DESIGNING A BLUEPRINT FOR THE SEMI-AUTOMATION OF SAMPLE SHIPMENT DOCUMENTATION IN SAP USING ENTERPRISE ARCHITECTURE PLANNING (EAP)

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ABSTRACT

PT Eco Smart Garment Indonesia (PT ESGI) is a garment manufacturing company that has implemented an Enterprise Resource Planning (ERP) system based on SAP (System Applications and Products). However, the process of generating sample shipment documents within the Shipping Department still faces inefficiencies due to repetitive manual procedures and data redundancy. Administrative staff must perform manual data entry, resulting in a cycle time of 30–40 minutes per shipment and a human error rate of 10–15% per cycle. This study aims to design a semi-automation blueprint for sample shipment documents within SAP using the Enterprise Architecture Planning (EAP) approach to enhance the efficiency and accuracy of the shipment administration process. The research methodology follows Spewak's EAP framework, encompassing an analysis of the existing state, a gap analysis, data architecture design using Entity Relationship Diagrams (ERD), and application architecture design in the form of an integrated DHL Report within SAP. The research yields a semi-automation blueprint featuring an integrated data architecture based on the "single source of truth" principle, a system architecture comprising an SAP DHL Report add on, and a new workflow that eliminates redundant manual activities. Implementing this blueprint is projected to reduce document generation cycle time from 30–40 minutes to 15–20 minutes per shipment, minimize human error to near-zero levels, and eliminate the need for intermediate Excel files. This study contributes to the development of information system architecture frameworks within the garment manufacturing sector and serves as a strategic guide for the company's digital

transformation toward more efficient and integrated business processes.

KEYWORDS Enterprise Architecture Planning (EAP), SAP, sample delivery documents

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INTRODUCTION

In an era of increasingly intense industrial competition, business process efficiency achieved through the use of information technology has become a key factor in gaining a competitive advantage. One manifestation of this technology implementation is the Enterprise Resource Planning (ERP) system, which serves to integrate and automate various corporate functions (Indriyani & Agusti, 2025). Among the various ERP platforms available, Systems, Applications, and Products (SAP) is one of the most widely adopted by large enterprises due to its ability to comprehensively unify business processes (Mahadewa, 2024).

PT Eco Smart Garment Indonesia (PT ESGI), a garment manufacturing company based in Boyolali and a subsidiary of PT Pan Brothers Tbk, has implemented an SAP system to support its operations. However, in practice, the sample shipment administration process continues to face significant challenges. This study was prompted by findings that the shipping department encounters operational issues when preparing documentation for sample shipments. Operators are required to manually copy data from SAP to Excel (for packing lists) and subsequently to a third party system (DHL), thereby creating a risk of human error and causing delays in the sample shipment process (Indriyani & Agusti, 2025). Based on interviews and direct observation within the Shipping Department, it was identified that administrators must repeatedly enter data across three different platforms. The process begins with the creation of internal documents such as Shipment Confirmation (KP), Outbound Delivery Order (ODO), Shipment Document (SD), and Invoices in SAP. This data must then be manually copied into Microsoft Excel to generate packing lists before being re-entered into the DHL system to issue international shipping labels. This repetitive and fragmented manual process not only consumes a significant amount of time but also increases the likelihood of data entry errors (Tarigan et al., 2024).

RESEARCH METHOD

Research Location

This research was conducted at PT Eco Smart Garment Indonesia, located in Ngepringan Hamlet, RT.01 RW.09, Jati Village, Sambi District, Boyolali Regency, Central Java Province. The research focused on the Shipping Department, specifically the process of preparing sample shipment documents, which includes KP, ODO, SD, Invoices, packing lists, and DHL reports.

Metode

This study utilizes both primary and secondary data. Primary data were collected through three methods. First, direct observation was conducted to examine in depth the administrative workflow for sample shipments within the Shipping Department, including data entry into SAP, data transfer to Excel, and the mechanism for entering data into the

DHL system. Second, in depth interviews were carried out using a guide developed based on the research problem. Informants were selected via purposive sampling based on the following criteria: Shipping Department employees with direct experience in completing sample shipment documentation, a minimum tenure of three years, and active use of both SAP and DHL systems. Two individuals were selected as the study sample: the Shipping Admin (operational staff) and the Shipping Manager (supervisor and process approver). Third, documentation involved gathering records related to the sample shipment process such as KP forms, ODO, invoices, and packing lists as well as screenshots of the DHL system interface. Secondary data were obtained from scholarly literature, including accredited national journals and textbooks relevant to EAP, SAP systems, document semi-automation, and pertinent prior research.

The data analysis method in this study is based on the Enterprise Architecture Planning (EAP) framework developed by Steven H. Spewak (1992). EAP is defined as the process of defining an architecture for information usage to support the business, along with a plan to implement that architecture (Spewak, 1992). This study is limited to the implementation planning stage; consequently, the analysis focuses on Layer 1 (Planning Preparation), Layer 2 (Current Business and Technology Modeling), and Layer 3 (Future Vision: Data Architecture and Application Architecture) (Mulyana & Setiawan, 2023).

