data collection, analysis of obtained information, and design of an information system that meets the company's requirements. Library research is conducted to gain a comprehensive understanding of the fundamental concepts of information systems, system analysis, the application of Visual Basic .NET in application development, as well as vehicle warranty concepts and principles. Data is collected from books, journals, articles, and other reference sources relevant to this research topic. The information obtained from library research serves as the foundation for formulating the concept and design of the vehicle warranty data information system. This approach ensures that the system development is grounded in established theoretical frameworks and best practices in the field of information systems development. Field research is carried out through direct observation and interviews with relevant parties at PT. Capella Dinamik Nusantara in Banda Aceh. The purpose of this field research is to gain an in-depth understanding of the current vehicle warranty data collection process, the challenges faced, and the company's needs and expectations regarding the information system to be developed. The data obtained from field research forms the basis for designing an information system that aligns with the company's requirements and conditions. This direct engagement with the operational environment ensures that the developed system addresses real-world challenges and provides practical solutions.

In addition to interviews, direct observation of work processes and routines at PT. Capella Dinamik Nusantara is also conducted. This observation aims to obtain a deeper understanding of the company's operational processes, organizational structure, and potential issues that can be identified. The data gathered from observation provides valuable input in designing an effective and efficient information system. By witnessing firsthand the workflow and operational challenges, the researchers can identify bottlenecks and inefficiencies that might not be apparent through interviews alone. Interviews are conducted with relevant parties at PT. Capella Dinamik Nusantara, particularly with the administrative department involved in the vehicle warranty data collection process. These interviews focus on understanding the current vehicle warranty data collection process, the challenges faced, and the company's expectations for the information system to be developed. The data obtained from interviews serves as the foundation for formulating the requirements and specifications of the information system. This direct engagement with stakeholders ensures that their perspectives and needs are properly captured and addressed in the system design. After data collection, the next step involves analyzing the information obtained from various sources and designing a vehicle warranty data information system that aligns with the company's needs and conditions. The information system development process encompasses design, coding, testing, and system implementation phases. Throughout the development process, continuous evaluation and improvement are carried out to ensure that the designed information system functions properly and meets the company's expectations. This iterative approach allows for refinements based on feedback and testing results, ultimately leading to a more robust and user-friendly system that effectively addresses the vehicle warranty data management challenges at PT. Capella Dinamik Nusantara.

4 | RESULT AND DISCUSSION

4.1 Results

Based on the results of the research conducted, several weaknesses were found in the motorcycle warranty management system running at PT. Capella Dinamik Nusantara. Although it has been computerized with the AHASS Information System service, there are still several obstacles that need to be fixed. One of the shortcomings is the lack of availability of an adequate application system for the motorcycle warranty data collection process in the service. This is a common obstacle in the management information system, and in-depth system analysis and system development are needed to fix the existing weaknesses and deficiencies. In addition, another deficiency is the lack of availability of motorcycle warranty data in the field. This is one of the problems in the administration of motorcycle warranties. Another obstacle faced is the lack of human resources, especially warranty managers who have a background in Information Technology. This limitation can hinder the efficiency and effectiveness of the motorcycle warranty management process as a whole. In conducting an analysis of the motorcycle warranty management information system, the system design steps are very important. System analysis is the stage after the analysis of the system development cycle which is defined from functional needs. At this stage, sketches or arrangements are made from several separate elements into a whole, functional, and useful unit. The design of a motorcycle warranty management information system at PT. Capella Dinamik Nusantara aims to produce a product in the form of an application program that is able to handle warranty data processing efficiently. The proposed solution in designing this system includes several important aspects, such as creating users and setting approvals by administrators, using desktop-based application technology, creating motorcycle warranty documents by users, and processing motorcycle warranty certificates by admins. The data structure design has also been designed to facilitate the management of admin, customer, and motorcycle warranty data.



Figure 1. Main Menu Form

KODEGARANSI	KODEPELANGGAN	TANGGAL	KM	PEKERJAAN	NOACS	NAMAACS
GR001	C0078043	15/9/2015	10000	SERVICE	-	-

Figure 2. Motorcycle Warranty Data Input Form

Tgl. Pemeriksaan	Jarak Tempuh Terakhir(km)

Figure 3. Print Output Form Print Data Care Card Data

In addition, the design of the motorcycle warranty management information system also includes various necessary features and functions, such as the login menu form, main menu form, customer data input form, motorcycle warranty data input form, and user data input form. With the integrated information system design, it is expected that the motorcycle warranty management process can be carried out more efficiently and effectively. Analysis of the efficiency and effectiveness of the new information system shows an increase in data management, operational cost savings, and the provision of more accurate information to company leaders. Thus, the development of a motorcycle warranty management information system at PT. Capella Dinamik Nusantara is a strategic step to improve the company's operational performance and efficiency. With an integrated and efficient system, it is expected that PT. Capella Dinamik Nusantara can optimize the motorcycle warranty services provided to customers, as well as increase overall customer satisfaction.

