



Digitalization-Based Strategic System Planning for Sustainable Textiles in the Clothing Industry

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ABSTRACT

Digital transformation requires organizations to align strategic objectives with well-structured information systems planning. This study aims to propose a Digitalization-based Strategic System Planning (DSSP) model to support strategic digitalization initiatives in the clothing industry. Adopting a qualitative approach, the research integrates the Strategic Information Systems Planning (SISP) framework by Ward and Peppard as the strategic foundation and the TOGAF Standard Version 10, limited to Architecture Development Method (ADM) Phases A, B, and C, as the architectural design framework. The proposed model is validated using the McFarlan Strategic Grid to assess the strategic positioning of the information systems portfolio. The results indicate that the DSSP model demonstrates strategic coherence and alignment between business strategy and information systems architecture. The study contributes a structured reference model to support digital transformation initiatives within the clothing industry.

Keywords: Digitalization, Strategic System Planning, Clothing Industry, Ward and Peppard, TOGAF

I. INTRODUCTION

Digital transformation has become an essential strategy for organizations seeking to improve operational efficiency, enhance competitiveness, and respond to rapidly changing market demands. The clothing industry, as one of the sectors experiencing significant technological disruption, is increasingly required to integrate digital technologies into its business processes. However, the industry also faces sustainability challenges. The fashion sector is estimated to contribute 8–10% of global carbon emissions and approximately 20% of industrial wastewater worldwide, while global textile production consumes around 79 trillion liters of water annually (Aponte et al., 2024; Niinimäki et al., 2020).



Strategic Information Systems Planning (SISP) plays a critical role in ensuring that information systems and technologies support organizational goals effectively. In the digital era, SISP is widely recognized as an important approach for aligning business strategy and information systems strategy. Effective planning must serve as a blueprint for transforming the entire business model (Peppard & Ward, 2016). Ward and Peppard provide a strategic approach to aligning business and information systems strategies, while TOGAF offers a comprehensive enterprise architecture framework for designing and managing information systems architecture (Peppard & Ward, 2016; The Open Group, 2022).

Several studies have applied strategic information systems planning and enterprise architecture frameworks in different organizational contexts. For example, Mulyani et al. (2020) utilized Ward and Peppard's framework to support strategic information systems planning, while Andry et al. (2023) integrated enterprise architecture concepts to facilitate organizational digital transformation. Similarly, Maulana (2024) employed strategic planning approaches to improve business process effectiveness. Although these studies demonstrate the benefits of strategic information systems planning, they primarily focus on business performance and digital transformation without specifically addressing sustainability-oriented digitalization in the clothing industry.

Research within the clothing and fashion industry has also received growing attention. Fung et al. (2019) highlighted the importance of sustainability considerations throughout the fashion supply chain, while Septiarani et al. (2021) discussed digital initiatives aimed at improving operational performance in clothing businesses. In addition, strategic development opportunities within the apparel sector have been widely discussed in previous studies. Nevertheless, existing studies have not comprehensively integrated strategic information systems planning, enterprise architecture, and sustainability objectives into a unified digitalization planning model for the clothing industry (Asfiah & Indriyanti, 2022).

Previous studies have used the Ward and Peppard framework to support strategic information systems planning, TOGAF to develop enterprise architecture, and the McFarlan Strategic Grid to evaluate and prioritize application portfolios. However, these frameworks are often applied separately or integrated only to a limited extent, particularly in studies related to sustainability-driven digital transformation in the clothing industry. As a result, there is still no comprehensive model that can effectively connect business strategy, enterprise architecture, application prioritization, and circular economy goals within a single strategic planning approach.

Although previous studies have demonstrated the effectiveness of the Ward and Peppard framework for strategic information systems planning, TOGAF for enterprise architecture development, and the McFarlan Strategic Grid for application portfolio analysis, these frameworks have generally been applied independently or in

limited combinations. Existing studies also tend to emphasize organizational performance or digital transformation without comprehensively integrating sustainability objectives into strategic information systems planning for the clothing industry. Consequently, there remains a lack of an integrated strategic planning model that simultaneously aligns business strategy, enterprise architecture, application portfolio prioritization, and circular economy objectives. This study addresses this gap by proposing a Digitalization-based Strategic System Planning (DSSP) model that unifies these complementary frameworks into a single reference model for sustainable digital transformation in the clothing industry.

To address this gap, this study proposes a Digitalization-based Strategic System Planning (DSSP) model by integrating the Strategic Information Systems Planning framework of Ward and Peppard with TOGAF Standard Version 10, focusing on Architecture Development Method (ADM) Phases A, B, and C. The proposed model is further validated using the McFarlan Strategic Grid to assess the strategic positioning of the information systems portfolio. By providing a structured reference model, this study aims to support digital transformation initiatives and strengthen the alignment between business strategy and information systems architecture within the clothing industry.

