

Integrated Enterprise Architecture for Coffee Shop Supply Chain and Customer Interaction Using TOGAF ADM

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Abstract: Although the coffee shop sector continues to expand quickly, enterprise architecture research in this domain has generally treated the customer-facing point of sale and the upstream sourcing of coffee as two separate concerns, so that supply chain and customer interaction are rarely represented together. This study builds an integrated enterprise architecture model for a coffee shop enterprise that brings supply chain operations and customer interaction into a single design spanning three product lines: coffee beverage, non-coffee beverage, and food and snack sales. The study is conceptual and design-oriented; the enterprise modelled is a representative reference case reconstructed from operational patterns reported in earlier studies of independent coffee shops, not an empirically observed firm. The work follows the phases of The Open Group Architecture Framework Architecture Development Method, from the Preliminary Phase to Migration Planning, with ArchiMate as the modelling notation and the Business Model Canvas as the expression of the business logic. The findings show that the Architecture Vision phase connects three stakeholder groups and their strategic drivers to specific realizing components, namely integrated point-of-sale management, customer service management, and smart inventory management, while the Business Architecture phase shows that all three product lines share a recurring procurement-inventory-preparation-sales pattern and rely on a common supplier and point-of-sale application layer instead of separate systems. A preliminary analytical self-assessment of coverage and traceability indicates internal completeness, whereas expert validation remains future work. The model offers a reusable reference architecture for the digital transformation of small and medium coffee shop enterprises.

Keywords: ArchiMate; Coffee Shop; Enterprise Architecture; Supply Chain Integration; TOGAF ADM

INTRODUCTION

Both globally and specifically in Indonesia, the coffee shop business has expanded quickly, propelled by consumers who increasingly expect experiences that are more innovative, convenient, and dependable (Budiman, Indrajit, & Dazki, 2025). With competition growing sharper, the role of information technology has changed: rather than merely supporting daily operations, it now acts as a source of lasting competitive advantage, especially when adopted in a coherent, strategy-aligned way instead of as a collection of unconnected point tools (Budiman et al., 2025). Enterprise Architecture

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(EA) provides precisely this coherent approach, allowing an organization to plan, align, and refine its business processes, applications, and technology infrastructure within one unified framework so that leaders can make well-informed decisions without duplication.

Of the EA frameworks in common use, The Open Group Architecture Framework (TOGAF) and its Architecture Development Method (ADM) continue to be among the most frequently chosen for constructing enterprise architectures, regardless of sector or organizational scale (Al Omari, Alkhateeb, & Hammo, 2024). Working alongside TOGAF, ArchiMate is an open and vendor-neutral modeling language that describes an architecture uniformly across its business, application, and technology layers (Zhi & Zhou, 2022). Within Indonesia, TOGAF ADM has already been employed in a range of small and medium enterprise (SME) settings, including retail firms (Andry, Liliana, & Clara, 2022), regulated financial SMEs (Sari, Mulyana, & Mukti, 2025), and other micro, small, and medium enterprise (UMKM) cases (Amanda, Hindarto, Indrajit, & Dazki, 2023; Maita, Mulyani Egust B, Salisah, & Rahmawita, 2022).

Even with this expanding literature, research that targets coffee shops specifically is still relatively limited. The studies that do exist typically capture either the customer-facing operations (ordering, payment, and service) or the upstream sourcing and inventory activities, yet they seldom bring the two together in one unified architecture (Budiman et al., 2025). A recent examination of a coffee shop chain, for example, concentrated mainly on application-layer integration for ordering, payment, and inventory, without tracing the design back to the coffee-bean supply chain inside the same set of diagrams (Budiman et al., 2025). Coffee differs from many retail goods in that its supply chain originates from a highly dispersed base of smallholder farmers, after which the beans move to distributors, roasters, and ultimately the shop counter (Petrillo, Rehman, & De Felice, 2025); consequently, an architecture limited to the point-of-sale layer represents only a portion of the value chain that shapes a coffee shop's costs, product quality, and customer experience.

The present study responds to this gap by putting forward an integrated EA model for a coffee shop that deliberately links supply chain activities (coffee-bean procurement, receiving and quality inspection, and ingredient inventory control) with customer interaction activities (ordering, preparation, cashiering, and payment) across three concurrent product lines: coffee beverages, non-coffee beverages, and food and snacks. ArchiMate is used as the notation and the TOGAF ADM phases provide the methodological structure, in line with earlier TOGAF-ADM investigations of SMEs and coffee shop businesses (Andry et al., 2022; Budiman et al., 2025; Maita et al., 2022; Sari et al., 2025); the Business Model Canvas (Salwin, Jacyna-Golda, Kraslawski, & Waszkiewicz, 2022) is first used to set out the value proposition, partners, and revenue streams, which are then converted into ArchiMate artifacts.

This research makes three contributions. First, it demonstrates cross-product-line integration in which the three product lines draw on a shared upstream Supplier application layer and a shared downstream POS layer instead of being represented as separate silos. Second, it follows a complete driver-goal-requirement chain that runs from stakeholder concerns down to the particular application components that realize them, so the architecture exhibits a clear link from strategy to execution. Third, it supplies a reusable reference model that other coffee shop SMEs can adapt, thereby carrying TOGAF-ADM-based digital transformation research (Amanda et al., 2023; Andry et al., 2022; Sari et al., 2025) into the specialty-beverage and food-service field. The rest of the paper surveys related work, explains the research method, reports the results by TOGAF ADM phase, discusses the findings together with their limitations, and then concludes.

LITERATURE REVIEW

Enterprise Architecture Frameworks

TOGAF supplies a systematic way to design, plan, implement, and govern an enterprise's information technology architecture. It is built around four domains (business, data, application, and technology) that are elaborated iteratively through the ADM, whose successive phases carry architects from strategic intent toward a governed and implementable architecture (Al Omari et al., 2024). Since TOGAF is a process framework rather than a notation, it is frequently combined with ArchiMate, an open modeling language that depicts architectural elements across the business, application, and technology layers

through a compact and consistent vocabulary, and that supports both the depiction of current and target states and the analysis of the impact of proposed changes (Zhi & Zhou, 2022).

Beyond the mechanics of the framework itself, a number of studies stress that the worth of EA hinges on how thoroughly it is tied to governance and to measurable results. A cross-country meta-analysis reported that the effect of EA on digital transformation success is conditioned by organizational culture, by how far it is integrated with emerging technologies such as AI, IoT, and blockchain, and by region-specific economic conditions, which shows that EA cannot be applied as a uniform template (Alghamdi, 2024). In a related vein, a framework for sustainable EA is said to depend on legislative backing, a top-down target architecture, architecture governance, shared services, and collaboration across organizations, principles first formulated for government EA but applicable to any well-structured digital transformation initiative (Thirasakthana & Kiattisin, 2021).

