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A TOGAF-based information governance model for the digital transformation of SMES

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Abstract: Digital transformation is key in business processes, including for Small and Medium Enterprises (SMEs). With digital transformation, a company can change the way it serves its customers, but this implementation carries high risks due to limited resources and management changes. SMEs often face obstacles in adopting new technologies, such as financial constraints, lack of technical skills, and barriers in technology implementation and human resources. Good IT governance is necessary for SMEs to survive technological developments. In general, business processes that already run are still done conventionally, thus governance needs to be implemented. From these problems, a strategic plan is needed that can produce a blueprint framework which is needed by the company. The findings of this study consist of TOGAF ADM-based architectural artifact documents, which serve as a foundation for identifying technology mappings that can be developed in alignment with the existing business processes of small and medium-sized enterprises (SMEs). A blueprint framework can be used by SMEs to determine the priorities and stages of system development over the next few years to be carried out, of course, by considering internal and external factors. From the results of the framework, the development of information systems for marketing and selling SME products is carried out to overcome problems such as the lack of knowledge of partners in marketing so that it has an impact on partner income. With structured IT governance, SMEs can align IT strategies with business goals and develop information systems that support business continuity in the future.

Keywords: Blueprint Development for SMEs, Strategic Planning, Technology, TOGAF ADM

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Introduction

Digital transformation has become a central part of business processes used by many companies, including Small and Medium Enterprises (SMEs) [1]. Digital transformation enables companies to use digital technologies to change the way they deliver services to customers. Digital transformation not only involves the adoption of new technologies, but also includes fundamental changes in how companies operate, serve customers, and create added value. The implementation of digital transformation in SMEs carries considerable risks due to their smaller organizational structures and less mature change management practices. SMEs often face obstacles in implementing digital transformation, such as limited resources, financial constraints, lack of technical skills, and challenges in adopting new technologies [1]. In the current condition, SMEs operate in an environment with rapidly evolving technologies, which requires the ability to quickly adapt to technological changes [2], [3]. Many SMEs still rely on conventional processes, such as product marketing, product sales, and payment transactions [4]. SMEs that have adopted technology will remain resilient amidst technological developments, whereas those with minimal use of technology will experience decline and struggle to compete with other competitors [5], [6].

This research will focus on a group of bamboo weaving SMEs in Kayubihi Village, Bangli Regency. Here there are many bamboo weaving craft distributors, with the products all still sold in the traditional way. A number of problems in the practice of IT governance management exist. These challenges are influencing the business operations of SMEs since these cannot compete

with other (larger and multinational) firms (lacking HR and monetary resources, and the capacity to follow technological developments on quick rate) [7], [8]. It is, therefore important to have a good strategic plan that will lead to increased revenue and guarantee the sustainability of these SMEs in the digital age.

The issues described above represent the underlying background of current challenges faced by SMEs, particularly the limitations in resources and competitive pressure from other businesses. These conditions demand that SMEs align their business processes with existing technologies. One of the most common problems and challenges in SME operations lies in product marketing and sales, which are still carried out using conventional methods. This significantly affects their ability to grow and sustain their business amidst technological challenges. With the rapid development of technology, SMEs are required to remain competitive and resilient. Therefore, they have to develop their businesses by integrating current business processes, especially the products marketing and sales with information technology implementation. This alignment process requires proper governance to ensure sustainability and competitiveness. Therefore, effective governance is essential and must be supported by a structured implementation method [9], [10].

Information Technology (IT) governance is a crucial aspect to manage the technological resources across various types of organizations, including Small and Medium Enterprises (SMEs) [11]. The effectiveness of IT governance enables SMEs to align technological strategies with business objectives, improve operational efficiency, and reduce risks associated with technology system management. Nevertheless, many SMEs still lack a structured understanding of the importance of IT governance, which often results in a mismatch between technological needs and business strategies. Research indicates that digital transformation involves the integration of digital technologies into all aspects of business operations, ultimately creating added value and enhancing efficiency. Digital transformation has become a necessity for all organizations, including SMEs, to remain relevant and competitive in today's digital era. Nevertheless, many SMEs continue to face challenges in implementing digital transformation effectively. One of the key barriers to successful digital transformation is the lack of proper IT governance. Studies have shown that effective IT governance can significantly enhance operational efficiency and support data-driven decision making Hauser[12].

