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Application of Artificial Intelligence in the Development of Automated Website Creation to Support Digital Transformation

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Abstract

The rapid advancement of digital technology has encouraged organizations and educational institutions to adopt digital transformation strategies to improve efficiency and service quality. Website development plays a crucial role in supporting this transformation; however, traditional website creation often requires significant time, technical expertise, and continuous maintenance. This study aims to investigate the application of Artificial Intelligence (AI) in automated website development to support digital transformation. The proposed system utilizes Artificial Intelligence and Natural Language Processing (NLP) techniques to automatically generate website content, structure, and layout based on user requirements. A comparative analysis was conducted between conventional website development methods and AI-based automated website generation. The system performance was evaluated using five criteria: website development time, content update efficiency, information accuracy, user satisfaction, and website adaptability. Development time was measured in minutes required to complete a website, content update efficiency by the average time required to publish updates, information accuracy through expert validation, user satisfaction using a 5-point Likert-scale questionnaire based on the System Usability Scale (SUS), and website adaptability by assessing the system's ability to accommodate changing user requirements. Statistical analysis was performed using descriptive statistics and paired sample t-tests ($p < 0.05$) to determine significant differences between the conventional and AI-

based approaches. The results indicate that AI implementation significantly improves website development speed, content update efficiency, information accuracy, user satisfaction, and website adaptability. Furthermore, the automation process reduces administrative workload and enables real-time content updates. The findings demonstrate that AI-based website development provides a more efficient, scalable, and adaptive solution for organizations seeking to accelerate digital transformation. Therefore, the integration of Artificial Intelligence into website development can enhance operational effectiveness and improve digital service delivery.

Keywords: Artificial Intelligence, Automated Website Development, Digital Transformation, Natural Language Processing, Website Automation.

1. Introduction

In the current era of digital transformation, the demand for fast, efficient, and accessible website development has increased significantly across various sectors, including business, education, and government. Organizations are increasingly required to establish a strong digital presence to improve communication, service delivery, and operational efficiency. However, conventional website development still requires technical expertise in programming, interface design, database management, and system configuration, creating substantial barriers for users with limited technical skills and slowing digital adoption [1], [2], [3].

Various technologies have been introduced to simplify website development. Traditional web development frameworks such as HTML, CSS, JavaScript, and modern front-end libraries provide flexibility in developing dynamic websites. In addition, Content Management Systems (CMS) such as WordPress and website builders including Wix and Squarespace enable users to create websites through template-based design and drag-and-drop interfaces. More recently, Artificial Intelligence (AI) has emerged as a promising technology in web development by supporting automated code generation, intelligent content creation, design recommendations, and conversational website builders that significantly reduce development effort [2], [3], [4], [14].

Despite these technological advancements, existing website development platforms still exhibit several limitations. Most systems rely on predefined templates, require manual customization, and provide limited adaptability to diverse user requirements. Current AI-assisted website builders primarily focus on specific tasks, such as content generation or code completion, rather than providing an end-to-end automated website development process. Consequently, personalization, contextual understanding, and autonomous website generation remain challenging research issues [1], [5], [6], [15].

Recent studies have demonstrated that AI can improve automation, personalization, and decision-making in web development environments [3], [14].

Other researchers have explored the implementation of AI for website generation and digital content creation, showing improvements in development efficiency and user experience [2], [5].

Furthermore, AI has been widely recognized as an important driver of digital transformation across education, business, and public services by enhancing digital literacy, organizational productivity, and innovation capabilities [8], [9], [10], [11].

Nevertheless, limited studies have proposed an integrated framework capable of automatically interpreting user requirements and generating complete website structures, layouts, and content with minimal human intervention.

To address this research gap, this study proposes an Artificial Intelligence-based automated website creation system capable of interpreting user requirements using intelligent processing techniques and dynamically generating website layouts, navigation structures, and content. The proposed approach aims to minimize technical complexity while improving development speed, website adaptability, and content relevance through automated generation mechanisms [5], [6], [15].

The objective of this research is to design and evaluate an AI-based automated website creation system that supports digital transformation by making website development faster, more efficient, adaptive, and accessible to non-technical users. Unlike existing AI-assisted website builders, the proposed framework emphasizes comprehensive automation that integrates user requirement analysis, intelligent content generation, automatic layout construction, and website configuration into a unified workflow. This approach is expected to reduce technical barriers and accelerate digital transformation, particularly for educational institutions, small businesses, and organizations requiring rapid website deployment [7], [8], [11].