Enterprise Architecture for SMEs and UMKM in Indonesia

A sizeable set of TOGAF-ADM case studies has examined digital transformation among Indonesian SMEs. In the retail sector, TOGAF ADM has been used to produce company-specific blueprints that then steer later technology investment (Andry et al., 2022). Within the UMKM segment, the method has served to design enterprise architectures grounded in existing business conditions, and the resulting adoption of digital technology has been shown to strengthen supply chain management, inventory control, decision-making, and customer relationship management (Maita et al., 2022). Its reach also extends to public-service utilities such as drinking-water providers, which illustrates its adaptability across different types of organization (Amanda et al., 2023). For a regulated financial SME, TOGAF 10 has been applied through a Design Science Research approach to yield an EA blueprint covering the business, information systems, and technology layers of small banks (Sari et al., 2025). Considered together, this work confirms that TOGAF ADM scales down well to SME settings, yet it also reveals that most cases concentrate on retail, cooperative, utility, or financial services rather than on the food-and-beverage or coffee shop sector in particular.

Enterprise Architecture in the Coffee Shop and Coffee Supply Chain

Of direct relevance here, an EA model for a coffee shop chain was constructed with TOGAF and ArchiMate, bringing together a smart ordering system, a multichannel payment system, and a cloud-based inventory management system, and yielding evident gains in operational efficiency and customer experience; nevertheless, that design, like most comparable studies, leans toward the application layer around ordering, payment, and inventory and does relatively little to model the upstream coffee-bean supply chain within the same diagrams (Budiman et al., 2025). Adding to this operational perspective, a coffee shop has been shown to act as an ecosystem orchestrator that raises community welfare through dynamic capabilities, which underlines that a coffee shop's value creation reaches well beyond its own premises into a wider network of suppliers and community partners (Priyono, Shukor, Moin, & Salikin, 2025). Quantitative findings further establish that digital marketing and service quality together exert a significant effect on customers' purchase decisions at a coffee shop, which justifies incorporating customer-service processes and their supporting application components into a coffee shop EA model (Putri & Sulaeman, 2022).

Toward the upstream side of the value chain, a mobile-application architecture aimed at transparency and traceability in the coffee supply chain combined blockchain, radio-frequency identification, and barcode technologies to sharpen decision-making in transportation, inventory, and purchasing while lowering operational costs (Petrillo et al., 2025). Separately, a corporate cloud transformation framework offers guidance for migrating operational systems such as POS and inventory management onto elastic cloud infrastructure, which bears directly on the Technology Architecture and Migration Planning phases of the present study (Gunturu, 2022). Lastly, a group of recent TOGAF-ADM studies drawn from a variety of industries, including digital financial services (Karjadi, Indrajit, & Dazki, 2025), digital banking (Sentosa, Indrajit, & Dazki, 2024), real estate (Widjaja, Indrajit, & Dazki, 2025), property development (Veronika, Dazki, & Indrajit, 2025), and the cruise sector (Watasendjaja, Chudra, & Yohannis, 2025), together attest to the adaptability of the ADM phase sequence across markedly

different domains and confirm that the phase structure used here is a well-established, industry-neutral methodological choice.

Synthesis of Prior Work and Positioning of This Study

Read together, the studies reviewed above differ along four dimensions that matter for the present work: the methodological approach used to develop the architecture, the architectural scope that was modelled, the way the resulting model was evaluated, and the limitation that this study seeks to address. Table 1 sets these dimensions side by side for the works most closely related to this research, so that the review moves beyond a descriptive listing toward an explicit comparison.

Table 1. Comparative synthesis of closely related prior studies

Study	Domain and method	Architectural scope modelled	Evaluation approach	Limitation relevant to this study
Andry et al. (2022)	Retail industry; enterprise architecture planning with TOGAF ADM	Business, application, and technology layers of one retail firm	Descriptive blueprint; no external validation reported	One dominant product line; suppliers remain outside the modelled boundary
Maita et al. (2022)	Indonesian UMKM; TOGAF ADM design study	Business processes and supporting systems of one small enterprise	Analytical discussion of expected benefits	Supply chain and customer relationship benefits are argued narratively rather than modelled as architecture elements
Amanda et al. (2023)	Drinking-water utility; TOGAF ADM	Enterprise-wide blueprint for a public-service provider	Conceptual assessment	Different sector; no multi-product-line or supply-chain-to-customer integration
Sari et al. (2025)	SME bank; TOGAF 10 within a Design Science Research approach	Business, information systems, and technology layers of a small bank	Evaluation inside the design science cycle	Regulated financial domain; single service line; upstream partners not modelled
Budiman et al. (2025)	Coffee shop chain; TOGAF ADM with ArchiMate	Application-layer integration of ordering, payment, and inventory	Qualitative assessment of operational efficiency and customer experience	Coffee-bean supply chain not represented in the same diagrams; the path from drivers to realizing components remains implicit
Petrillo et al. (2025)	Coffee supply chain; mobile application architecture using blockchain, radio-frequency identification, and barcode technology	Upstream transparency and traceability from farm to distribution	Analysis of decision-making and operational cost effects	Stand-alone traceability application rather than an enterprise architecture that also contains the customer-facing layer
Watasendjaja et al. (2025)	Cruise industry; TOGAF ADM with ArchiMate	Enterprise-wide architecture for a service operator	Conceptual modelling	Confirms the domain-neutrality of the phase sequence but does not address small food-and-beverage enterprises

Three patterns emerge from this comparison. Methodologically, the enterprise architecture studies converge on the same Architecture Development Method phase sequence and are predominantly single-case, qualitative design studies whose evaluation stops at internal analytical reasoning or descriptive argument rather than external validation; this is a limitation that the present study shares and therefore reports explicitly rather than overstates. In terms of scope, the enterprise architecture studies model the internal enterprise and treat suppliers as external actors outside the modelled boundary, whereas the one reviewed study that examines the coffee supply chain in depth does so as a stand-alone traceability application rather than as part of an enterprise-wide architecture (Petrillo et al., 2025); neither strand of this literature therefore yields a single coherent set of diagrams in which farmer, distributor, inventory, barista, cashier, and customer appear together. In terms of granularity, the small-enterprise studies model one dominant product or service line, so the question of whether several product lines can be served by one shared application and data layer, which is precisely the investment question facing an independent coffee shop with a limited information technology budget, is left unanswered. These three limitations define the design problem addressed in this paper.

Table 2 makes the resulting positioning explicit by mapping prior work and the present study against the aspects that follow from those limitations. As the table shows, individual aspects have each been addressed somewhere in the literature, but no single prior study combines upstream supply chain

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modelling, customer interaction modelling, parallel product lines, driver-to-component traceability, and shared application and data components within one architecture for the coffee shop domain. That combination, rather than any individual aspect taken alone, is the contribution claimed here.