Thus, the implementation of TOGAF enables SMEs to design an enterprise architecture that aligns with their business needs and ensures that the technologies employed can deliver added value [13]. The research findings indicate that effective IT governance can minimize the risks of technology implementation failure and enhance the competitiveness of SMEs in the digital market. One of the main challenges that faced by SMEs in undergoing digital transformation is the limitation of resources. Some studies show that SMEs often struggle to allocate funds for new technology investments due to limited operating capital. Moreover, the low level of digital literacy among SME management teams also presents a significant barrier. Other research also has found that SMEs in Indonesia still lag behind in adopting digital technologies, particularly in traditional sectors such as manufacturing and traden [14].

In light of these challenges, a suitable strategic planning approach is required for the development of SME information systems. A blueprint framework is currently essential to guide the development of systems that align with the specific needs of SMEs. Beyond conventional and technological approaches, an integrated needs analysis process must be conducted in planning the architecture using the TOGAF ADM methodology. TOGAF ADM is a framework that can be utilized to develop a strategic planning for SME information system development. TOGAF ADM consists of eight phases used to structure architectural artifacts such as: *Architecture Vision, Business Architecture, Information System Architecture, Technology Architecture, Opportunities and Solutions, Migration Planning, Implementation Governance,* and *Architecture Change Management* [10], [15]*.* This framework also enables SMEs to accelerate the digitalization process by leveraging technologies that match their specific needs. According to research, effective IT Governance plays a critical role in enhancing the competitiveness of SMEs, particularly in today's digital era. A structured IT governance framework not only ensures that adopted technologies are well integrated into business processes but also enables organizations to improve their operational efficiency and effectiveness. The implementation of TOGAF is expected to support SMEs in aligning their IT strategies with business objectives, thereby facilitating a smoother digital transformation process [16], [17].

The implementation of TOGAF is expected to assist SMEs in managing change and reducing risks associated with the adoption of new technologies. The application of TOGAF offers several benefits, including:

1. Improved The Operational Efficiency: The implementation of TOGAF enables SMEs to design and implement more integrated IT architectures, thereby enhancing operational efficiency and reducing costs associated with technology management.
2. Enhanced Competitiveness: By adopting TOGAF, SMEs can adapt to new technologies, it is also allowing them to compete with larger companies in broader markets. Research has shown that SMEs implementing IT governance frameworks are able to increase their competitiveness by up to 25% compared to those that do not.
3. Improved Risk Management: TOGAF provides guidance in managing risks associated with technology implementation. Studies have shown that SMEs utilizing TOGAF in their digital transformation efforts have successfully reduced the risk of technology implementation failure by up to 30%.

The result of this study is a set of TOGAF ADM architectural artifact documents that can be used to identify which technologies can be developed in alignment with the existing business processes of SMEs. The blueprint framework can serve as a tool for SMEs to determine the development priorities and the stages of system implementation over the coming years, taking into account both internal and external factors. Based on the framework, a marketing and sales information system for SME products was developed to address issues such as the limited knowledge of partners in marketing, which has had a direct impact on their revenue.

Methodology

The research methodology outlines the stages which undertaken in this study. The methodology is illustrated in Figure 1. The stages of the research methodology can be described as follows:

1. Exploration of Research Concepts. The first stage involves exploring the TOGAF ADM concept to be implemented in strategic planning. This stage also includes a literature review of previous related studies.
2. Observation and Interviews. The second stage consists of direct field observation and interviews with relevant stakeholders to collect the data related to the information management processes of SMEs in Kayubihi Village, Bangli.
3. Analysis. The third stage involves analyzing the results of interviews, observations, and conceptual exploration. The analysis is conducted by applying the steps in the research to illustrate the TOGAF ADM artifacts.
4. System Design and Implementation. The fourth stage is the design and implementation of an information system used as a medium for information dissemination. The implemented system is developed in accordance with the system development documentation.
5. Conclusion. The fifth stage involves drawing conclusions based on the analysis of the TOGAF ADM artifacts and the implementation of the information system.