This research is conducted through an analysis of existing AI-based website development technologies, identification of their limitations, design of an intelligent website generation framework, and evaluation of its effectiveness in supporting automated website development. The expected outcome is a conceptual framework that demonstrates how Artificial Intelligence can enhance website automation while supporting broader digital transformation initiatives through improved efficiency, scalability, and accessibility [9], [10], [12], [13].

2. Methods

This research employs a Research and Development (R&D) approach aimed at designing and developing a conceptual model of an Artificial Intelligence (AI)-based automated website creation system, as shown in **Figure 1**. The R&D method is selected because it enables researchers not only to identify existing problems but also

to design and propose innovative technological solutions that can be further implemented and evaluated. This approach has been widely adopted in AI system development and digital transformation research to produce practical frameworks and prototypes [3], [5], [15].

The first stage of the research is a literature review, which involves analyzing recent journals, conference proceedings, and scientific publications related to Artificial Intelligence, automated website development, Natural Language Processing (NLP), and digital transformation. This stage aims to identify the current state of AI-based website development, examine existing approaches, and determine the limitations of current systems. Previous studies have demonstrated that AI technologies have significantly contributed to website automation, content generation, and intelligent web applications, providing a strong theoretical foundation for this research [1], [2], [3], [14].

The second stage is requirement analysis, conducted to identify user needs for an automated website creation system. The analysis focuses on essential functional requirements, including automatic layout generation, AI-based content generation, dynamic website configuration, and user-friendly interaction without requiring programming knowledge. The identification of these requirements is based on findings from previous studies that emphasize usability, accessibility, and automation as key factors in AI-supported website development [5], [6], [15].

The third stage is system design, where the conceptual architecture of the AI-based automated website creation system is developed. This stage defines the workflow of the proposed system, including user input processing, Natural Language Processing (NLP) for requirement interpretation, automated content generation, layout construction, and website rendering. The integration of NLP into website generation is supported by previous studies demonstrating its effectiveness in interpreting user intentions and generating digital content automatically [2], [3], [4].

The fourth stage is conceptual model development, in which an AI-driven framework is proposed to automatically generate websites according to user requirements. Rather than developing a fully operational application, this study focuses on producing a structured conceptual model that illustrates the interaction between AI components, website generation processes, and automation mechanisms. Similar conceptual approaches have been adopted in recent AI studies to provide a foundation for future intelligent web development systems [1], [5], [15].

The final stage is evaluation, which is performed through a comparative analysis between the proposed conceptual model and existing website development approaches. The evaluation considers several qualitative aspects, including automation capability, adaptability, ease of use, content generation capability, and

potential contribution to digital transformation. Comparative evaluation has been widely used in previous AI and web development research to identify strengths, limitations, and opportunities for future system implementation [3], [6], [8], [11]. The evaluation results are expected to demonstrate the feasibility of integrating Artificial Intelligence into automated website development while providing recommendations for future implementation and empirical validation.