Table 2. Positioning of this study against prior work on six architectural aspects

Aspect	Andry et al. (2022)	Maita et al. (2022)	Sari et al. (2025)	Budiman et al. (2025)	Petrillo et al. (2025)	This study
Coffee shop or food-and-beverage domain	No	No	No	Yes	Partial (upstream only)	Yes
Upstream supply chain actors modelled inside the architecture	No	Partial	No	No	Yes	Yes
Customer interaction processes modelled	Partial	Partial	Yes	Yes	No	Yes
Several product lines modelled in parallel	No	No	No	No	No	Yes
Explicit driver-goal-requirement-component traceability	Partial	No	Partial	Partial	No	Yes
Application and data components shared across product lines	No	No	No	Partial	No	Yes
External or expert validation of the model	Not reported	Not reported	Partial	Not reported	Partial	Planned; preliminary self-assessment reported

Note: Yes indicates that the aspect is explicitly modelled or reported; Partial indicates that it is addressed only in part or outside the architecture model; No indicates that it is not addressed; Not reported indicates that the source does not describe the item.

METHOD

This study follows a qualitative, design-oriented research strategy in keeping with earlier TOGAF-ADM-based EA work in the SME and food-service sector (Andry et al., 2022; Budiman et al., 2025; Maita et al., 2022; Sari et al., 2025). The business processes analyzed here, covering three product lines (coffee beverage, non-coffee beverage, and food and snack sales) together with the associated supply chain interactions with coffee farmers, distributors, and ingredient suppliers, were reconstructed from operations typical of independent coffee shops and cross-checked against secondary sources on EA frameworks, ArchiMate modeling conventions, and previous coffee-shop and UMKM EA case studies. It must be stated unambiguously that the coffee shop examined in this study is a representative conceptual case rather than one specific named enterprise. Its vision, mission, product lines, supplier relationships, and business processes were synthesized from patterns commonly found in independent Indonesian coffee shops and from the coffee shop and UMKM case studies reviewed above, so that the outcome functions as a reference architecture that individual coffee shops can instantiate and adapt to their own context. This design-oriented framing is appropriate for the objective of producing a replicable model rather than diagnosing or evaluating one firm's live implementation.

A terminological consequence follows and is applied consistently throughout the remainder of the paper. Because no enterprise was observed empirically, the term baseline architecture is used instead of current architecture. The baseline presented in the Technology Architecture and Opportunities and Solutions subsections is a conceptual reference baseline that represents the typical application and technology configuration reported for independent coffee shops in the reviewed literature; it is not an as-is architecture obtained through field observation, system inventory, or documentation audit at a named firm. The gap analysis reported later therefore compares a conceptual baseline with a conceptual target, and its result should be read as a design-level argument about the capabilities a coffee shop of this type would need to add, not as a diagnosis of any particular enterprise. Every statement about operational benefit in the Result and Discussion sections is accordingly an expected benefit of the proposed design rather than a measured outcome.

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The scope of this study is deliberately bounded at the Preliminary Phase through Phase F (Migration Planning). Phase G (Implementation Governance) and Phase H (Architecture Change Management) govern an implementation that is already under way and manage change requests against a deployed architecture; both presuppose an operating enterprise that has begun to realize the architecture, which lies outside the boundary of a conceptual reference model that has not yet been instantiated at a specific firm. Requirements Management, which the Architecture Development Method places at the centre of the cycle rather than in the sequence of phases (Al Omari et al., 2024), is nevertheless exercised throughout the work reported here: the stakeholder concerns and strategic drivers elicited in Phase A are carried forward as architecture requirements, traced into the business processes of Phase B, into the application and data components of Phase C, and into the technology nodes of Phase D, and are then reused in Phases E and F as the criteria against which gaps are identified and the roadmap is prioritized. The coverage and traceability assessment reported in the Preliminary Architecture Evaluation subsection is the mechanism by which this requirements thread is verified. Extending the model into Phases G and H, once a partner enterprise adopts the reference architecture, is stated as future work rather than silently omitted.

The research unfolds through the stages below, each mapped to the corresponding TOGAF ADM phase (Al Omari et al., 2024). The Preliminary Phase sets the scope of the engagement, verifies that TOGAF ADM and ArchiMate suit a single coffee shop enterprise, and adopts the firm's vision, mission, and slogan as architecture principles. In the Architecture Vision phase (Phase A), the key stakeholders (owner/management, customer, and supplier) and their concerns are identified, and a driver-goal-requirement chain is assembled with the ArchiMate motivation extension so that strategic drivers such as revenue growth and operational efficiency are tied to the components that realize them. The Business Architecture phase (Phase B) draws on the Business Model Canvas (Salwin et al., 2022) to set out partners, value propositions, customer segments, and resources, and then produces three ArchiMate business-process views, each covering procurement, preparation, and sales/service sub-processes. The Information Systems Architecture phase (Phase C) determines the application components (Supplier, POS) and data objects (Database Supplier, Database POS) that bind the three process views into a single application landscape. The Technology Architecture phase (Phase D) states the technology nodes that host the application and data layers. Finally, the Opportunities and Solutions phase (Phase E) and the Migration Planning phase (Phase F) locate the gaps between the conceptual baseline and the target architecture and set out a prioritized roadmap for closing them.

For consistency with the source diagrams, ArchiMate notation is applied throughout, separating business-layer, application-layer, and technology-layer elements in accordance with the standard ArchiMate convention (Zhi & Zhou, 2022). Every diagram in this paper was prepared by the authors. The resulting architecture is then subjected to a preliminary analytical self-assessment against two internally defined criteria, coverage and traceability, derived from the stakeholder concerns and strategic drivers established in the Architecture Vision phase. This assessment is a verification of internal consistency performed by the authors and is not an empirical validation; the protocol for the expert-judgment validation that is required before any claim of practical validity can be made is specified in the Preliminary Architecture Evaluation subsection.

RESULT

Preliminary Phase

The Preliminary Phase fixes the architectural principles that underpin every later design decision. The coffee shop's vision is to grow into a welcoming coffee destination that sparks connection, creativity, and community through outstanding coffee and meaningful experiences, summarized in the slogan "Good Coffee, Good Vibes." That vision is made concrete through mission statements centered on serving high-quality coffee, drinks, and food with consistency and excellence; offering a comfortable, inclusive setting where customers can meet, work, learn, and celebrate; nurturing coffee culture via workshops and community engagement; forging strong ties with suppliers and local communities; innovating continuously in products, services, and experiences; and providing convenience through online ordering, catering, and event services. Because these statements were adopted as architecture principles, each subsequent design decision was tested for alignment with them: the commitment to

consistency and excellence gives rise to the Inventory Accuracy goal in the Architecture Vision phase, while the commitment to convenient online ordering gives rise to the online-orders revenue stream in the Business Architecture phase. The same vision, mission, and slogan are carried through into the Business Model Canvas presented later in this section.