RESULT AND DISCUSSION

Analysis of Existing Conditions

Current Business Process Modeling

Based on observations and interviews, the administrative procedure for sample shipments at PT ESGI is still performed manually and involves three disconnected platforms, SAP, Microsoft Excel (Packing List), and the DHL system (Indriyani, 2026; Indriyani & Agusti, 2025). The current workflow for generating sample shipment documents begins with the administrator logging into SAP to create an ODO (Outbound Delivery Order), followed by an SD (Shipment Document), and finally an Invoice. Once the internal documents are complete, the administrator copies the Invoice number into the Excel file (Packing List). The final stage involves logging into the DHL system and manually entering data by copying it from the Excel file (Packing List) into the corresponding DHL fields. This process requires the administrator to have both the Excel file and the DHL system open simultaneously, constantly switching back and forth to transfer data from Excel to DHL and then returning to Excel to retrieve the next piece of information.

Direct measurements identified several types of time waste.

The total cycle time to complete a set of sample shipment documents ranges from 30 to 40 minutes shipment. The time breakdown is as follows, generating internal documents in SAP takes 15 to 20 minutes, entering the invoice number onto the packing list takes 1 to 2 minutes, and copying data from the packing list to the DHL system is the most time consuming stage taking 15 to 20 minutes due to differing data formats and the need to manually search for and match data points one by one.

The identified types of waste include waste of motion (as the administrator must switch between Excel and DHL screens dozens of times per cycle), waiting time (caused by searching for data in unstructured Excel files), rework (due to entry errors occurring in 10–15% of cycles, adding 10–20 minutes shipment), and data redundancy (since the same data must be entered three times, SAP → Excel → DHL).

Gap Analysis

The gap analysis reveals significant differences between current and desired states across several aspects. Regarding business processes, current operations rely on manual tasks across three non integrated platforms, whereas the desired state entails an integrated workflow requiring only a single data entry in SAP, this would reduce cycle times from 30–40 minutes to 15–20 minutes per shipment and lower the human error rate from 10–15 percent to near zero.

In terms of data architecture, current data is fragmented across three locations (SAP, Excel, DHL) in non standardized formats that do not meet DHL requirements, and there is no automated validation. The desired state involves centralized data within SAP formatted to meet DHL needs uring consistency through a single source of truth and incorporating automated validation. Meanwhile, regarding system architecture, the primary gaps lie in the absence of integrated DHL reporting within SAP, the lack of integration between applications (SAP, Excel, DHL), and the absence of validation features in Excel.

Tabel 1. Gap Analysis

Aspect	Current Condition	Desired Condition
Workflow	Manual, 3 non integrated platforms	Integrated, single data entry in SAP
Cycle time	30–40 minutes/delivery	15–20 minutes/delivery
Human error	10–15% per cycle	Approaching 0%
Intermediary medium	Excel (unstructured)	DHL report in SAP (structured)

Future Architectural Design

Data Architecture Design

Based on a gap analysis, the future data architecture was designed around the "single source of truth" principle, ensuring that all sample shipment data is stored centrally within the SAP system. This design resulted in eight interconnected data entities: Marketing Department, Shipment Confirmation (KP), Outbound Delivery Order (ODO), Shipment Document (SD), Invoice, DHL Report, Buyer, and DHL System.

A fundamental change lies in the DHL Report entity, which replaces the role of Excel as an intermediary medium. The DHL Report entity connects directly to the Invoice entity via a one-to-one relationship, meaning Invoice data automatically becomes available in the DHL Report format integrated within SAP. This eliminates two manual data transfer points that were previously primary sources of inefficiency and human error: the transfer of data from the Invoice (SAP) to Excel (Packing List) and from Excel to the DHL system.

The developed process-versus-entity matrix identifies the DHL Report entity as the most critical component, as it bridges the data in SAP with the input requirements of the DHL system. The "Generate DHL Report" process serves as the key step enabling administrators to copy data directly from SAP to the DHL system, by passing Excel entirely.

System Architecture Design

Based on the process versus entity matrix, four system candidates were identified. The SAP system remains the operational backbone, supplemented by an integrated DHL Reporting module. The DHL Reporting system (an SAP add-on) is a new system proposed as a critical strategic candidate for sustaining future operational efficiency strategies. Within the future architecture, the Microsoft Excel system serves solely as a transitional

aid and for archiving purposes, while the DHL system remains the ultimate system of record for shipment data entry and label generation. The functional specifications for the SAP-integrated DHL report were designed to present sample shipment data in a format compatible with the input fields of the DHL system. This eliminates the need for administrators to use intermediate Excel files, reduces the document creation cycle time from 30–40 minutes to 15–20 minutes per shipment, and minimizes human error associated with manual copy pasting and data reconciliation. The primary users are Shipping Department administrators responsible for generating sample shipment documents, while the Shipping Department Manager can also access the report for oversight and verification purposes.

The data presented in the DHL report is derived from the Invoice table (invoice number, invoice date, and value of goods), the recipient and sender address tables (recipient name, address, city, postal code, country, and phone number), and fixed sender details PT ESGI stored in the company's master data. The DHL report also includes additional features such as data validation which displays alerts for incomplete or invalid data search functionality based on invoice number or date range, and limited editing capabilities for specific fields that may require adjustment before the data is copied to the DHL system.