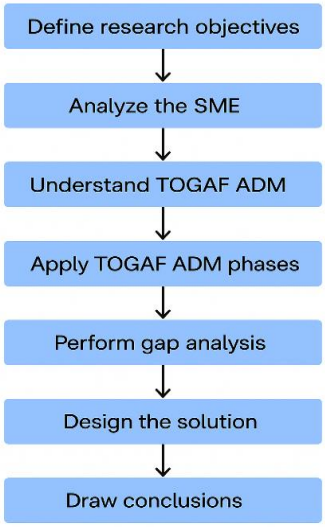

Figure 1. Research method

Results and Discussions

This section presents the results of the TOGAF analysis, covering stages from the Preliminary Phase to the Technology Architecture Phase.

Preliminary Phase

The Preliminary Phase is the beginning of the TOGAF framework stage. This phase defines the starting steps, including determining the scope of the enterprise, selecting the architectural framework, and identifying the tools to be used. In this research, the preliminary analysis involves describing the current condition of the object under study, namely the bamboo weaving SMEs. This stage serves as the foundation for analyzing and illustrating the existing business processes of the artisans. The detailed analysis in this initial phase is as follows:

1. Scope: The focus of this research is on bamboo weaving SMEs in Kayubihi Village, Bangli Regency, which require IT governance to support their digital transformation efforts.
2. Stakeholders: SME owners, artisans, local government, and customers.
3. Architecture Principles: Sustainability: Utilization of technologies that support long-term sustainability. Scalability: Technology solutions that can scale according to the evolving needs of SMEs. Efficiency: Digitalization processes that enhance and accelerate operational activities.

At this stage, an analysis is conducted for an e-commerce system that can be applied into traditional markets. It can support the transition from conventional to online sales. The Preliminary Phase is carried out by dividing the business processes into two categories, as presented in Table 1 below:

Table 1. Preliminary phase

Principle	Description
	Bussiness Architecture
Product Enhancement	Product enhancement is carried out through product development and alignment with market needs.
Business Continuity	SMEs are able to sustain their operations in the face of various challenges and competitive pressures.
Product quality	Maintaining the product quality by using high-quality raw materials and producing in accordance with established standards.
Compliance with Government Regulations	The products which are produced and marketed must comply with government regulations.

Operational Continuity	The business continues to operate despite facing several challenges.
	Data Architecture
Data as an Asset	SME data is considered an asset and holds value that must be properly protected and managed.
Data Accessibility	Data should be easily accessible and manageable.
Data Accuracy	Data must be reliable and accountable for its accuracy.
Data Security	All SME data must be protected and safeguarded against potential risks of data breaches.
	Application Architecture
Application Usability	The application should be easy to use for both users and end-users, ensuring high usability and functionality.
Application Flexibility	The application should function effectively and be compatible with existing technologies to minimize the need for frequent modifications.
	Technology Architecture
Technology Security	The technology must ensure data security to prevent risks from both internal and external threats.
Technology Evolution	To maintain the quality and ensure the continuity of business processes in product sales, regular updates are necessary by monitoring technological developments and user needs.

Architecture Vision

In the Architecture Vision phase, it focuses on assessing transformation readiness to achieve the target enterprise architecture, identifying the architecture vision, and evaluating business capabilities. This phase is divided into main activities, such as: inbound logistics, operations, outbound logistics, sales, marketing, and customer service. Supporting activities consist of: human resources, finance, inventory, and procurement. The analysis is depicted in Figure 2 below.