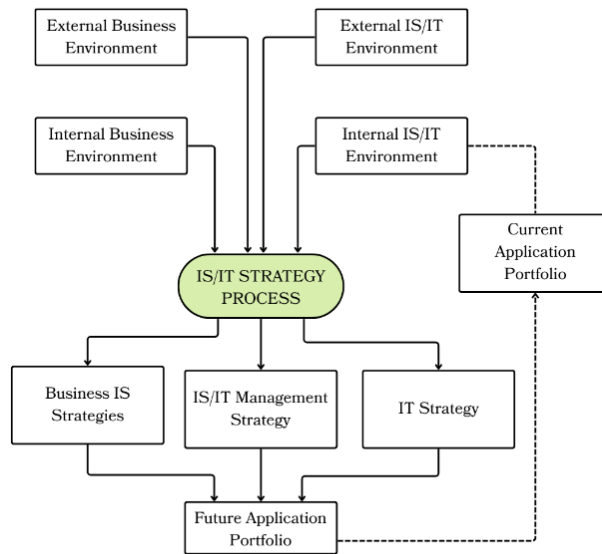
II. LITERATURE REVIEW

Theory of Strategic Information Systems Planning

Strategic Information Systems Planning (SISP) is widely recognized as an important approach for aligning business strategy and information systems strategy. According to Ward & Peppard (2016), effective planning should serve as a blueprint for transforming the entire business model and ensuring that information systems initiatives support organizational objectives.

In essence, SISP emphasizes that information systems are not only technical tools, but also strategic enablers that must be aligned with business direction. This alignment is critical to ensure that technology investments contribute directly to organizational goals, rather than operating in isolation.

One of the most widely used frameworks in SISP is the Ward and Peppard framework, which serves as the foundational model in this study and underpins the development of the DSSP model.



Source: Adapted and redesigned from Ward and Peppard (2016)

Figure 1. Ward and Peppard Framework

The framework highlights four interconnected domains that must be aligned to achieve effective strategic planning:

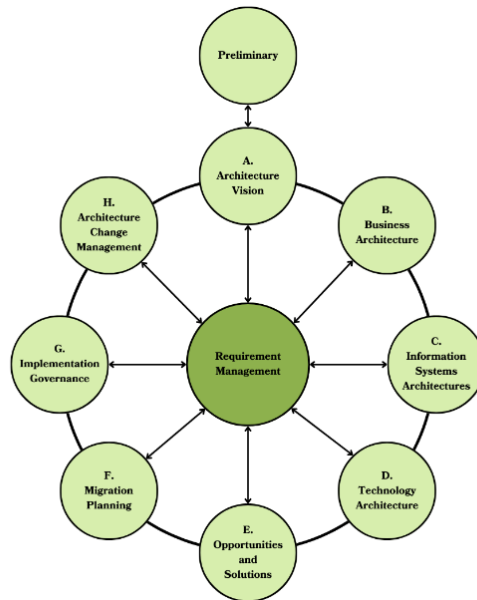
1. Business Strategy: Defines the organization's long-term direction, goals, and competitive positioning
2. Organizational Strategy: Focuses on internal structure, processes, and capabilities that support business goals
3. Information Systems (IS) Strategy: Describes how information systems are designed to support business processes and decision-making
4. Information Technology (IT) Strategy: Covers the technology infrastructure and technical resources required to implement IS solutions.

The interaction between these four domains ensures that information systems and technology development are fully aligned with both business needs and organizational capabilities. In this study, the Ward and Peppard framework acts as the primary strategic foundation for designing a circular economy-based digital transformation model within DSSP.

Enterprise Architecture Using TOGAF

The Open Group Architecture Framework (TOGAF) is one of the most widely adopted Enterprise Architecture (EA) frameworks used to design, plan, and manage enterprise information system architecture in a structured way. TOGAF provides a systematic approach to ensure that business goals are properly translated into information system and technology solutions.

One of the core components of TOGAF is the Architecture Development Method (ADM), which serves as a step-by-step methodology for developing enterprise architecture.