Blueprint Design for DHL Report Semi-Automation in SAP

The designed blueprint comprises five main views. First is the SAP login page, serving as the primary gateway for administrators to access all available SAP features. Second is the Invoice Tcode input page, which directs the system to the sales invoice creation interface a prerequisite for accessing and generating the DHL Report. Third is the invoice number input page, where administrators can enter a specific invoice number or select one from a list,this page includes a date range search feature to facilitate access to past shipment data. Fourth is the DHL Report page, which displays sample shipment data in a structured format matching the column sequence of the DHL system, here, white colored data fields are editable, while blue colored fields are read only. Fifth is the DHL page, displaying the specific fields administrators must complete, such as the sender's address, recipient's address, shipment details, and commodity code (HS Code).

There is a significant difference between the current state and the desired state. Currently, data is sourced from unstructured Excel files (Packing Lists), requiring administrators to manually locate data point by point, this process takes 15–20 minutes per shipment and carries a high risk of error (10–15% per cycle). In contrast, the desired state utilizing DHL reports from SAP features data organized sequentially according to DHL column specifications, thereby reducing processing time to 5–10 minutes per shipment and bringing the error risk close to zero.

Blueprint Report DHL

Tabel 2. Comparison of current and expected conditions

Aspect	Current Condition	Desired Condition
Data source	Excel (Packing List) unstructured	DHL report from SAP structured
Data lookup	Manual, searching item by item	Data arranged sequentially according to DHL columns
Processing time	15–20 minutes	Shipment 5–10 minutes
Shipment Error risk	High (10–15% per cycle)	Low (near 0%)

The results of this study demonstrate that applying the EAP methodology yields a comprehensive semi-automation blueprint capable of addressing inefficiencies in the sample shipment administration process. These findings align with research by Tryana (2021), which showed that enterprise architecture design using EAP and the Zachman Framework applied to a garment retail company successfully defined key business processes and produced data and application architectures that reduced business cycle times while enhancing the company's operational efficiency and effectiveness.

The primary improvement resulting from this blueprint is the elimination of two manual data transfer points through the development of an integrated DHL report within SAP. This addresses key weaknesses identified in the SWOT analysis, data redundancy and format mismatches between Excel packing lists and the DHL system. By implementing this blueprint, the company can leverage its existing strengths an integrated SAP system, experienced administrative staff, and management support to overcome internal weaknesses and capitalize on external opportunities presented by advancements in information technology.

This study also reinforces the findings Vinayak Kalabhavi, (2025) that effective system integration can enhance efficiency and reduce manual intervention. In his study, Vinayak Kalabhavi (2025) demonstrated that a resilience framework designed to optimize asynchronous integration between SAP ECC and CRM via BDoc and IDoc message management successfully improved issue resolution efficiency by 80% and reduced manual intervention by 70%. However, unlike that study, which focused on the technical aspects of communication protocols, this research emphasizes the development of an architectural framework as a strategic guideline, consistent with the nature of EAP as a planning tool rather than a detailed design tool (Spewak, 1992).

This research is also relevant to the findings Sheriva et al.,(2024) it highlights that the implementation of ERP and its supporting systems often falls short of optimal due to various technical challenges, such as legacy system integration and inadequate infrastructure. By designing a structured blueprint, this research offers a solution to these integration issues through a systematic architectural approach.

A limitation of this study is that the system was not directly implemented or tested; consequently, the resulting blueprint remains conceptual in nature. However, by incorporating interface mock-ups, this blueprint provided the company with a concrete visual representation prior to the actual implementation phase. This study was also limited to the Shipping Department of PT ESGI and focused solely on the process of generating sample shipment documents (KP, ODO, invoice, packing list, and DHL reports) without directly integrating with the DHL system.

CONCLUSION

Based on the research conducted, the following conclusions can be drawn. This study successfully developed a blueprint for the semi-automation of sample shipment documentation within SAP using an EAP approach, comprising three key components, an integrated data architecture based on the "single source of truth" principle, a system architecture featuring an integrated DHL report within SAP, and a new workflow scenario that eliminates redundant manual tasks. With this blueprint, the sample shipment documentation process becomes more efficient, administrators need only input data once into SAP,

and the data automatically becomes available in a structured DHL report format that meets DHL's system requirements.

The data architecture design successfully identified eight interconnected data entities and was engineered to eliminate two manual data transfer points specifically, the transfer from the SAP invoice to the Excel packing list and from Excel to the DHL system which were the primary sources of inefficiency and human error. Thanks to this integrated data architecture, the documentation process is accelerated, as data no longer requires repeated entry across three separate locations.

Overall, the implementation of the semi-automation blueprint has yielded significant positive results. Cycle times dropped from 30–40 minutes to 15–20 minutes per shipment, the human error rate was reduced from 10–15 percent to near zero, data entry requirements in SAP were cut from three steps to one, and the use of Excel as an intermediary previously a source of inefficiency was eliminated.

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