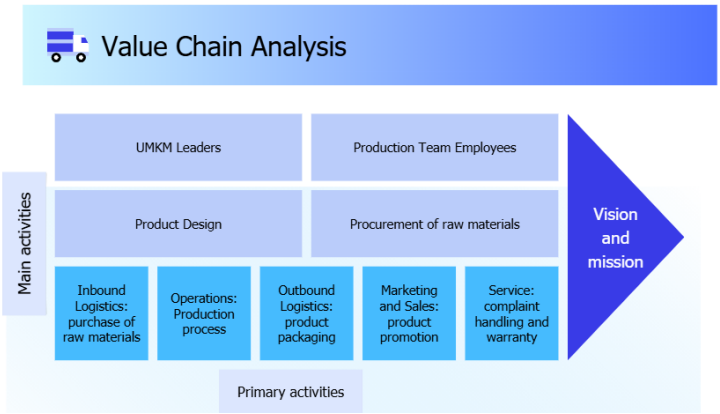

Figure 2. Value chain

Business Architecture

In this phase, an illustration is provided regarding the analysis of business processes and business functions related to the main business activities, which consist of:

1. The core processes in this business architecture are: sourcing of local raw materials, manual production by artisans, product marketing conducted directly and through local markets.
2. The required technologies include an order management system and inventory tracking system to support operational efficiency.
3. Business Process Document: A workflow diagram that integrates manual processes with digital technologies. Several stages and business processes are categorized into conventional and digital processes. The entire sequence is illustrated in a value stream map

for the business processes of bamboo weaving SMEs. Figure 3 presents the value stream map as follows:

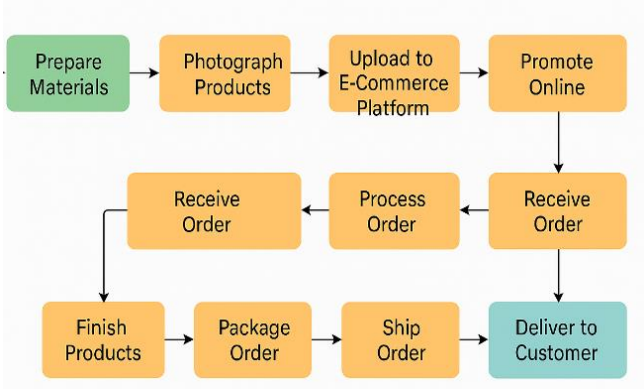

Figure 3. Value stream map

This Figure 3 Value Stream Map illustrates the business process flow of bamboo woven craft SMEs, from raw material procurement to product delivery to customers. This diagram visualizes the integration between manual and digital processes designed to improve operational efficiency of SMEs. The figure above illustrates the flow of both conventional and digital business processes, serving as a recommendation for future business operations, with the detailed analysis as follows Table 2.

Table 2. Business processes

Activity	Business Process	Notes
Raw Material Procurement	a. Contacting local suppliers. b. Purchasing and recording are done immediately	Manual
Weaving Production	a. Handcrafted by artisans traditionally b. Production results are recorded by administrative staff.	Manual
Product Data Entry	a. Product data is entered into the information system. b. Product descriptions and images are uploaded to the e-commerce platform.	Digital
Product Marketing	a. Promotion through social media and websites. b. Content distribution is managed by the marketing admin.	Digital
Ordering and Payment	a. Customers place the orders through the online system. b. Payment is made via bank transfer or digital payment gateway.	Digital
Packaging and Delivery	a. Products are packaged and shipped by delivery personnel. b. Delivery status is updated in the system.	Manual

This value stream illustrates the end-to-end process from raw material procurement to product delivery to the customer, as well as the points of digital integration within the process. The details of the Business Architecture Gap Analysis are as follows Table 3 :

Table 3. Business architecture gap

Business Are	Current Business Architecture	Business Architecture Target	GAP
Marketing Process	Manual and local	Digital via e-commerce platforms	No digital channels; low digital literacy
Inventory Management	Undocumented, manual process	Inventory management information system	Lack of system; risk of data loss or stock mismanagement
Product Ordering	By phone or in-person	Online ordering through website	Online ordering system is not yet available
Sales Recording	Manual using book	Automation using digital systems	No available online ordering system
Market Access	Limited to local/regional markets	National atau international through marketplace	No integration with marketplace platforms
Business Process Documentation	Poorly documented	Digitally documented and standardized	Standardized no digital SOPs