Source: Adapted and redesigned from The Open Group (2022)

Figure 2. The Open Group Architecture Framework Standard v10

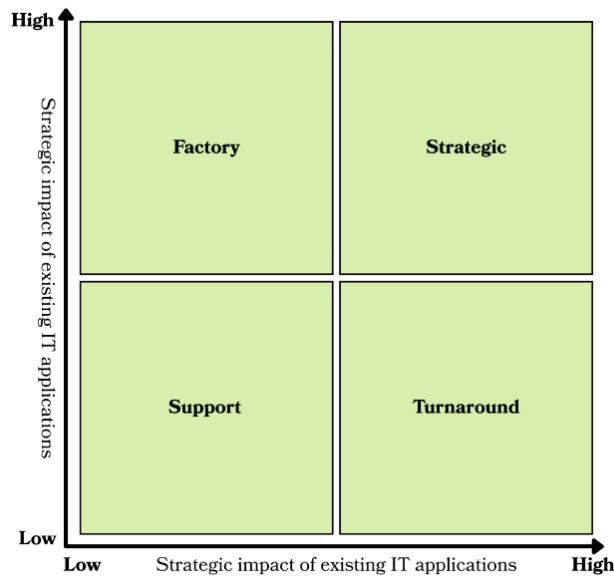
This study focuses on ADM Phase A (Architecture Vision), Phase B (Business Architecture), and Phase C (Information Systems Architecture), which are used to translate strategic objectives into business and information system architectures.

1. Phase A: Architecture Vision defines the scope, stakeholders, and overall objectives of the architecture initiative
2. Phase B: Business Architecture describes business processes, organizational structures, and operational requirements
3. Phase C: Information Systems Architecture focuses on designing data and application systems that support business processes.

These three phases are sufficient to support the design of the DSSP model, as they directly connect strategic intent with system-level design outcomes.

McFarlan Strategic Grid

The McFarlan Strategic Grid is used to classify information systems according to their current and future strategic impact on organizational performance.



Source: Adapted and redesigned from McFarlan (1983)

Figure 3. McFarlan Strategic Grid

The model categorizes information systems into four quadrants based on their role in supporting business operations and strategic development:

1. **Support:** IT has a low impact on both current operations and future strategic development. IT's role here tends to be limited to internal administrative functions
2. **Factory (Key Operational):** IT is critical to the continuity of daily operations (high current impact), but no new systems are being developed that are expected to drastically alter the company's competitive landscape (low future impact).
3. **Strategic:** IT is at the core of an organization's competitive advantage, where both current operational systems and future development plans have a significant impact on business success.
4. **Turnaround (High Potential):** The current operational impact may be low, but new systems are being developed with high potential to transform the company's business model or future strategy (Ives et al., 2023).

In this study, the McFarlan Strategic Grid is used as a validation tool to assess the strategic position of proposed information systems within the DSSP model.

Previous Studies and Research Gap

Previous studies have examined strategic information systems planning, enterprise architecture, and IT strategic positioning using frameworks such as Ward and Peppard, TOGAF, and the McFarlan Strategic Grid.

However, these studies generally apply the frameworks separately and have not fully integrated them into a single strategic system planning model. Research focusing on the clothing industry is also still limited, particularly in integrating digital transformation with sustainability and circular economy principles.

Therefore, this study proposes a Digitalization-based Strategic System Planning (DSSP) model that integrates Ward and Peppard for strategic alignment, TOGAF ADM (Phase A, B, and C) for enterprise architecture design, and McFarlan Strategic Grid for strategic classification, with a focus on circular economy-based digital transformation.

III. METHOD

Benchmark selection

The benchmarking analysis was based on H&M, Zara, and SHEIN because each company demonstrates a distinct approach to digital transformation and sustainability in the global clothing industry. H&M was chosen for its strong focus on sustainability and circular economy initiatives, Zara for its highly integrated digital supply chain and RFID-based inventory management, and SHEIN for its AI-driven demand forecasting and on-demand production strategy. These companies were selected using four criteria: (1) their strong influence in the global clothing industry, (2) the availability of public annual and sustainability reports, (3) their adoption of advanced digital technologies, and (4) their commitment to sustainability. Rather than comparing the overall performance of these companies, the benchmarking analysis was designed to identify diverse digital best practices that could inform the development of the proposed DSSP model.

Data sources

The benchmarking analysis was conducted using secondary data collected from publicly available corporate documents. These included annual reports, sustainability reports, official company websites, and other publicly disclosed materials from H&M, Zara, and SHEIN. These sources were chosen because they provide detailed insights into each company's digital transformation initiatives, sustainability strategies, operational practices, and supply chain management.

Research approach

This study adopts a qualitative approach to develop a DSSP model for the clothing industry. The research focuses on integrating strategic information systems planning, enterprise architecture, and information system portfolio analysis into a unified framework that supports digital transformation and circular economy objectives.

