Research Article

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Application of Zachman Framework in Designing Enterprise Architecture of Setunggal Coffee Business

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Abstract
This research aims to design enterprise architecture in Setunggal Coffee business using Zachman Framework as a structural and comprehensive approach. In facing the challenges of digitization and information management, this coffee business needs an integrated information system that suits its organizational needs. This research uses a qualitative method with a case study approach. Data collection techniques were conducted through direct observation, interviews with business owners, and documentation studies of operational processes. The results showed that the Zachman Framework is able to map all business elements from various perspectives, from planners to system implementers. With this approach, information needs and business processes can be described more clearly and structured. The resulting architecture design is able to support decision-making, strengthen coordination between business units, and improve operational efficiency. The implications of this research provide a strong basis for the development of enterprise architecture-based information systems at the scale of small and medium enterprises (SMEs). In addition, this approach can also be used as a reference for other businesses in building digital systems that are adaptive, flexible, and aligned with business goals.

Keyword: Zachman Framework, Enterprise Architecture, Information System, Business Design, Setunggal Coffee.

1. Introduction

I. General Phenomenon of Research Variables
The rapid development of information technology requires every line of business to adapt, including in the management of business processes and information systems. Small and medium enterprises (SMEs), such as Setunggal Coffee, need to build an effective digital infrastructure in order to compete, improve services, and speed up decision-making. However, many SMEs lack a thorough understanding of how to design information systems that are structured and aligned with business objectives. This leads to operational inefficiencies and low quality data used in business management.
II. Problem Approach (Gap Analysis)
Zachman Framework is one of the enterprise architecture approaches that has been proven to be able to design information systems systematically and comprehensively. According to Zachman (1987), this framework presents a multidimensional approach to defining information systems from various perspectives, ranging from business owners to technical implementers. Handoko and Ramdhan (2019) showed that the application of the Zachman Framework in educational institutions succeeded in increasing the effectiveness of communication and system design. Meanwhile, research by Awaluddin (2016) proved that this framework is suitable for use in small to large scale organizations due to its flexibility and classification accuracy. Even so, the application of the Zachman Framework to the SME sector, especially local coffee businesses such as Setunggal Coffee, has rarely been studied in depth. This is the gap in this research.
III. Research Objectives
This research aims to apply the Zachman Framework in designing enterprise architecture for Setunggal Coffee. The main focus is to structure information and business processes that can support business operations in an efficient and integrated manner. To achieve this, the research will also explore how system design models and business processes can be developed to support system efficiency and integration.
IV. Systematics of Article Writing
The writing of this article is organized into several main sections. The first section is the Introduction which outlines the background, research gap, objectives, and systematics. The second section presents a literature review that discusses the theory and previous research. Furthermore, the third section is the Research Method which explains the approach and data collection techniques. The fourth section presents the Results and Discussion which outlines the application of the framework and data interpretation. Finally, the fifth section is the Conclusion that summarizes the research findings and provides implications and suggestions.

2. The Art of Research

Good research is built on a solid theoretical foundation and a thorough understanding of previous works. This literature review aims to explore the main concepts that form the basis of the research, namely Enterprise Architecture, Zachman

Framework, as well as the context of its application to the small and medium enterprise (SME) sector, specifically in the coffee industry.

1. Enterprise Architecture
   Enterprise architecture is a systematic approach to designing and managing the structure, processes, information, and technology in an organization to align with business objectives (Sessions, 2007). In the context of SMEs, enterprise architecture helps simplify business complexity and improve operational efficiency. According to Lankhorst (2009), this architecture is important to ensure integration between business needs and information technology systems.
2. Zachman Framework
   The Zachman Framework was introduced by John A. Zachman in 1987 as a conceptual framework for designing information systems architecture in organizations. This framework consists of a matrix of 6 rows (perspectives: Planner, Owner, Designer, Builder, Subcontractor, and System) and 6 columns (interrogatives: What, How, Where, Who, When, Why) that explain the elements of architecture from various points of view (Zachman, 1987). This framework is non-linear and flexible, so it can be used for various scales of organizations, including SMEs.
3. Relevance of Zachman Framework in SMEs
   The study by Handoko and Ramdhan (2019) states that the application of the Zachman Framework can improve the efficiency and quality of information systems in the education sector. Meanwhile, Awaluddin (2016) showed that this framework can be adapted modularly for small-scale businesses such as cooperatives or coffee shops. The research proves that a systematic architecture approach can be applied to different contexts, including local businesses that have not been optimally digitized.
4. Digitalization in the Local Coffee Industry
   The local coffee industry is currently starting to shift towards digital, both in terms of marketing, stock management, and financial records. However, there are still many business actors who do not have a structured system design framework. This is an opportunity to apply the Zachman Framework to help formulate information systems that are able to answer operational challenges and support sustainable business growth.
5. The Art of Research in System Design
   This literature review also refers to "The Art of Research" approach, which is how researchers not only rely on logic and data, but also creativity, context sensitivity, and synthesis ability in developing a framework. According to Gray and Malins (2004), effective research in the field of design and information systems requires a deep understanding of user needs and contextual interpretation of the theory used.