Architecture Vision

Three principal stakeholder groups were identified, each carrying its own chain of concerns (Fig. 1). For owner/management, the concerns run from Sales Performance through Profitability, Inventory Availability, and Customer Satisfaction to Operational Efficiency. For the customer, they run from Product Quality through Fast Service, Affordable Price, and Payment Convenience to Order Accuracy, which together capture the practical experience factors behind repeat visits. For the supplier, they run from Procurement Schedule through Inventory Information and Purchase Order Accuracy to Long-term Partnership, reflecting upstream partners' concern for predictable, accurate ordering that keeps the commercial relationship durable. Placing all three chains alongside one another, instead of privileging only the owner or only the customer as many retail EA studies do, makes clear that the architecture has to serve internal management goals, customer-experience goals, and upstream supplier-relationship goals at once, a triangulated perspective that fits the ecosystem-orchestration role coffee shops occupy in the broader value network (Priyono et al., 2025).

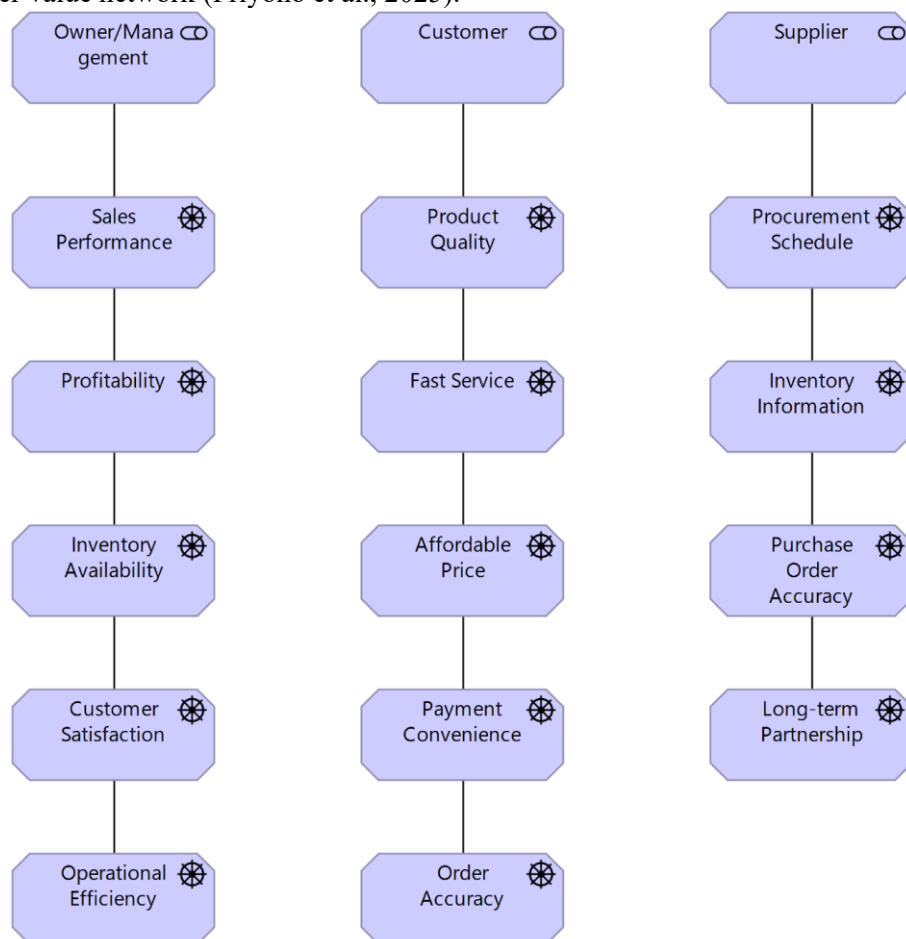


Fig. 1 Model of stakeholders and their concerns for the owner/management, customer, and supplier groups

Extending these stakeholder concerns, an ArchiMate motivation chain links the owner/management stakeholder to three top-level drivers: Increase Revenue, Improve Customer Satisfaction, and Improve Operational Efficiency (Fig. 2). Increase Revenue breaks down into Increase Monthly Sales, which rests on Higher Customer Retention and, beyond that, on Better Customer Experience, itself achieved through Fast Service and High Product Quality; Fast Service is delivered by the Integrated POS Management

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application component. Improve Operational Efficiency breaks down into Reduce Operational Cost, which relies on Inventory Accuracy and Faster Order Fulfillment, the former being delivered by the Smart Inventory Management application component. Improve Customer Satisfaction is ultimately delivered by Customer Service Management. This driver-goal-requirement chain equips the architecture with a visible line of sight from strategic intent to the exact application components that have to be built or procured, thereby closing a traceability gap that earlier coffee-shop EA studies tend to leave implicit (Budiman et al., 2025).

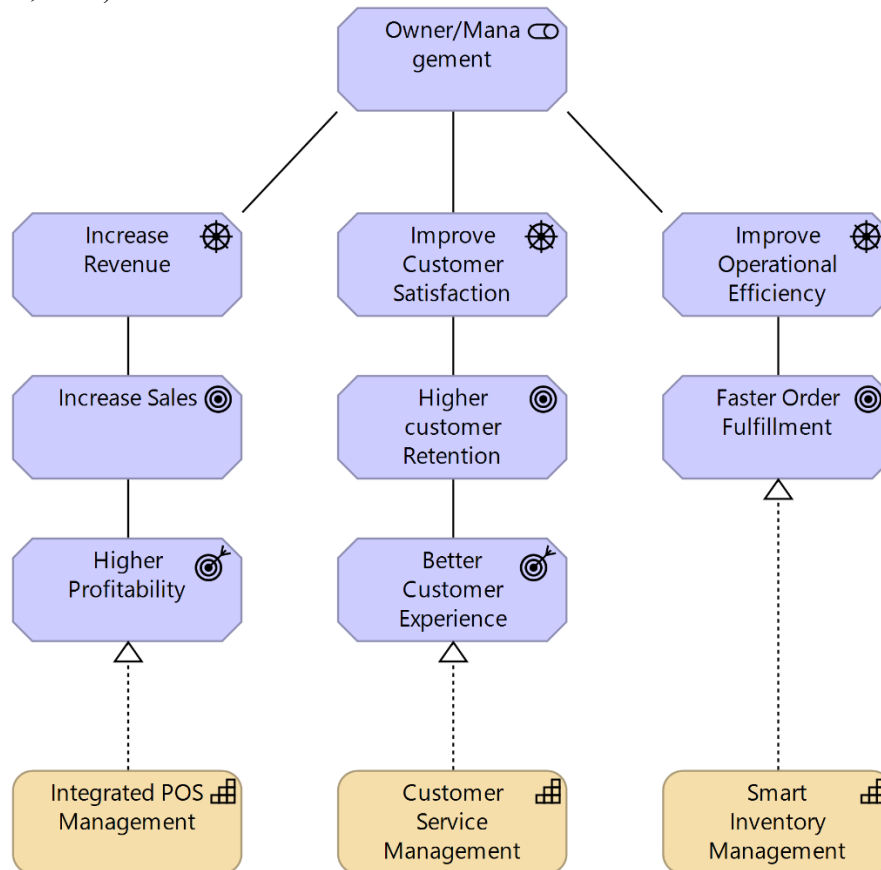


Fig. 2 Business strategy view connecting strategic drivers and goals to the application components that realize them