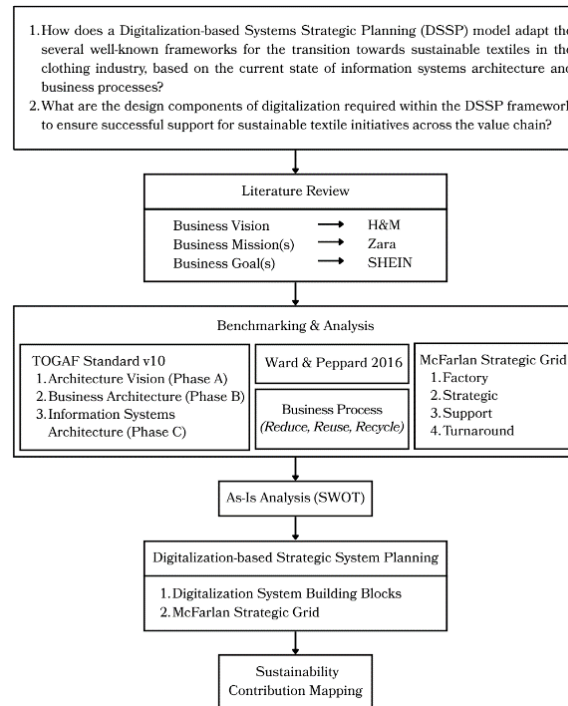


Figure 4. Research Process

This study began with a literature review and benchmarking analysis of three global fashion companies, namely H&M, Zara, and SHEIN. Annual reports, sustainability reports, and publicly available documents were analyzed to identify sustainability strategies, circular economy initiatives, and digitalization practices. The findings were used to establish the strategic foundation and identify best practices relevant to the development of the Digitalization-based Strategic System Planning (DSSP) model.

The DSSP model was developed by integrating the Ward and Peppard framework, TOGAF Architecture Development Method (ADM), and the McFarlan Strategic Grid. First, the Ward and Peppard framework was applied to analyze business objectives, organizational requirements, and information system needs related to circular economy implementation. This stage ensured that digitalization initiatives were aligned with sustainability goals and organizational strategy.

Next, TOGAF ADM was employed to translate strategic requirements into enterprise architecture. This study focused on Phase A (Architecture Vision), Phase B (Business Architecture), and Phase C (Information Systems Architecture). These phases were used to define the target architecture, business processes, data requirements, and application components needed to support circular economy activities.

Finally, the proposed information systems were evaluated using the McFarlan Strategic Grid to determine their strategic importance and implementation priority. The outputs of all stages were integrated into the DSSP model, providing a structured framework for supporting digital transformation and circular economy implementation in the clothing industry. The overall research process is illustrated in Figure 4.

IV. RESULTS AND DISCUSSION

Strategic Foundation for DSSP Development

The development of the Digitalization-based Strategic System Planning (DSSP) model began with the identification of strategic business objectives and digitalization priorities within the clothing industry. To establish a comprehensive strategic foundation, this study conducted a benchmarking analysis of leading fashion companies, namely H&M, Zara, and SHEIN. These companies were selected due to their extensive implementation of digital technologies and sustainability initiatives across various business processes.

Table 1. As-Is Analysis

Type	Key Findings
Strengths	Integration of AI, RFID, DPP, circular systems, supply chain visibility, data-driven decision making, sustainability monitoring, supplier integration, and reverse logistics support.
Weaknesses	High implementation costs, supplier digital readiness issues, data transparency challenges, reverse logistics complexity, and ESG standardization difficulties.
Opportunities	Growing demand for sustainable fashion, advancement of digital technologies (AI, blockchain, IoT, RFID, DPP), circular economy adoption, and expansion opportunities for SMEs.
Threats	Cybersecurity risks, technology dependence, high implementation costs, fast-changing fashion trends, and greenwashing risks.

Source: Developed by the author, 2026

Table 1 presents the SWOT analysis conducted to identify the internal and external factors influencing the development of the DSSP model. The analysis indicates that the proposed model possesses several strengths, particularly in its ability to integrate digital technologies such as artificial intelligence (AI), Radio Frequency Identification (RFID), Digital Product Passport (DPP), and circular systems into a unified platform. These capabilities support data-driven decision-making, supply chain visibility, sustainability monitoring, and reverse logistics management across clothing business processes.

The SWOT analysis demonstrates that DSSP has strong potential to support digital transformation and sustainability objectives in the clothing industry. The identified strengths, weaknesses, opportunities, and threats subsequently serve as the basis for formulating strategic initiatives through the strategic mapping process.

Table 2. Strategy Mapping Result

Strategy	Code	Description
Strength + Opportunity	SO1	Development of AI-driven forecasting within DSSP to improve production planning accuracy, optimize inventory management, and reduce overproduction through real-time data analytics.
	SO2	Development of RFID-based inventory tracking to improve real-time inventory visibility, product traceability, and operational efficiency across the supply chain ecosystem.
	SO3	Development of integrated supply chain coordination within DSSP to improve real-time collaboration among suppliers, manufacturing, and distribution partners through a cloud-based integration ecosystem.
	SO4	Development of an integrated emission monitoring system within DSSP to support sustainability control and centralized monitoring of Scope 1, 2, and 3 emissions.
Strength + Threat	ST1	Development of a recycling and resale platform to support circular economy implementation and respond to increasing public pressure on sustainable fashion practices.
	ST2	Development of a donation management system to support product redistribution, extend product usability, and strengthen social sustainability within the circular fashion ecosystem.
Weakness + Opportunity	WO1	Development of supplier integration and onboarding mechanisms to improve supplier digital readiness, standardization, and ecosystem collaboration within DSSP.
	WO2	Development of reverse logistics integration within DSSP to optimize product return, recycling, and closed-loop supply chain processes.
Weakness + Threat	WT1	Development of a data verification system to improve sustainability transparency, ensure data consistency, and reduce greenwashing risks in sustainability claims.