3. Method

This research used a qualitative descriptive approach with the aim of describing the application of the Zachman Framework in designing enterprise architecture in a local coffee business, namely Setunggal Coffee. This approach was chosen because it allows researchers to explore in depth the process and context of designing information systems in a specific business environment.

1. Type of Research
   This type of research is descriptive qualitative. This research aims to systematically describe and analyze how the elements in the Zachman Framework are applied in developing enterprise architecture. This approach is used because the main focus of the research is not to measure quantitatively, but to understand the relationship between business entities and the information systems that support them.
2. Data Collection Techniques
   The data in this research was collected through several methods, namely:
   - Direct observation of Setunggal Coffee's business activities, especially in the aspects of management, operational processes, and information technology used.
   - Semi-structured interviews with business owners, operational staff, and customers to explore needs, problems, and expectations related to information systems.
   - Documentation study, which is a review of business documents such as simple financial statements, inventory records, and the POS (Point of Sale) system used.
3. Development Framework
   The system development framework refers to the Zachman Framework which has six perspectives (Planner, Owner, Designer, Builder, Subcontractor, and System in Operation) and six main focuses (What, How, Where, Who, When, and Why). Each element in this framework is described contextually according to the conditions of Setunggal Coffee, starting from the definition of information needs (data), business processes, organizational structure, to technology implementation.

Visualization of the Zachman framework is also used as the main tool in designing an enterprise architecture blueprint that can be implemented by businesses. (What, How, Where, Who, When, and Why). Each element in this framework is described contextually according to the conditions of Setunggal Coffee, starting from the definition of information needs (data), business processes, organizational structure, to technology implementation. Visualization of the Zachman framework is also used as the main tool in designing an enterprise architecture blueprint that can be implemented by businesses.

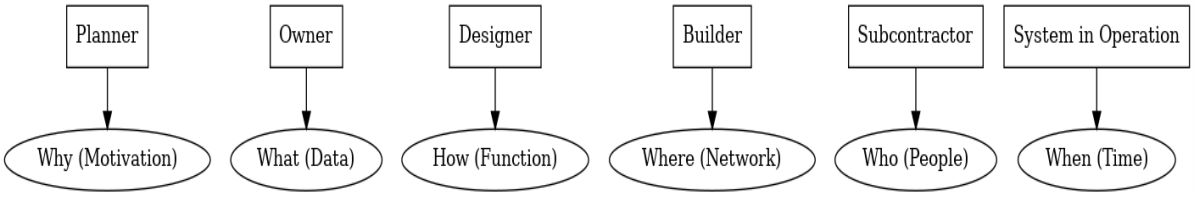

Figure 1. Development Framework

By utilizing this framework, this research can map every need and business process of Setunggal Coffee in a structured manner. For example, from the Planner's perspective, identification is carried out on business goals and business development directions. Owner's perspective, by describing how the business defines important data such as customers and products, as well as work process strategies. Designer focuses on the shape of the system and the process model designed. In the next stage we can involve the Builder who is in charge of determining the technology that can support the system. The Subcontractor is related to the technical implementation of the system, while the System in Operation will evaluate the running of the system in real conditions.

Table 1. Zachman Framework - Setunggal Coffee

Perspectives / Interrogative	What (Data)	How (Function)	Where (Location)	Who (Person)	When (Time)	Why (Motivation)
Planner	Coffee products, raw materials, customers , suppliers	Key processes: ordering, production, distribution	Physical store, partner shop, online marketplace	Customers, owners, suppliers	Operating hours, production schedule	Business vision and mission, desire to expand market
Owner	Product category (ground coffee, beans, direct brew)	Business workflow (order → roasting → delivery)	Location of warehouse, shop, delivery	Organization all structure (manager, production staff, courier)	Promotion calendar, coffee events	Strategies to increase customer loyalty and production efficiency
Designer	ERD of customer data, products, transactions	DFD diagram of online ordering system	POS system architecture, website, and marketplace	User roles: admin, customer, cashier	Automatic scheduling system	Business process to IT system
Builder (Developer)	MySQL database tables product, user, order	Application code: frontend website, backend order system	Web hosting, database server	Admin and customer user interface	Order execution and real-time stock updates	Translation of business needs to technology
Subcontract or (Third Party)	SQL query, table structure	API modules: payment gateway, shipment tracking	Server infrastructure (cloud hosting)	System users: frontend dev, backend dev	API response time, error logs	System parameters such as minimum stock filter
Functioning System	Real-time transaction data	Running process (checkout, payment, tracking)	Active website, store POS system	Customers who are shopping	Transaction time, delivery time	System running to fulfill end user needs

The visualization produced in the form of a flowchart makes it easier for business owners/owners to understand the interrelation ships between elements in their business and become a guide in developing information systems in the future. With this approach, the digital transformation process in the MSME environment can be carried out in a more targeted manner and according to the needs of the field.