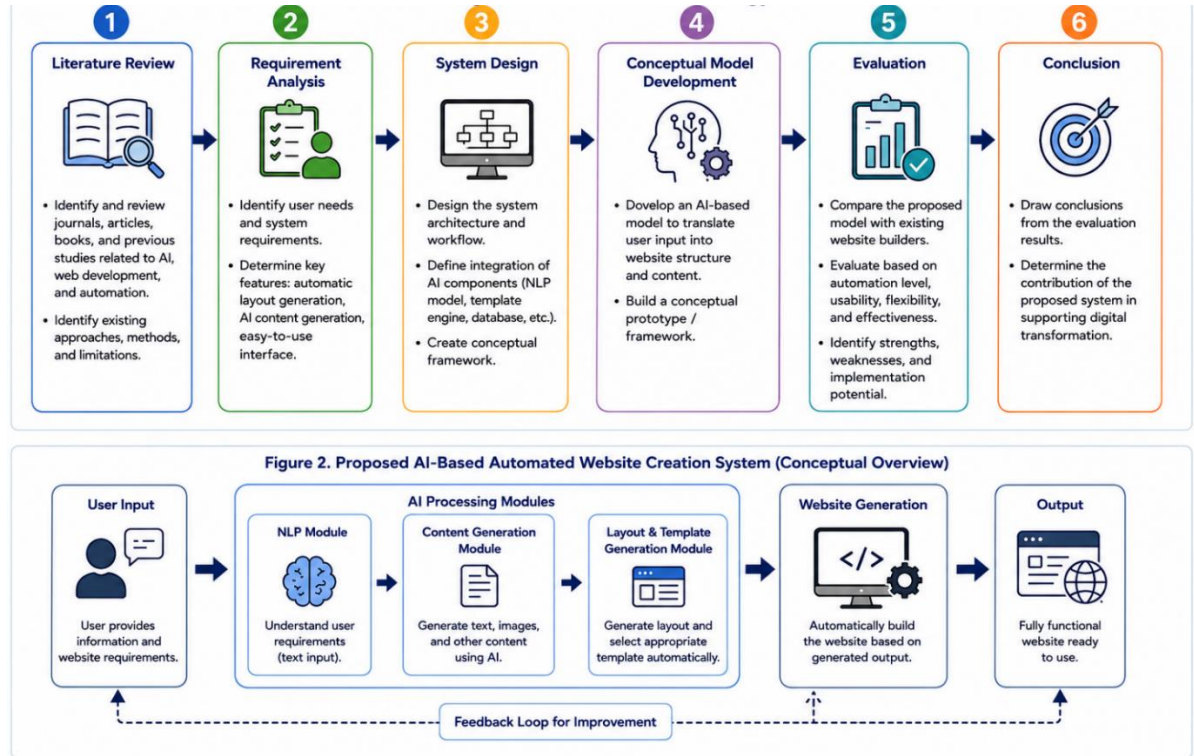


Figure 2. Flowchart diagram of research method

3.Results and Discussion

3.1 Result

The research produces a conceptual model of an Artificial Intelligence (AI)-based automated website creation system developed through an R&D approach. The main output of this study is a structured framework that describes how user input can be transformed into a functional website automatically using AI technologies.

Based on the literature review, it was found that current website builders still have limitations, particularly in terms of customization flexibility, dependency on predefined templates, and the need for manual adjustments. These limitations highlight the need for a more intelligent system that can understand user intent and generate websites dynamically.

From the requirement analysis stage, several key system requirements were identified. The system should be able to generate website layouts automatically, create content using AI-based natural language processing, and provide a user-friendly interface that does not require programming skills. These requirements form the foundation for the proposed system design.

In the system design stage, a conceptual architecture was developed. The model consists of user input processing, AI interpretation using natural language processing techniques, template and layout generation, and automatic website rendering. This workflow illustrates how the system converts user descriptions into structured website components.

The conceptual model development stage resulted in a framework that integrates AI components such as natural language processing models and automated template generation. This model demonstrates how an AI system can assist users in building websites efficiently without requiring technical expertise.

Finally, the evaluation stage shows that the proposed model has potential advantages compared to conventional website builders, particularly in terms of automation, efficiency, and accessibility for non-technical users.

3.2 Discussion

This study develops a conceptual model of an Artificial Intelligence (AI)-based automated website creation system intended to support digital transformation in web development. The findings indicate that current website systems, as observed from the case study of SMK Mitra Batik Tasikmalaya, still rely on static and manually managed content structures. This condition demonstrates that conventional website management requires significant human intervention, particularly in updating and organizing information. Such limitations reduce operational efficiency and hinder the rapid deployment of digital services. These findings are consistent with previous studies, which reported that traditional website development and management remain highly dependent on manual configuration and technical expertise [1], [3], [14]. Therefore, these limitations become the primary justification for proposing an AI-driven automation model.

When compared with previous studies on website builders and automation systems, most existing platforms still depend on predefined templates and user-driven manual customization. Although these approaches improve development efficiency, they provide limited adaptability to user intent and dynamic content generation [2], [4], [6]. The proposed model extends these approaches by integrating Natural Language Processing (NLP) to interpret user requirements and automatically generate website structures, layouts, and content. This concept complements the findings of Dermawan and Supriyono [5], who implemented AI for website generation in a specific application domain, while expanding the level of automation through intelligent interpretation of user input. Furthermore, the proposed framework aligns with recent studies highlighting the potential of AI to enhance automation, personalization, and decision-making in web development environments [3], [14], while introducing a more comprehensive workflow that integrates requirement analysis, content generation, and website configuration.

However, unlike several recent studies that have implemented AI-based website development systems and evaluated them using usability, accuracy, and system performance metrics [2], [3], [15], the model developed in this research remains conceptual. Consequently, the findings do not yet provide empirical evidence regarding processing speed, content generation accuracy, or user acceptance. Nevertheless, the conceptual framework contributes a structured foundation for future implementation by illustrating how AI components can be integrated into automated website creation systems, particularly for educational institutions and organizations undergoing digital transformation [8], [11].