Source: Developed by the author, 2026

Table 2 presents the strategic mapping matrix developed using the TOWS approach to transform the findings of the SWOT analysis into actionable strategic initiatives for DSSP development. These findings provide a strategic foundation for determining the business capabilities, information systems requirements, and digital initiatives incorporated into the proposed DSSP model.

DSSP Model Development

Based on the strategic initiatives identified through the strategic mapping process, the DSSP model was developed by integrating the Ward and Peppard framework with TOGAF Standard Version 10. This integration enables the translation of business objectives and strategic priorities into a structured digitalization roadmap consisting of business capabilities, information systems requirements, and supporting technological components. Following the TOGAF Architecture Development Method (ADM), the model focuses on Phase A (Architecture Vision), Phase B (Business Architecture), and Phase C (Information Systems Architecture) to ensure alignment between business strategy and information systems architecture.

The DSSP Architecture Vision was developed to support the digitalization of the clothing industry through a cloud-based ecosystem that integrates stakeholders, business processes, and sustainability-oriented digital services within a centralized platform. The proposed architecture leverages technologies such as Artificial Intelligence (AI), Radio Frequency Identification (RFID), Digital Product Passport (DPP), big data analytics, and sustainability monitoring systems to enhance supply chain visibility, transparency, and operational efficiency. In addition, DSSP is designed to support circular economy practices by facilitating recycling, reuse, donation, and reverse logistics activities.

The DSSP Business Architecture outlines the key business capabilities required to support digital transformation and sustainability in the clothing industry. It brings together suppliers, manufacturers, distributors, recycling partners, and donation organizations into a centralized digital ecosystem that enables better coordination across the supply chain. The architecture covers core business processes, including supplier onboarding, production planning, inventory management, supply chain coordination, sustainability monitoring, and circular economy activities. By facilitating real-time information sharing and collaboration among stakeholders, the proposed architecture improves operational efficiency while enhancing transparency and traceability throughout the clothing value chain.

The Digitalization System Building Blocks (DSBB) represent the core digital components that support the development and implementation DSSP framework. DSBB is designed to identify and organize the required IS/IT components based on the strategic recommendations.

Table 3. DSSP Building Blocks

Strategy	Code	Keyword	IS/IT Requirement
SO1: Development of AI-driven demand forecasting within DSSP to improve production planning accuracy, optimize inventory management, and reduce overproduction through real-time data analytics.	AIF-1	Artificial Intelligence	AI-driven Forecasting System
SO2: Development of RFID-based inventory tracking and data verification systems to improve product traceability, sustainability transparency, ESG data consistency, and reduce greenwashing risks across the supply chain ecosystem.	RFID-1	Radio Frequency Identification	RFID-based Sensor & Data Verification System
SO3: Development of integrated supply chain coordination within DSSP to improve real-time collaboration among suppliers, manufacturing, and distribution partners through a cloud-based integration ecosystem.	SC-1	Supply Chain Integration	Supply Chain Integration System
SO4: Development of an integrated emission monitoring system within DSSP to support sustainability control and centralized monitoring of Scope 1, 2, and 3 emissions.	EM-1	Emission Monitoring	Emission Monitoring System
WO1: Development of supplier integration and onboarding mechanisms to improve supplier digital readiness, standardization, and ecosystem collaboration within DSSP.	SU-1	Supplier Integration	Supplier Integration & Onboarding System
WO2: Development of reverse logistics integration within DSSP to optimize product return, recycling, and closed-loop supply chain processes.	RL-1	Reverse Logistics	Reverse Logistics System
ST1: Development of a recycling and resale platform to support circular economy implementation	RR-1	Recycling & Reuse	Recycling & Reuse Platform

and respond to increasing public pressure on sustainable fashion practices.

ST2: Development of a donation management system to support product redistribution, extend product usability, and strengthen social sustainability within the circular fashion ecosystem.

WT1: Development of a data verification system to improve sustainability transparency, ensure ESG data consistency, and reduce greenwashing risks in sustainability claims.