Information System Architecture

This stage is divided into two levels of analysis, namely data architecture and application architecture. The following is an explanation of each phase:

Data Architecture

In this phase, the focus is on identifying the data currently in use and the data required to support the proposed system development. The general concept of the data architecture is as follows:

1. Data Types: Product data, customer data, supplier data, and financial data.
2. Storage: Utilization of cloud-based databases for centralized data management.

This strategic planning aims the utilization of technology by developing an e-commerce system, an inventory system, and a financial system to support SME business processes. All data and systems will be centralized and utilize cloud storage for data management. This approach requires qualified human resources to assist in system administration. In general, the data management planning for the systems to be developed is as follows:

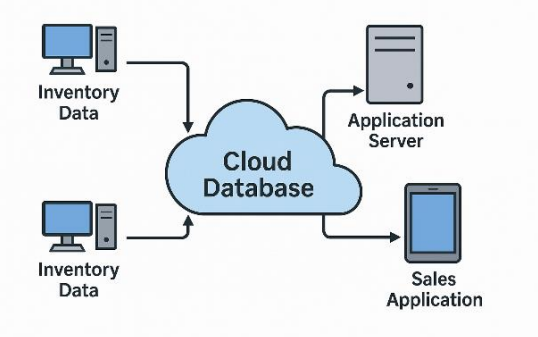

Figure 4. Data management architecture

Figure 4 above is a visualization of a cloud-based database solution that illustrates how data from the inventory system and sales application is connected to the cloud database and application server. The figure above illustrates the data management plan, which utilizes cloud technology for data storage. Based on the proposed systems to be developed, the next step is to conduct a data planning analysis, as illustrated below:

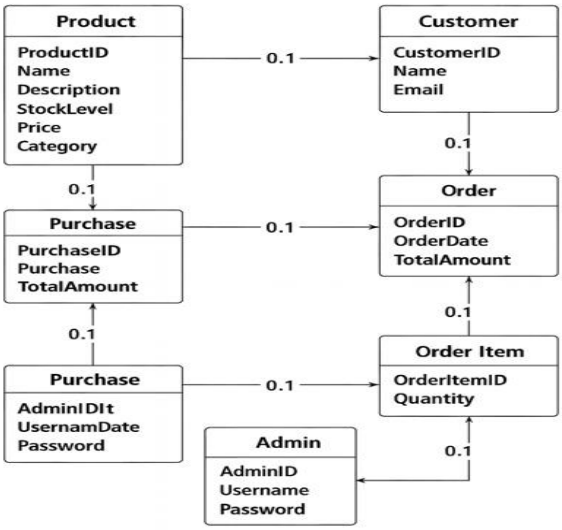

Figure 5. ERD data design

Figure 5 above shows the Entity-Relationship Diagram (ERD) of an information system designed for bamboo weaving craft SMEs. This diagram models the relationship between the main entities such as Product, Customer, Order, Order Item, Purchase, Supplier, and Admin.