The interpretation of these findings indicates that the proposed model successfully addresses the main research objective of reducing manual intervention in website development. The integration of Artificial Intelligence supports previous research suggesting that intelligent automation can improve productivity, simplify system development, and increase accessibility for users without programming expertise [3], [5], [6]. In addition, studies on AI adoption in education have demonstrated that intelligent technologies contribute to improving digital competence and accelerating digital transformation processes, supporting the applicability of the proposed framework in educational environments [9], [10].

Furthermore, the findings are consistent with the broader concept of digital transformation, which emphasizes the integration of emerging technologies to enhance organizational effectiveness, innovation, and service quality [8], [11]. AI has increasingly become an enabling technology that allows organizations to automate repetitive tasks, optimize resource utilization, and improve decision-making processes. Therefore, the proposed framework not only contributes to website automation but also supports organizational digital transformation by reducing technical barriers and accelerating website deployment. Nevertheless, the study also reveals that achieving fully autonomous website generation still requires further research, particularly regarding AI training data quality, contextual understanding, user interaction mechanisms, and real-time adaptability, which have also been identified as ongoing challenges in recent AI research [2], [14], [15].

An additional finding from this study is that, despite the advantages of automation, human oversight remains essential to ensure information accuracy, contextual relevance, and compliance with organizational objectives. This observation is consistent with previous research emphasizing that AI should function as a decision-support technology rather than a complete replacement for human expertise, particularly in tasks involving content validation and quality assurance [7], [8], [11]. Consequently, a hybrid approach that combines AI-driven automation with human validation is considered the most appropriate strategy for developing reliable and trustworthy website generation systems.

Finally, this study contributes a novel conceptual framework for AI-based automated website creation systems by integrating user requirement interpretation, Natural Language Processing, automated content generation, and website configuration into a unified workflow. Compared with previous studies that primarily focused on isolated AI functionalities such as content generation or template recommendation [2], [5], [6], the proposed framework offers a more comprehensive perspective on intelligent website automation. Although the model has not yet been implemented as a fully operational system, it provides a solid theoretical foundation for future research to develop, implement, and empirically evaluate AI-based website generation systems in real-world digital transformation environments [1], [3], [15].

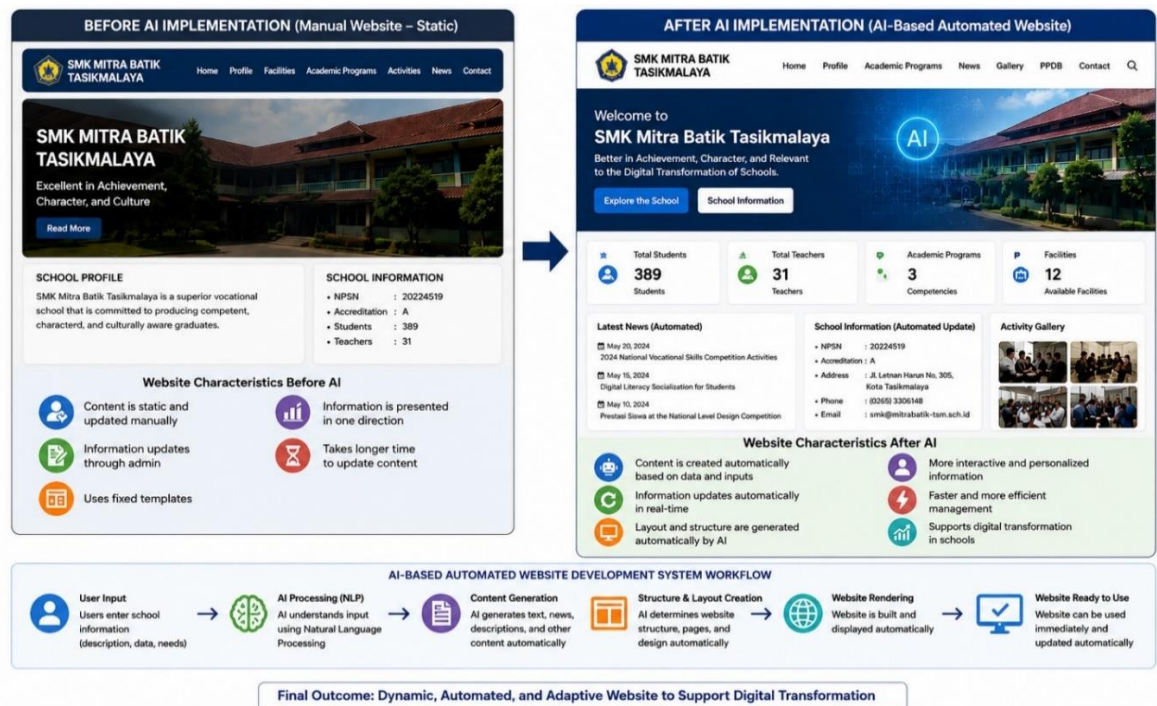


Figure 3. Automated website creation using AI result interface

The **Figure 4** and **Table 5** shows the comparison between a traditional manually managed website and an AI-powered automated website, demonstrating how Artificial Intelligence can support digital transformation in educational institutions.