4. Result

Based on the analysis conducted on Setunggal Coffee using the Zachman Framework, an enterprise architecture mapping that includes six perspectives and six main focuses was obtained. From the results of observations and interviews, it was found that the business processes in this shop already have a consistent operational pattern, but have not been documented systematically. This section describes the results of field research on Setunggal Coffee's business based on the application of the Zachman Framework. The results obtained are detailed in the following points:

a. Object of Research
   The main object in this research is a local coffee business called Setunggal Coffee, which operates on an MSME scale and focuses on selling coffee, both directly and online. The main focus of this research is how the business process runs and how the information system supports the business operations.

b. Object Characteristics
   Based on observations and interviews, Setunggal Coffee has the following characteristics:
   - The business was pioneered by local MSME players with management that is still manual.
   - The transaction process already uses a simple POS (Point of Sale) system, but has not been integrated with the inventory management system and financial reports.
   - There is no formal documentation of data structures, business processes, or operational responsibilities.

Table 2: Framework Explanation

Explanation of Framework (Zachman Framework)	
Planner	Business objectives are focused on service efficiency and market expansion. Business direction includes digitizing processes and strengthening brand identity.
Owner	The main business processes include purchasing materials, product manufacturing, customer service, and stock management. Key areas of management include customer, product, and transaction data.
Designer	The process model is organized in a flowchart that describes the operational flow from ordering to financial reporting. The system is designed to be interconnected between work units.
Builder (System Developer)	Technology recommendations that can be used include a POS system that is integrated with an inventory database and a cloud-based financial recording application.
Subcontractor (Technical Implementation)	Technical implementation is adjusted to the limitations of human resources and MSME budgets. Development starts from small modules that can be implemented in stages.
System in Operation	Evaluation of the existing system shows that even though it uses POS, there are still inefficiencies because stock records and reports are done separately. The new system designed is expected to unify these functions.

c. Explanation of the Framework (Zachman Framework)
   The application of the Zachman Framework is done by mapping six perspectives and six main focuses. The results of the mapping are summarized as follows:
   - Planner:
     Business objectives are focused on service efficiency and market expansion. Future business directions include digitizing processes and strengthening brand identity.

- Owner:
  Key business processes include raw material purchasing, product processing, customer service, and stock management. Key data managed includes customer, product, and transaction data.
- Designer:
  The process model is organized in the form of a flowchart that describes the operational flow from ordering to financial reporting. The system is designed to be interconnected between work units.
- Builder (System Developer):
  Technology recommendations that can be used include a POS system integrated with an inventory database and a cloud-based financial recording application.
- Subcontractor (Technical Implementation):
  Technical implementation is adjusted to the limitations of human resources and MSME budgets. Development starts from small modules that can be implemented in stages.
- System in Operation:
  Evaluation of the existing system showed that even though it was already using POS, there were still inefficiencies because stock records and reports were done separately. The new system designed is expected to be able to unify these functions.

5. Discussion

This section describes the research results obtained from the previous points, and interprets the meaning of the mapping based on the Zachman Framework for the Setunggal Coffee business.

a. Congruence between business needs and framework
   From the mapping results, it can be seen that the Zachman Framework is able to accommodate the growing needs of Setunggal Coffee. For example, in the Planner and Owner perspectives, the business goals to be achieved are aligned with the digitalization strategy and increased service efficiency. This shows that this framework approach can be used flexibly in an MSME environment.
b. Findings of weaknesses in the current system
   The research found that the information system used has not been able to support the entire business process. For example:
   - Inventory is still done manually and separated from the sales system.
   - There is no centralized recording system that can be accessed in real-time.
   - There is no written standard operating procedure (SOP) that guides employee activities.
c. Advantages of the Zachman approach for MSMEs
   The Zachman framework helps develop system architecture with a comprehensive approach. Every element from data, processes, locations, actors, time, to goals can be described in a structured manner. This is important for MSME players who do not have any system documentation or blueprint at all.
d. Direct implications for Setunggal Coffee's business
   The direct impact of this mapping is the emergence of awareness of the importance of system design from the start. Business owners become more aware of what components need to be considered in developing information systems, ranging from customer data structures to employee work models..

6. Conclusion

The research concludes that the application of the Zachman Framework has successfully facilitated the design of enterprise architecture at Setunggal Coffee. By using this framework, business processes that were previously undocumented could be systematically identified and aligned with relevant architectural perspectives. The resulting design provides a clear and structured foundation that supports the gradual development of information systems tailored to the specific operational needs of the business. These findings confirm that the Zachman Framework is an effective reference model for enterprise architecture development in small-scale business environments.

However, this research has several limitations. It focuses solely on one business unit, Setunggal Coffee, which restricts the ability to generalize the results across other types of SMEs. Moreover, the implementation phase has not yet been carried out; the study is limited to the design and mapping of enterprise architecture without validating it through real-world application. Further empirical research is necessary to assess the practical performance and long-term benefits of the proposed model.

In terms of practical implications, the application of the Zachman Framework allows for better-structured documentation and mapping of business processes. It also provides technology recommendations that align with actual business needs and serves as a guide for business owners to plan and implement information systems in a more systematic and phased

approach. These outcomes can support SMEs in enhancing operational efficiency and strategic alignment through structured architectural planning.

Acknowledgments

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