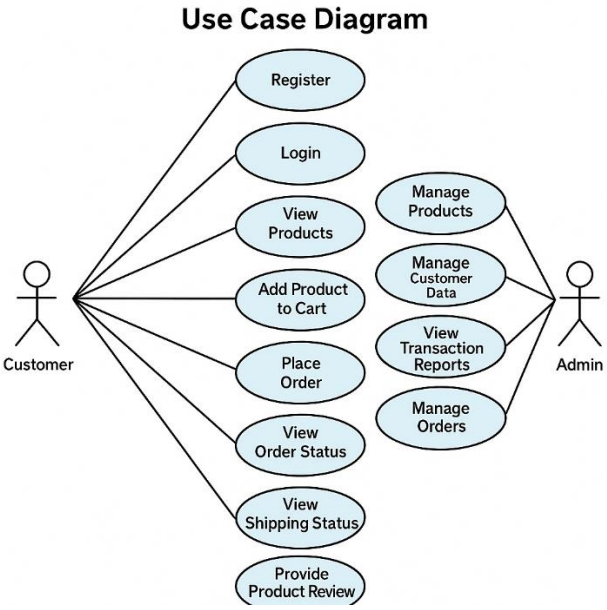

Figure 6. Use case system design diagram

Figure 6 provides a comprehensive overview of user interaction with the system, both from the customer and admin side. This diagram also shows the system boundaries and main functions that will be developed in a web-based information system to support SME digitalization. This diagram is an important basis in system design, especially at the requirement analysis stage.

Application Architecture

This phase involves analyzing the application architecture to be developed. For system planning, the proposed systems are as follows: an e-commerce system for marketing purposes, an inventory management system for stock control, and a simple financial recording application.

To ensure that the technology architecture can be optimally implemented in bamboo weaving SMEs, a needs analysis is required, covering technical aspects, human resources, and operational support. The identified requirement components are as follows:

1. Hardware Requirements: Each hardware requirement includes a computer or laptop for administrative and inventory management staff, a tablet or smartphone for mobile access by artisans or marketing staff, and a simple financial recording application.
2. Software Requirements: Each software requirement includes a web-based sales information system, a cloud-based inventory management application, and a sales and distribution monitoring dashboard.
3. Network Infrastructure Requirements: Each network requirement includes a stable internet connection with a minimum speed of 10 Mbps and an adequate router and modem for the SME's internal network.
4. Cloud Platform Requirements: Each cloud platform requirement includes cloud storage services such as Google Drive, Dropbox, or AWS S3, and cloud databases such as Firebase or Google Cloud SQL to store transaction, customer, and inventory data
5. Data Security and Protection: Each security requirement includes multi-factor authentication (MFA) for system access, the use of HTTPS for all online transactions, and automated and periodic data backups.
6. Human Resources and Training Requirements: Each HR and training requirement includes basic system usage training for SME managers and artisans, the provision of Standard Operating Procedures (SOPs) for technology usage, and technical assistance during the early stages of implementation.

Table 4 and Table 5 are the analysis for production matrix data and Table 5 is used for marketing matrix data with data types in each data entry.

Table 4. Data matrix for production and procurement

Description	Data Entity	Type of Data
Warehouse and vendor management application	Product	Master Data
	Materials	Master Data
	Tools	Master Data
	PO	Transactional Data
	Invoices	Transactional Data
	Vendor	Master Data
	Employees	Master Data
	Customers	Master Data

Tabel 5. Data matrix for marketing and distribution

Description	Data Entity	Type of Data
Warehouse and vendor management application	Product	Master Data
	PO	Transactional Data
	Invoices	Transactional Data
	Expeditions	Master Data
	Employees	Master Data
	Customers	Master Data
	Product Detail	Transactional Data
	Sales	Transactional Data
	Discount	Transactional Data

Technology Architecture

In this phase, an artifact called the Technology Portfolio Catalog is created to identify and manage the hardware, software, and network infrastructure required by the SME. The following is the technology architecture diagram for the system to be developed.

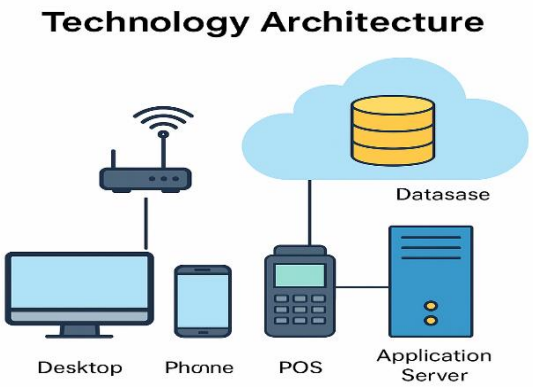

Figure 7. Architecture technology

Figure 7 illustrates the technology architecture that supports the information system in the bamboo weaving craft SME. This architecture is designed to support the digitalization process from product management to online transactions. Based on the technology architecture illustrated above, the proposed portfolio catalog is as follows Table 6.