DM-1

Donation
Management

Donation
Management
System

RFID-1

Radio
Frequency
Identification

RFID-based
Sensor & Data
Verification
System

Source: Developed by the author, 2026

The proposed architecture translates the DSSP Building Blocks into an integrated digital ecosystem that supports the implementation of digitalization and sustainability initiatives in the clothing industry. The architecture was developed based on the strategic requirements identified through the Ward and Peppard framework and structured using TOGAF ADM Phase C to ensure alignment between business capabilities and information systems. Table 4 presents the proposed application portfolio developed to support the DSSP model.

Table 4. DSSP Proposed Application

Code	Description
AIF-1	AI-driven Forecasting System
RFID-1	RFID-based Sensor & Data Verification System
SC-1	Supply Chain Integration System
EM-1	Emission Monitoring System
SU-1	Supplier Integration & Onboarding System
RL-1	Reverse Logistics System
RR-1	Recycling & Reuse Platform
DM-1	Donation Management System

Source: Developed by the author, 2026

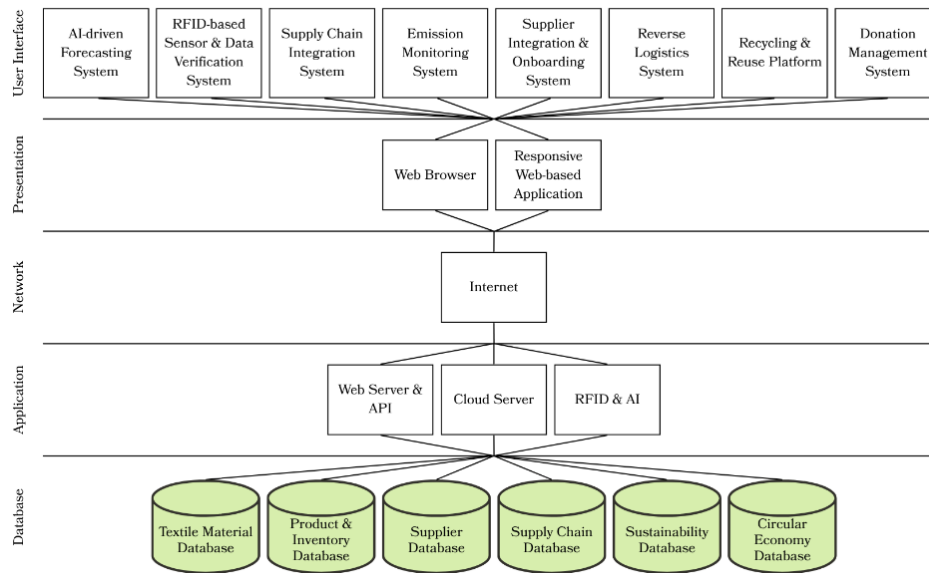


Figure 5. Data Architecture

Figure 1 illustrates the proposed data architecture of DSSP. The architecture integrates users, application systems, databases, and supporting infrastructure within a cloud-based environment to facilitate centralized data management, real-time information sharing, and sustainability monitoring. This architecture enables seamless data exchange among stakeholders while improving traceability and supporting data-driven decision-making.

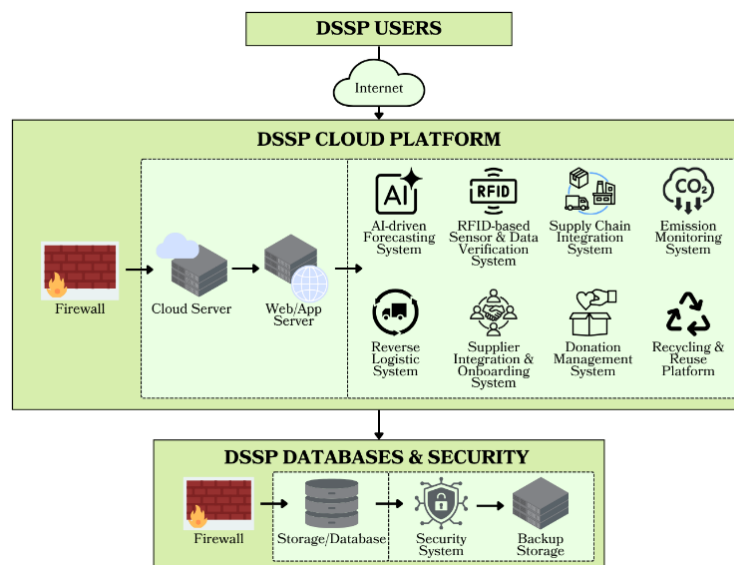


Figure 6. Network Architecture

Figure 2 presents the proposed network architecture that connects users, cloud infrastructure, application servers, databases, and security components within the DSSP platform. The cloud-based architecture supports secure communication, centralized operations, and reliable data storage, while ensuring system scalability, operational continuity, and effective collaboration across the clothing supply chain.