Business Architecture

The Business Architecture phase opens with a Business Model Canvas (Fig. 3) that spans ten revenue-generating value propositions: coffee beverage sales, non-coffee beverage sales, food and snack sales, coffee-bean sales, venue rental for events, coffee classes and workshops, catering and coffee-cart services, coffee-brewing equipment sales, merchandise sales, and online orders. Every value proposition is linked to its key partners and its intended customer segments. Coffee beverage sales, for instance, rely on coffee roasters, distributors, and suppliers of milk, sugar, and syrup, and cater to daily visitors, office workers, students, and enthusiasts. Coffee-bean sales, on the other hand, rely directly on coffee farmers, cooperatives, roasters, and distributors, and cater to home brewers and resellers. The canvas acts as the bridge between the firm's strategic vision and its ArchiMate process models: each revenue stream is a candidate for its own business-process view, and this study renders the three highest-volume streams in full ArchiMate detail (Budiman et al., 2025; Salwin et al., 2022).

VISION, MISSIONS, SLOGAN		
VISION To become a welcoming coffee destination that inspires connections, creativity, and community through exceptional coffee and meaningful experiences. MISSIONS Serve high-quality coffee, beverages, and food with consistency and excellence. Create a comfortable and inclusive space for customers to meet, work, learn, and celebrate. Support coffee culture through workshops, education, and community engagement. Build strong partnerships with suppliers, local communities, and business partners. Continuously innovate products, services, and customer experiences. Deliver convenience through online ordering, catering, and event services. SLOGAN Good Coffee, Good Vibes.		
PARTNERS/SUPPLIERS	REVENUE/VALUE/PRODUCT/SERVICE	COSTUMERS
Coffee roasters, coffee distributors, milk suppliers, sugar and syrup suppliers	Coffee Beverage Sales	Daily visitors, office workers, students, coffee enthusiasts
Tea suppliers, chocolate suppliers, matcha suppliers, fruit suppliers, milk suppliers, syrup suppliers	Non-Coffee Beverage Sales	Children, teenagers, non-coffee drinkers, families
Bakeries, food ingredient suppliers, frozen food suppliers, raw material distributors	Food and Snack Sales	All café visitors, lunch customers, students
Coffee farmers, coffee cooperatives, coffee roasters, coffee distributors	Coffee Bean Sales	Home brewers, coffee enthusiasts, loyal customers, coffee resellers
Event organizers, local communities, sound system vendors, decoration vendors	Venue Rental for Events	Communities, companies, organizations, event organizers
Barista trainers, coffee training institutions, brewing equipment suppliers	Coffee Classes and Workshops	Aspiring baristas, coffee enthusiasts, students, F&B SMEs
Event organizers, booth rental companies, coffee ingredient suppliers, mobile coffee equipment vendors	Catering Services or Coffee Cart Services	Companies, seminar committees, wedding organizers, event organizers
Coffee equipment distributors, brewing equipment manufacturers, coffee equipment importers	Coffee Brewing Equipment Sales	Home brewers, coffee enthusiasts, aspiring baristas, small café owners
Printing vendors, apparel manufacturers, merchandise suppliers, graphic designers	Merchandise Sales	Loyal customers, café brand fans, customer communities
Online delivery platforms, payment gateway providers, website/application providers	Online Orders	Remote workers, office workers, delivery customers
RESOURCES		
Café building / shop space	Kitchen equipment and food preparation tools	Coffee cart and catering equipment
Coffee machines (espresso machine, grinder, brewing equipment)	Coffee bean inventory and raw materials	Brand, logo, social media accounts, and customer database
Furniture and interior (tables, chairs, decorations)	POS (Point of Sale) system and payment system	Training materials and workshop equipment
Skilled baristas and café staff	Online ordering platform / website / mobile app	Business licenses, permits, and operational SOPs
Marketing and promotional materials	Customer loyalty program and membership system	Supplier and partner network
Inventory management system	Delivery vehicles and logistics equipment	Financial capital and working capital

Fig. 3 Business Model Canvas of the coffee shop enterprise, showing partners, value propositions, customer segments, and resources

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The first and most central business-process view (Fig. 4) starts upstream with three business actors, the Coffee Farmer, the Coffee Distributor, and a generic Supplier role, which feed a Supply Chain process made up of five sequential sub-processes: Coffee Bean Procurement, Coffee Bean Receiving and Quality Check, Inventory Management, Coffee Beverage Preparation, and Coffee Beverage Ready. A Supplier application component, itself backed by a Database Supplier data object, serves this process. On the downstream side, a Customer Interaction process represents the customer-facing flow: a Customer submits a Customer Order that enters Order Processing, from which the flow divides into a preparation path, where a Barista carries out Coffee Preparation, and a transactional path, where a Cashier performs Payment Processing and issues a Receipt, with Customer Service completing the loop back to the Customer. Both the Supplier component and the customer-facing flow meet at a shared POS application component backed by a Database POS data object, and the two databases in turn persist to a single Server Database technology node. This meeting point, in which one shared POS and one shared server layer support the supply side and the customer-facing side alike, is the key structural trait that sets this integrated architecture apart from EA models that keep sourcing and point-of-sale as separate systems.