Table 6. Technology portfolio catalog

Product	Spesification	Description
Desktop Computer	Intel i5 processor, 8GB RAM, 256GB SSD	Used to access the inventory management information system and print transaction reports.
Smartphone	Android/iOS, 6 inch touchscreen, internet connection	Used by artisans or administrators to manage orders and communicate with customers.
POS Terminal	Touchscreen, Bluetooth/WiFi connectivity, thermal printer	Used to digitally record direct sales transactions.
Wi-Fi Router	Dual Band 2.4GHz/5GHz, up to 300Mbps speed	Provides internet connectivity for devices within the SME's internal network.
Cloud Database	Google Cloud SQL / Firebase / AWS RDS	Stores product, customer, sales, and purchase transaction data in a centralized and real-time manner.
Application Server	Cloud-based hosting, supports PHP/NodeJS, 10–50GB storage capacity	Runs the web-based sales and inventory information system accessible online.

A comparison between SMEs that have implemented an IT governance framework and those that have not highlights the importance of a structured enterprise architecture. For example, a bamboo craft SME in Gianyar Regency that integrated digital order tracking and a product catalog through a mobile-based information system experienced a 30% increase in customer retention and a 22% reduction in inventory error costs. In contrast, SMEs in Kayubihi Village that did not have such a system continued to rely on manual record-keeping, which often resulted in duplicate orders and stockouts. Furthermore, research by [1] found that SMEs that implemented TOGAF-based planning demonstrated measurable improvements in operational effectiveness, reporting a 25% higher order processing speed and greater consistency in customer feedback. These examples support the finding that structured IT governance significantly improves SME competitiveness while reducing the risk of system failure by providing clear implementation path and technology alignment strategy. Other studies [2] have adopted a digital catalog and basic information system to manage product and order data. This approach resulted in a 20% increase in revenue and reduced order errors. This approach resulted in a 20%

increase in revenue and reduced order errors. Similarly, studies implemented a semi-digital process using cloud-based spreadsheets and marketplaces, achieving national market expansion.

Conclusion

Based on the results of this study, it can be concluded that the proposed model for SME marketing development planning is the implementation of an e-commerce system and an inventory management system. This study shows that the implementation of TOGAF ADM provides a strategic and structured framework to support the digital transformation of SMEs. This study has produced a depiction of: an analysis of the vision architecture described in the value chain. Business architecture described in the Value Stream Map, business process table, and business architecture gap table. Data architecture has provided a proposal for data management with a cloud database, usecase diagram and ERD. And has described the proposed application architecture and technology architecture. This framework also provides a solid foundation for long-term system development, serving as a reference for managing and advancing IT in the SME environment. The application of TOGAF in the context of SMEs, even in its balanced form, provides a practical basis for reducing implementation risk by up to 30% and improving competitive performance by approximately 25%. These results support the role of enterprise architecture as a potential strategy for small businesses undergoing digital transformation.

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References

[1] I. Maita, W. M. Egust B., F. N. Salisah, and M. Rahmawita, "Perancangan enterprise architecture untuk mendukung transformasi digital usaha kecil dan menengah (UMKM) menggunakan TOGAF ADM," *Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi*, vol. 8, no. 1, pp. 48–54, 2022.

[2] A. Fauzi and Y. H. Putra, "Analisa dan perancangan model umum enterprise architecture untuk e-business usaha mikro kecil dan menengah (UMKM) dengan menggunakan framework TOGAF ADM," *Jurnal Tata Kelola dan Kerangka Kerja Teknologi Informasi*, vol. 4, no. 2, 2021.