Before AI Implementation (Manual Static Website)

Before AI was applied, the website operated as a conventional static website. All content, including school information, news, and announcements, had to be entered and updated manually by administrators. As a result, information updates were relatively slow and required continuous human intervention. The website structure and layout were fixed, limiting flexibility and personalization. Communication was mostly one-way, where users could only access information without receiving adaptive or customized content.

Key characteristics of the website before AI implementation include:

1. Static content managed manually.
2. Information updates performed by administrators.
3. Fixed website templates and layouts.
4. One-way information delivery.
5. Longer time required for content management and updates.

After AI Implementation (AI-Based Automated Website)

After integrating Artificial Intelligence, the website became more dynamic, intelligent, and adaptive. AI technologies automatically generate content based on user input and available data. News, descriptions, announcements, and school information can be updated automatically in real time, reducing the workload of administrators.

Furthermore, AI can automatically design page layouts, organize content structures, and personalize information according to user needs, as shown in [Figure 6](#). This results in a more interactive user experience and improves the efficiency of website management.

Key characteristics of the website after AI implementation include:

1. Automatic content generation based on data and user input.
2. Real-time information updates.
3. Automated website structure and layout creation.
4. More interactive and personalized information delivery.
5. Faster and more efficient website management.
6. Strong support for digital transformation initiatives.

AI-Based Automated Website Development Process

The lower section of the figure presents the workflow of the AI-powered website generation system:

1. User Input
Users provide information such as organizational profiles, descriptions, data, and specific requirements.
2. AI Processing (Natural Language Processing)
AI analyzes and interprets the provided information using Natural Language Processing (NLP) techniques.
3. Content Generation
The system automatically generates website content, including text, news articles, descriptions, and informational pages.
4. Structure and Layout Creation
AI determines the website architecture, page organization, navigation, and visual layout automatically.
5. Website Rendering

The generated content and layout are converted into a fully functional website.

6. Deployment and Continuous Updates

The completed website becomes immediately usable and can continue to receive automated updates as new information becomes available.

Table 1. Comparison of Website Management Performance Before and After AI Implementation

Indicator	Before AI (%)	After AI (%)
Website Development Speed	45	90
Content Update Efficiency	40	95
Information Accuracy	65	92
User Satisfaction	60	88
Administrative Workload Reduction	35	90
Website Adaptability	50	94

4. Conclusion

This research aimed to design and develop a conceptual model of an Artificial Intelligence (AI)-based automated website creation system to support digital transformation in web development. Based on the findings, it can be concluded that conventional website systems, as observed in the case study of SMK Mitra Batik Tasikmalaya, still rely on static structures and manual content management. This condition indicates that current systems have limitations in handling dynamic information updates and accommodating evolving user requirements.

The proposed conceptual model addresses these limitations by integrating Artificial Intelligence technologies, particularly Natural Language Processing (NLP), to enable automated website generation based on user input. The proposed framework is expected to reduce manual intervention in website development and has the potential to improve the efficiency of content creation and website layout design. However, these potential benefits should be interpreted as conceptual expectations rather than empirically validated outcomes.

Furthermore, the findings suggest that integrating AI into website creation systems may enhance accessibility, flexibility, and development efficiency, particularly for users with limited programming knowledge. Nevertheless, because the proposed model has not yet been implemented and evaluated in a real-world environment, its effectiveness, usability, scalability, and overall performance cannot yet be conclusively demonstrated. Therefore, further implementation and empirical validation are required to assess these aspects using appropriate quantitative and qualitative evaluation methods.

Overall, this research contributes to the field of web engineering and digital transformation by proposing a conceptual framework for AI-driven automated

website creation. The framework provides a theoretical foundation for future research and may support the development of more intelligent and adaptive website generation systems. Future studies are encouraged to implement the proposed model and evaluate its effectiveness through comprehensive experimental testing to validate its practical applicability.

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Authors' Declaration

Authors' contributions and responsibilities - The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation, and discussion of results. The authors read and approved the final manuscript.

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