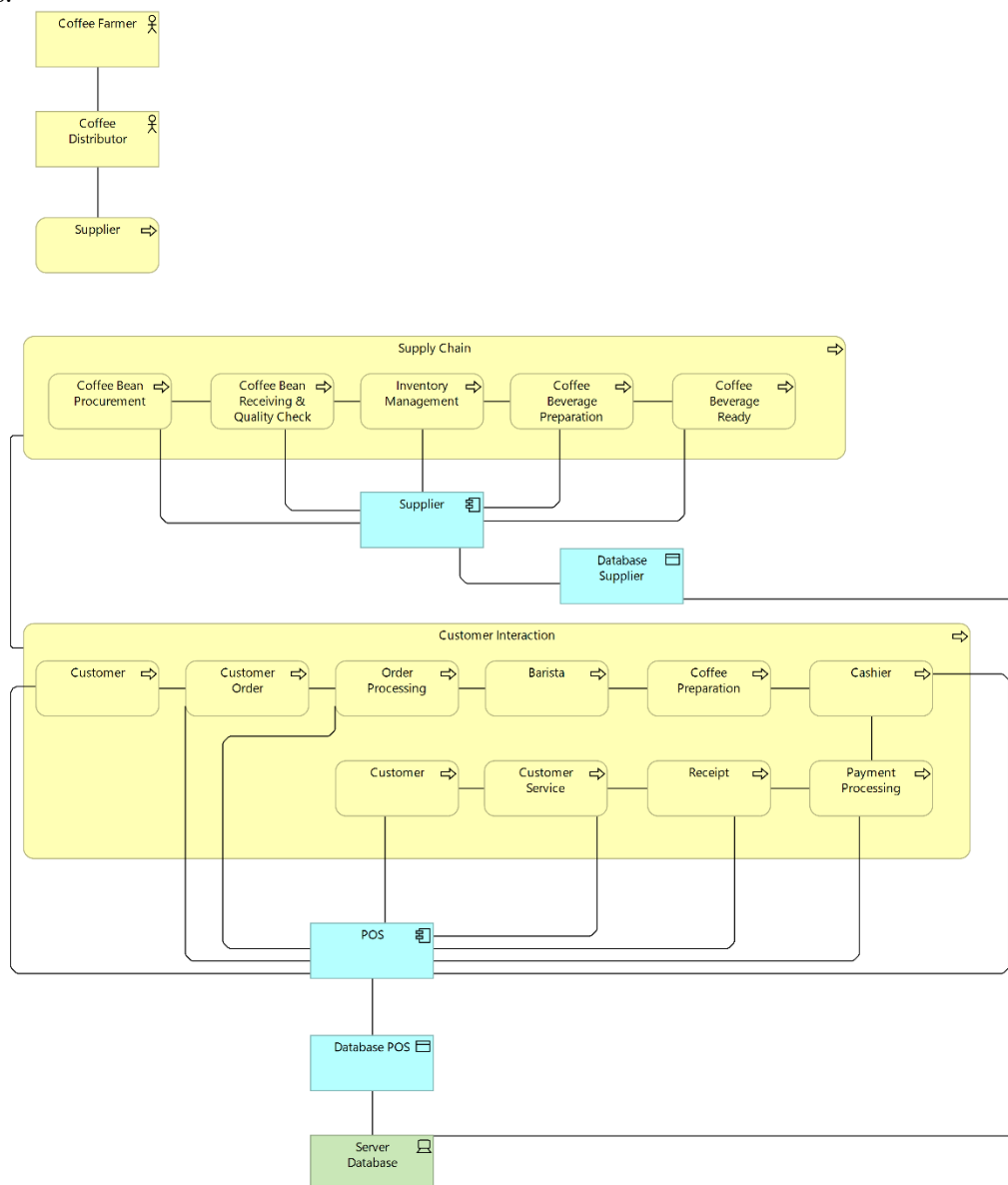


Fig. 4 Coffee Beverage Sales process that unites supply chain and customer interaction through a shared POS and server layer

The second business-process view (Fig. 5) transfers the same structural pattern to non-coffee beverages such as tea, chocolate, matcha, and fruit-based drinks. An Ingredient Supplier actor together with a Supplier application component, both backed by the same Database Supplier data object, feed a Non-Coffee Beverage Sales process consisting of Ingredient Procurement, Ingredient Receiving, Inventory Management, and Stock Monitoring. On the customer-facing side, the Customer Order enters Order Processing; a Cashier and Payment Processing produce a Receipt, while in parallel a Barista performs Beverage Preparation to create the non-coffee beverage, which then moves through Beverage Sales and Customer Service back to the Customer. Just as in the coffee process, the two sides meet at the shared POS application component, Database POS, and Server Database node, which reinforces the cross-product-line integration.

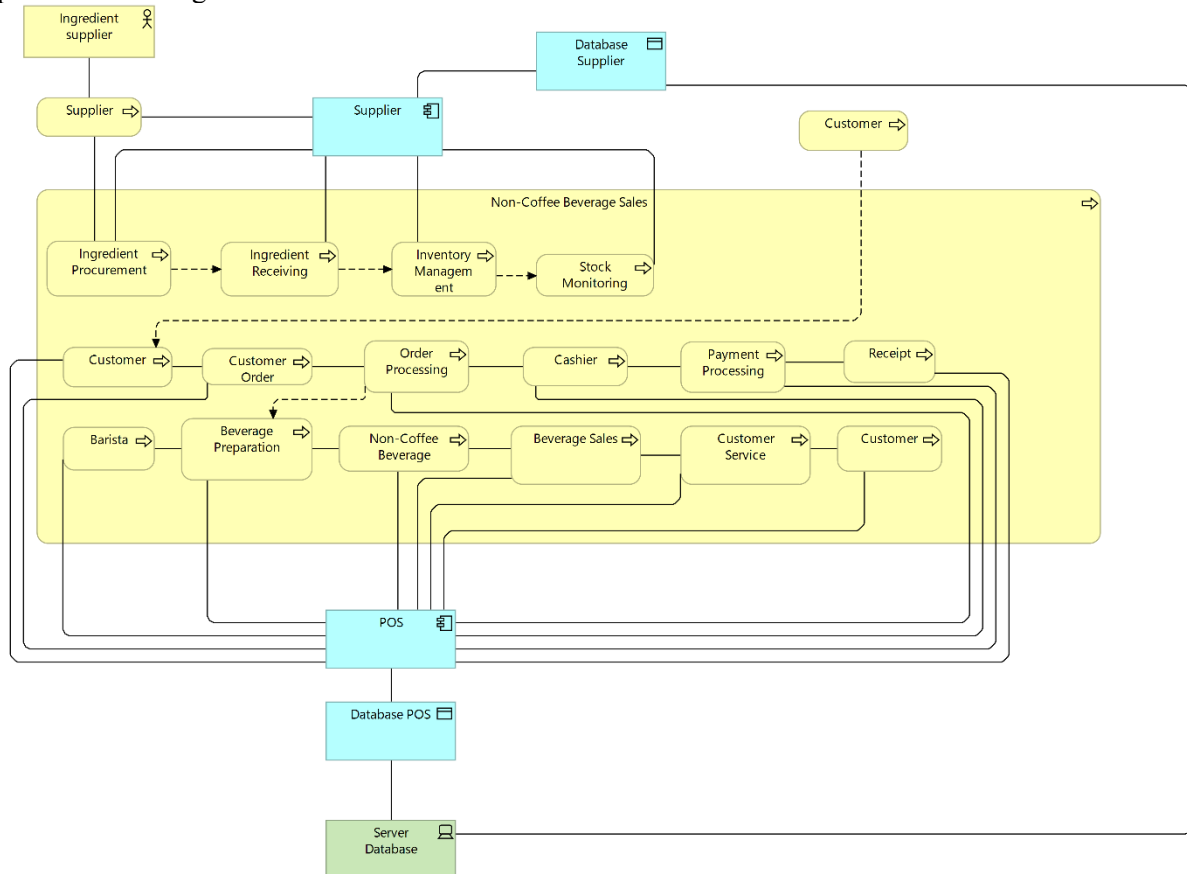


Fig. 5 Non-Coffee Beverage Sales process that reuses the shared Supplier, POS, and server components

The third business-process view (Fig. 6) turns to food and snack items. A Bakery and Food Ingredient Supplier actor together with a Supplier application component, again backed by Database Supplier, feed a Procurement process consisting of Food Procurement, Ingredient Receiving, Inventory Management, and Inventory Stock. The customer-facing flow once more starts with Customer Order and Order Processing and continues through Cashier, Payment Processing, and Receipt, while in parallel Kitchen Staff carry out Food Preparation to yield items marked Food and Snack Ready, which then move through Food and Snack Sales and Customer Service. This view converges on the same POS application component and Database POS data object; only the underlying node differs slightly, being represented as a generic Device rather than the shared Server Database, which reflects a lighter point-of-preparation terminal in the kitchen area.