DSSP Applicability and Validation

To ensure the practical applicability of the proposed model, DSSP was designed as a standardized strategic planning framework that can be adopted by organizations across the clothing and textile value chain. Although the model was developed through benchmarking of H&M, Zara, and SHEIN, its implementation is not limited to large multinational companies. Instead, DSSP is intended for organizations pursuing digital transformation and sustainability initiatives through process integration, traceability, sustainability monitoring, and data-driven decision-making. Table 5 presents the DSSP applicability standard, which defines the organizational characteristics suitable for implementing the proposed model.

Table 5. DSSP Applicability Standard

Code	Description
Industry sector	Clothing and textile industry
Business model	Clothing manufacturing, fashion retailing, apparel production, or integrated fashion supply chains
Sustainability commitment	Organizations seeking to implement circular economy practices through Reduce, Reuse, and Recycle (3R) principles
Digitalization need	Organizations requiring process integration, sustainability monitoring, traceability, and data-driven decision-making
Supply chain scope	Industries involving multiple stakeholders such as suppliers, manufacturers, distributors, consumers, and recycling partners
Scale	Small-, medium-, and large-scale clothing industries
Industry sector	Clothing and textile industry
Business model	Clothing manufacturing, fashion retailing, apparel production, or integrated fashion supply chains

Source: Developed by the author, 2026

Since clothing industries vary in terms of operational complexity, technological capabilities, and available resources, DSSP implementation is categorized into three organizational clusters: small-, medium-, and large-scale industries. This clustering enables organizations to adopt the proposed applications progressively based on their digital maturity and business requirements.

As presented in Table 6, small-scale organizations are recommended to implement essential applications that support demand forecasting and circular economy activities.

Table 6. DSSP Clustering

Cluster	Characteristic	Recommended Application
Small-scale	Limited resources, low operational complexity, and local supply chain networks	AIF, DM, RL, RR
Medium-scale	Moderate resources, intermediate operational complexity, and regional supply chain networks	AIF, DM, RL, RR, SC, SU
Large-scale	Extensive resources, high operational complexity, and integrated global supply chain networks	AIF, DM, RL, RR, SC, SU, RFID

Source: Developed by the author, 2026

Model Validation using McFarlan Strategic Grid

To evaluate the strategic relevance of the proposed DSSP model, the application portfolio was validated using the McFarlan Strategic Grid. This validation assesses the contribution of each proposed application based on its operational importance and strategic impact within the clothing industry. The resulting application portfolio is classified into four quadrants: Strategic, Factory (Key Operational), Support, and Turnaround. Table 7 presents the validation results of the DSSP application portfolio.

Table 7. DSSP Strategic Grid

Factory	Support
- RFID-based Sensor & Data Verification System - Supply Chain Integration System - Emission Monitoring System	Supplier Integration & Onboarding System
Strategic	Turnaround
AI-driven Forecasting System	- Recycling & Reuse Platform - Reverse Logistics System

Source: Developed by the author, 2026

Sustainability Contribution Mapping

To evaluate the sustainability impact of the proposed DSSP model, each application was mapped against the three sustainability dimensions: economic, social, and environmental sustainability. This mapping demonstrates that DSSP not only facilitates digital transformation and business process integration but also supports the implementation of sustainability-oriented practices throughout the clothing value chain.

Table 8 presents the sustainability contribution of each DSSP application. The results indicate that several applications contribute simultaneously to multiple sustainability dimensions.

Table 8. Sustainability Contribution Mapping

Sustainability Contribution	Code	IS/IT Requirement	Explanation
Economic Value	AIF-1	AI-driven Forecasting System	Supports operational efficiency and reduces inventory holding costs through demand-based production forecasting.
	SC-1	Supply Chain Integration System	Enhances operational coordination and improves supply chain efficiency.
	SU-1	Supplier Integration & Onboarding System	Reduces supply chain fragmentation and coordination inefficiency.
	RL-1	Reverse Logistics System	Improves resource utilization and product recovery efficiency.
	RR-1	Recycling & Reuse Platform	Creates additional economic value from reusable and recycled products.
Social Value	RFID-1	RFID-based Sensor & Data Verification System	Increases transparency and strengthens consumer trust in sustainability information.
	SU-1	Supplier Integration & Onboarding System	Improves supplier collaboration and digital readiness.
	RL-1	Reverse Logistics System	Encourages stakeholder participation in circular economy activities.
	RR-1	Recycling & Reuse Platform	Encourages sustainable consumption behavior among consumers.
	DM-1	Donation Management System	Supports social redistribution and community-oriented sustainability activities.
Environmental Value	AIF-1	AI-driven Forecasting System	Reduces overproduction and textile waste generation.
	RFID-1	RFID-based Sensor & Data Verification System	Supports material traceability and waste reduction through real-time inventory tracking.