4.2 Discussion

The research findings reveal significant challenges in the motorcycle warranty management system at PT. Capella Dinamik Nusantara, despite the existing computerization through the AHASS Information System service. These findings highlight the need for a comprehensive system redesign to address the identified shortcomings and enhance operational efficiency. One of the primary deficiencies identified is the absence of an adequate application system specifically designed for motorcycle warranty data collection in the service department. This gap represents a fundamental weakness in the company's information management infrastructure. While the AHASS system provides basic functionality, it lacks the specialized features required for efficient warranty processing. This finding aligns with common challenges in management information systems where generic solutions often fail to address industry-specific or organization-specific requirements. The situation necessitates a tailored approach to system development that considers the unique warranty management processes at PT.

Capella Dinamik Nusantara. Another critical issue uncovered is the insufficient availability of motorcycle warranty data in the field. This deficiency points to potential problems in data collection procedures, data storage mechanisms, or data accessibility. Without comprehensive warranty data readily available, the company faces challenges in warranty validation, claim processing, and warranty service delivery. This limitation can significantly impact customer satisfaction and operational efficiency, as warranty claims may take longer to process or may be processed incorrectly due to incomplete information. The research also highlights a human resource constraint, particularly the shortage of warranty managers with Information Technology backgrounds. This limitation is particularly problematic in today's digital business environment where technical expertise is essential for effective system utilization and optimization. The lack of IT-proficient personnel can impede the implementation of new systems, limit the company's ability to troubleshoot technical issues, and reduce the potential for continuous system improvement through user feedback and innovation.

In response to these challenges, the research proposes a comprehensive system redesign that incorporates several key components. The development of a desktop-based application technology forms the core of this solution, providing a dedicated platform for warranty management that addresses the specific needs of PT. Capella Dinamik Nusantara. The proposed system includes user management with administrative approval processes, ensuring appropriate access control and security. Additionally, the system enables users to create motorcycle warranty documents and administrators to process warranty certificates, streamlining the warranty management workflow. The implementation of the new system, as evidenced by the development of various forms including the main menu, motorcycle warranty data input, and print output forms, represents a significant improvement over the previous system. These interfaces are designed to facilitate efficient data entry, retrieval, and processing, addressing the core operational needs of warranty management. The print output functionality, particularly for Care Card Data, enhances customer service by providing tangible warranty documentation. The data structure design incorporated into the new system facilitates comprehensive management of administrative, customer, and motorcycle warranty data. This structured approach to data organization ensures data integrity, enables efficient data retrieval, and supports advanced reporting capabilities. By centralizing data management, the system reduces the risk of data inconsistencies and improves overall data quality.

Analysis of the new system's efficiency and effectiveness reveals notable improvements in several areas. Enhanced data management capabilities reduce the time and effort required for warranty processing, leading to operational cost savings. The system also provides more accurate and timely information to company leadership, supporting informed decision-making and strategic planning. These improvements collectively contribute to optimized motorcycle warranty services and increased customer satisfaction. The development of this integrated motorcycle warranty management information system represents a strategic investment for PT. Capella Dinamik Nusantara. By addressing the identified deficiencies in the existing system and incorporating features specifically designed for warranty management, the company is well-positioned to enhance its operational performance and customer service quality. The system's ability to streamline warranty processing, improve data accessibility, and support informed decision-making aligns with contemporary best practices in information systems development and business process optimization. The implementation of the new motorcycle warranty management information system at PT. Capella Dinamik Nusantara addresses critical operational challenges and provides a foundation for improved service delivery. The system's comprehensive design, incorporating user management, data processing, and reporting capabilities, offers a holistic solution to the company's warranty management needs. Moving forward, continued evaluation and refinement of the system will be essential to ensure it remains aligned with evolving business requirements and technological advancements.

5 | CONCLUSIONS AND FUTURE WORK

Based on the observations conducted, several relevant conclusions can be drawn. First, the implementation of the Machine Warranty Data Information System at PT. Capella Dinamik Nusantara Banda Aceh is expected to provide a positive contribution in generating more accurate and effective motorcycle warranty data reports. With this information system in place, the process of data collection and analysis can be performed more quickly and precisely. Second, the implementation of the information system is expected to provide convenience for PT. Capella Dinamik Nusantara Banda Aceh by accelerating the overall flow of information and reducing the potential for human error. With an integrated information system, the motorcycle warranty data processing is expected to operate more efficiently and effectively. Additionally, the use of the new system is also expected to reduce errors that may arise in the data collection process, information management, and resource allocation. With a more sophisticated and structured information system, the error rate can be minimized, thus providing a positive impact on the company's overall performance.

As suggestions for future improvements, the author would like to propose several recommendations. First, to enhance the accuracy and efficiency of data processing, the company needs to further optimize computer usage by not only focusing on software such as Microsoft Office but also considering the use of other software that aligns with the company's needs. Second, the company needs to pay attention to increasing the capacity of human resources (brainware) involved in managing the information system. Training and development of information technology skills for employees need to be enhanced so that they can interact with the information system effectively and optimally. By implementing these suggestions, it is expected that PT. Capella Dinamik Nusantara Banda Aceh can continue to improve its service quality and operational efficiency through better and optimal utilization of information systems.

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