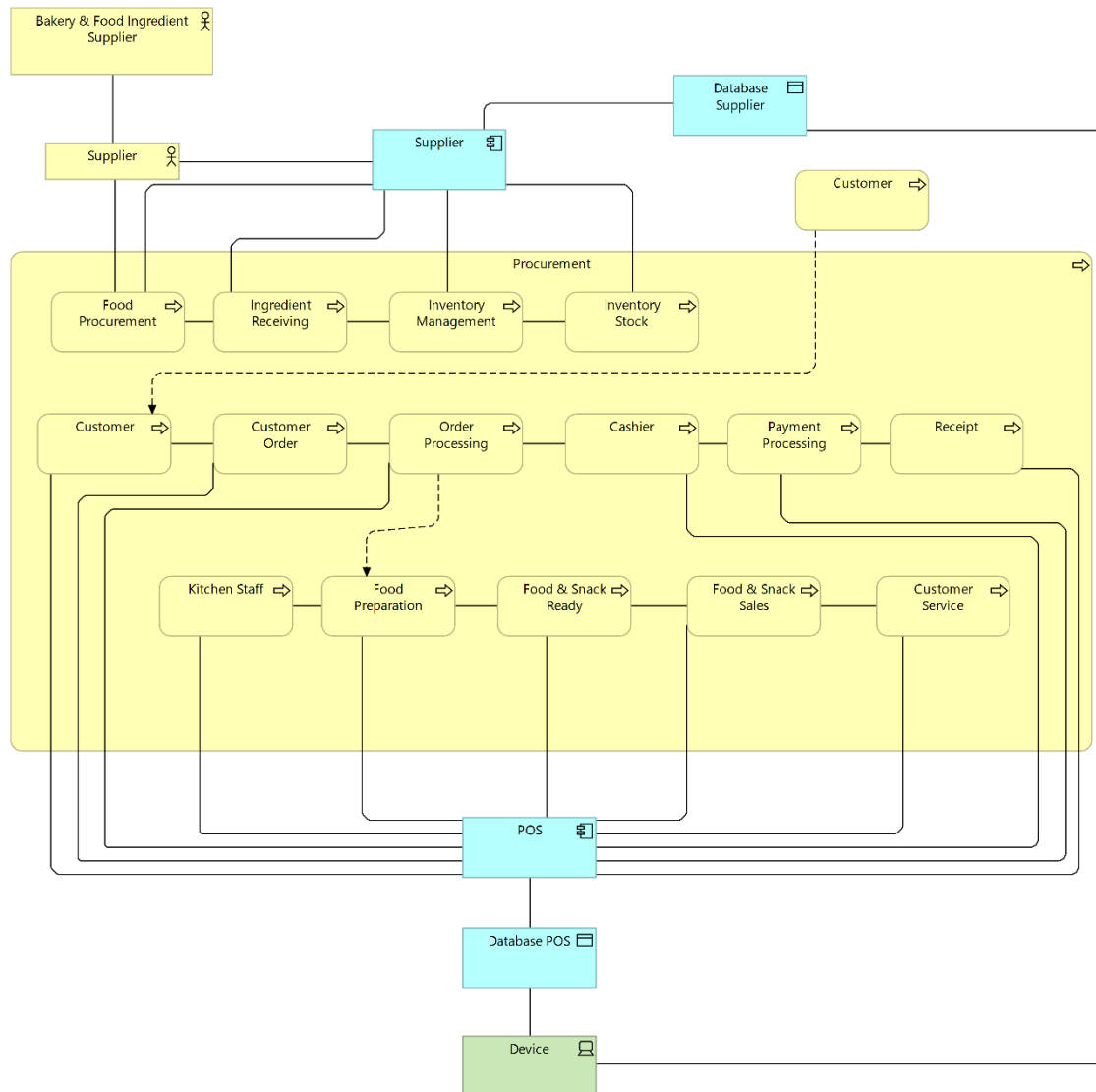


Fig. 6 Food and Snack Sales process that converges on the shared POS application component

Taken as a whole, the three business-process models display a consistent four-stage pattern, procurement, receiving/inventory, preparation, and sales/service, repeated across coffee beverages, non-coffee beverages, and food and snacks; each stream calls on its own specialized suppliers yet converges on a common Supplier application component, a common Database Supplier, a common POS application component, and, for two of the three streams, a common Server Database. This is the structural evidence behind the paper's central claim: instead of three separate point solutions for three product lines, the coffee shop's business architecture is realized through a small, reusable collection of shared application and data components, which is precisely what integration means in the context of this study's contribution.

Information Systems Architecture

Two application components appear in all three business-process views and thus anchor the coffee shop's application architecture: the Supplier component, which handles every procurement-side interaction between external suppliers and internal inventory-management processes, and the POS component, which handles every customer-facing interaction, namely ordering, cashiering, payment processing, and receipts, across the three product lines. This two-component arrangement is intentionally minimal: instead of buying a separate ordering-and-payment system for each product line, the application landscape reuses one POS component for coffee, non-coffee, and food and snack

transactions and one Supplier component for all three procurement flows, echoing the application-layer consolidation reported in earlier coffee-shop EA work (Budiman et al., 2025).

Two data objects underpin the application layer: Database Supplier, which holds procurement, receiving, and inventory data for all three product lines, and Database POS, which holds order, payment, and receipt data. Because both are shared across the product lines instead of being split per product, the architecture is designed to enable consolidated, near-real-time visibility of the overall inventory position and of total daily sales across the whole menu. This is an intended capability of the proposed design rather than a measured result; it corresponds to the Inventory Accuracy and Sales Performance concerns raised in the Architecture Vision phase and is consistent with the argument that enterprise architecture yields its greatest value when joined with data-driven, emerging-technology capabilities rather than left as a set of static structural diagrams (Alghamdi, 2024).