EM-1	Emission Monitoring System		Monitors emissions to support sustainability and environmental control.
RL-1	Reverse Logistics System		Supports waste reduction through product return and recovery activities.
RR-1	Recycling & Reuse Platform		Supports recycling and product reuse to reduce textile waste generation.
DM-1	Donation Management System		Extends product lifecycle and reduces unnecessary clothing disposal.

Source: Developed by the author, 2026

V. CONCLUSION AND RECOMMENDATION

This study proposed a Digitalization-based Strategic System Planning (DSSP) model to support digital transformation and sustainability in the clothing industry by integrating the Ward and Peppard Strategic Information Systems Planning framework with TOGAF Standard Version 10 (ADM Phases A, B, and C). The proposed model addresses key industry challenges through eight integrated digital applications that support demand forecasting, traceability, supply chain coordination, sustainability monitoring, supplier integration, reverse logistics, recycling and reuse, and donation management.

The organizational clustering demonstrates that DSSP can be adopted by companies of different scales, while validation using the McFarlan Strategic Grid confirms the strategic relevance of the proposed application portfolio. Furthermore, the sustainability contribution mapping shows that DSSP supports economic, social, and environmental sustainability.

Despite its contributions, this study has several limitations. First, the proposed enterprise architecture was developed only up to TOGAF ADM Phases A, B, and C, without extending to the subsequent implementation and governance phases. Second, the DSSP model remains a conceptual strategic planning framework and has not yet been empirically implemented or evaluated in real organizational settings. Third, the benchmarking analysis was limited to three global clothing companies, which may not fully represent the diversity of digital transformation practices across the clothing industry.

Future research is encouraged to extend the proposed model by incorporating the remaining TOGAF ADM phases and conducting empirical implementation and evaluation within clothing industry organizations. Future studies may also incorporate additional benchmark companies and expert validation to further refine the proposed DSSP model.

REFERENCES

- Andry, J. F., Bernanda, D. Y., Honni, Christianito, K., & Andriani, A. (2023). Analysis of Information Systems Strategic Planning using Ward and Peppard Framework Case E-Commerce Company. *International Journal of Advances in Applied Sciences*, 12(2), 179–187. <https://doi.org/10.11591/ijaas.v12.i2.pp179-187>
- Aponte, N. O., Gómez, J. H., Argüelles, V. T., & Smith, E. D. (2024). Fast Fashion Consumption and Its Environmental Impact: A Literature Review. *Sustainability: Science, Practice, and Policy*, 20(1). <https://doi.org/10.1080/15487733.2024.2381871>
- Asfiah, & Indriyanti, A. D. (2022). Perencanaan Strategis Sistem Informasi pada Toko Hijab Q-Ya menggunakan Metode Ward and Peppard. *Journal of Emerging Information Systems and Business Intelligence*, 3(3), 43–51. <https://doi.org/10.51519/journalita.volume3.issuue2.year2022.page66-78>
- Fung, Y.-N., Choi, T.-M., & Liu, R. (2019). Sustainable Planning Strategies in Supply Chain Systems: Proposal and Applications with A Real Case Study in Fashion. *Production Planning and Control*, 31(11–12), 883–902. <https://doi.org/10.1080/09537287.2019.1695913>
- Ives, B., Lacity, M., & Ross, J. (2023). F. Warren McFarlan's Pioneering Role in Impacting IT Management Through Academic Research. *MIS Quarterly Executive*, 22(4), 273–286. <https://doi.org/10.17705/2msqe.00086>
- Maulana, Y. M. (2024). Model Application Portfolio berdasarkan Framework TOGAF dan McFarlan Strategic Grid. *Jurnal Fasikom*, 14(2), 339–345. <https://doi.org/10.37859/jf.v14i2.7119>
- Mulyani, A., Kurniadi, D., Septiana, Y., & Wahyono, T. (2020). Strategic Planning for the Implementation of Tourism Information Systems. *International Journal of Scientific & Technology Research*, 9(2), 4714–4717.
- Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The Environmental Price of Fast Fashion. *Nature Reviews: Earth and Environment*, 1, 189–200. <https://doi.org/10.1038/s43017-020-0039-9>
- Peppard, J., & Ward, J. (2016). *The Strategic Management of Information Systems: Building a Digital Strategy*. Wiley. https://books.google.co.id/books?id=JGG-CgAAQBAJ&printsec=copyright&redir_esc=y#v=onepage&q&f=false
- Septiarani, C. I., Ramadhan, A., Saputra, A. F., & Yalina, N. (2021). Perencanaan Strategis Sistem Informasi dan Teknologi Informasi pada PT. Matahari Department Store TBK. *Indonesian Journal on Computer and Information Technology*, 6(1), 43–51. <https://doi.org/10.31294/ijcit.v6i1.8911>
- The Open Group. (2022). *TOGAF® Standard, Version 10*. <https://www.opengroup.org/togaf>