[3] E. R. Susanto, J. Tambotoh, and A. T. Ezra, "Perencanaan arsitektur enterprise menggunakan kerangka kerja TOGAF ADM pada Toko Ezra Computer," *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 9, no. 4, 2022, [Online]. Available: https://jurnal.mdp.ac.id/index.php/jatisi/article/view/2774.

[4] D. Dumitriu and M. A.-M. Popescu, "Enterprise architecture framework design in IT management," *Procedia Manuf*, vol. 46, pp. 932–940, 2020.

[5] R. Tri and S. W. Sardjono, "Perancangan enterprise architecture event management system pada universitas," *ITEJ*, vol. 7, no. 2, 2022, [Online]. Available: https://syekhnurjati.ac.id/journal/index.php/itej

[6] S. Kotusev, S. Kurnia, and R. Dilnutt, "Enterprise architecture artifacts as boundary objects: an empirical analysis," *Inf Softw Technol*, vol. 155, 2023, doi: https://doi.org/10.1016/j.infsof.2022.107108.

[7] D. Amanda, D. Hindarto, E. Indrajit, and E. Dazki, "Proposed use of TOGAF-based enterprise architecture in drinking water companies," *Sinkron*, vol. 8, no. 3, pp. 1265–1277, Jul. 2023, doi: 10.33395/sinkron.v8i3.12477.

[8] K. V. de Oliveira, E. C. Fernandes, and M. Borsato, "A TOGAF-based framework for the development of sustainable product-service systems," in *Procedia Manufacturing*, Elsevier B.V., 2021, pp. 274–281. doi: 10.1016/j.promfg.2021.10.039.

[9] J. Barrios, and E. Kornyshova, "Process-oriented knowledge representation of the requirement management phase of TOGAF-ADM: an empirical evaluation,". *Jurnal Procedia Computer Science* , vol. 192, 2021.

[10] A. G. A. V. D. M. Crike Kearny, "Data-driven enterprise architecture and the TOGAF ADM phases," *IEEE International Conference on Systems, Man and Cybernetics*, 2016. (check author name)
[11] D. T. Yulianti, A. Adelia, T. Gantini, and G. G. T. Kesumah, "Penerapan phase E TOGAF 9.1 pada rencana migrasi sistem," *Jurnal Teknik Informatika dan Sistem Informasi*, vol. 9, no. 1, Apr. 2023, doi: 10.28932/jutisi.v9i1.5709.
[12] A. Hauser, F. Eggers, and S. Güldenberg, "Strategic decision-making in SMEs: effectuation, causation, and the absence of strategy," *Small Business Economics*, vol. 54, pp. 775–790, Mar. 2020, doi: https://doi.org/10.1007/s11187-019-00152-x.
[13] L. Menglong, Y. Shuanghui, Z. Mengmeng, C. Tao, C. Honghui, and Z. Xiaoxue, "A coevolutionary framework of business-IT alignment via the lens of enterprise architecture," *Journal of Systems Engineering and Electronics*, vol. 31, no. 5, pp. 983–995, 2020, doi: 10.23919/JSEE.2020.000073.
[14] R. Pramudita and N. Safitri, "Integrasi Zachman framework dan TOGAF ADM," *Information System For Educators And Professionals Journal,* vol. 1, no. 2, pp. 157–166, 2017. doi:https://doi.org/10.51211/isbi.v1i2.386.
[15] H. Qurratuaini., "Designing enterprise architecture based on TOGAF 9.1," *IOP Conf Ser Mater Sci Eng*, vol. Vol 403, 2018.
[16] M. I. Alhari, A. Amalia, and N. Fajrillah, "Enterprise architecture: a strategy to achieve e-government dimension of smart village using TOGAF ADM 9.2," 2022. doi: http://dx.doi.org/10.30630/joiv.6.2-2.1147.
[17] T. Kaddoumi and M. Watfa, "A foundational framework for agile enterprise architecture," *International Journal of Lean Six Sigma*, vol. 13, no. 1, pp. 136–155, Aug. 2021, doi: https://doi.org/10.1108/IJLSS-03-2021-0057.