Technology Architecture

The technology layer of the conceptual baseline architecture is comparatively lightweight: in the coffee- and non-coffee-beverage views, Database Supplier and Database POS both persist to a Server Database node, whereas the food and snack view uses a Device node to support the sales counter and kitchen interface. This corresponds to the on-premises or single-server deployment reported as typical for independent coffee shops in the reviewed literature rather than to a distributed cloud setup, and it is modelled here as a reference baseline rather than as an observed installation. Set against the strategic ambitions implied by the vision and mission, such as event catering, online ordering, and eventual multi-branch growth, this single-server model becomes the scalability constraint that the Opportunities and Solutions subsection takes up. A corporate cloud transformation framework, which stresses the phased migration of on-premises operational systems such as point-of-sale and inventory management onto elastic cloud infrastructure, supplies a directly relevant reference for advancing this layer (Gunturu, 2022).

Opportunities and Solutions

Setting the conceptual baseline architecture against the target architecture implied by the vision, mission, and driver-goal chain exposes three principal gaps, summarized in Table 3 together with the proposed target design and the implementation horizon at which each is expected to be addressed. First, the single-server technology layer constrains the scalability required to sustain online ordering, event catering, and possible multi-branch operation simultaneously; a phased migration of the Database POS and Database Supplier layers to a managed cloud service is proposed as the response, following the cloud-transformation guidance of Gunturu (2022). Second, although the Supplier component records procurement and receiving data, it does not yet carry traceability down to coffee-farmer and distributor level in a way that satisfies the long-term-partnership concern; extending the Supplier application with farm-level data capture and logistics tracking, as demonstrated for coffee supply chains by Petrillo et al. (2025), is proposed to deepen this relationship and is expected to improve the informational basis for inventory forecasting. Third, the architecture still lacks a dedicated customer loyalty or membership component, even though the Business Model Canvas names a loyalty programme among the enterprise's resources and Customer Retention sits at the heart of the driver-goal chain; adding such a component and linking it to the existing POS component would close the gap between the stated goal and the modelled application landscape (Putri & Sulaeman, 2022). It should be emphasized that the benefits attached to each proposed solution in Table 3 are design expectations derived from the cited literature and from the logic of the model, and that they have not been measured in an operating enterprise.

Table 3. Baseline, gap, target architecture, and implementation horizon

Architectural aspect	Conceptual baseline (as-is reference)	Gap identified	Proposed target architecture	Implementation horizon
G1. Technology and scalability	Database Supplier and Database POS persist to a single on-premises Server Database node; the food and snack view relies on a local Device node	A single-server deployment constrains simultaneous online ordering, event catering, and multi-branch operation, and concentrates failure risk in one node	Phased migration of Database POS and Database Supplier to a managed cloud database service, leaving the existing process design intact (Gunturu, 2022)	Short term (0-6 months)

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Architectural aspect	Conceptual baseline (as-is reference)	Gap identified	Proposed target architecture	Implementation horizon
G2. Supply chain traceability	The Supplier component records procurement and receiving transactions at distributor level only	No farm-level or lot-level data, so the supplier Long-term Partnership concern and the informational basis for inventory forecasting are only partly supported	Extension of the Supplier component with structured farm-level and distributor-level data capture and logistics status, without requiring a full blockchain implementation (Petrillo et al., 2025)	Medium term (6-12 months)
G3. Customer loyalty management	A loyalty programme appears as a resource in the Business Model Canvas, but no application component realizes it	The Higher Customer Retention and Better Customer Experience goals have no realizing component, which breaks the driver-to-component chain at that point	A dedicated customer loyalty and membership component, linked to the shared POS component and to Database POS so that retention can be measured against transaction data	Long term (12-24 months)

Migration Planning

Drawing on the gaps set out in Table 3, a phased migration roadmap is proposed. Over the short term (0-6 months), the coffee shop consolidates its existing Database POS and Database Supplier onto a managed cloud database service, which is expected to reduce single-point-of-failure risk without disturbing current processes. Over the medium term (6-12 months), the Supplier component gains structured data-capture fields for farm-level and distributor-level information, enabling basic traceability reporting without yet requiring a full blockchain implementation. Over the longer term (12-24 months), a customer loyalty and membership component is added and connected to the POS component, so that the Customer Retention and Customer Experience goals can be pursued with measurable, transaction-linked data. This staged sequence follows the incremental, risk-managed philosophy built into the Migration Planning phase of the Architecture Development Method (Al Omari et al., 2024) and parallels the capability-based recommendations reported in comparable digital-transformation studies of SME and coffee shop enterprises (Budiman et al., 2025; Gunturu, 2022; Sari et al., 2025). Because the roadmap has not been executed, the horizons should be read as planning proposals whose feasibility is itself one of the propositions that the expert validation described below is intended to test.

Preliminary Architecture Evaluation

Before any claim about the quality of the design is made, the status of the assessment reported here must be stated plainly: it is a preliminary internal self-assessment carried out by the authors against criteria that the authors themselves defined, and it is therefore evidence of internal consistency rather than of practical validity. Two criteria were applied, both derived from the Architecture Vision phase. Coverage checks whether every stakeholder concern and strategic driver is addressed by at least one element of the target architecture. Traceability checks whether an explicit path can be followed from each driver, through its intermediate goals and requirements, down to a concrete realizing application component. Table 4 records the outcome for each driver chain so that the assessment can be audited by the reader rather than accepted on assertion.

Applying these criteria shows that the three driver chains, Increase Revenue, Improve Customer Satisfaction, and Improve Operational Efficiency, each terminate in a realizing component, namely Integrated POS Management, Customer Service Management, and Smart Inventory Management respectively, and that the owner/management, customer, and supplier concerns are reflected either in these components or in the shared Supplier, POS, and database elements. No realizing component was introduced without a driver to justify it. One chain, however, does not close: the Higher Customer Retention goal and the supplier Long-term Partnership concern have no realizing component in the baseline model, which is precisely why they appear as gaps G2 and G3 in Table 3 and are scheduled in the roadmap. The self-assessment therefore indicates that the architecture is internally consistent and, with those two exceptions, complete with respect to the defined strategic intent.

Table 4. Coverage and traceability self-assessment of the proposed architecture

Strategic driver	Goal and requirement chain	Realizing component	Stakeholder concerns addressed	Assessment
Increase Revenue	Increase Monthly Sales, Higher Customer Retention, Better Customer Experience, Fast Service	Integrated POS Management	Sales Performance and Profitability (owner/management); Fast Service and Order Accuracy (customer)	Covered and traceable
Improve Customer Satisfaction	Better Customer Experience, High Product Quality	Customer Service Management	Customer Satisfaction (owner/management); Product Quality and Payment Convenience (customer)	Covered and traceable
Improve Operational Efficiency	Reduce Operational Cost, Inventory Accuracy, Faster Order Fulfilment	Smart Inventory Management	Inventory Availability and Operational Efficiency (owner/management); Procurement Schedule, Inventory Information, and Purchase Order Accuracy (supplier)	Covered and traceable
Higher Customer Retention and Long-term Partnership (sub-goals)	Loyalty programme named as a resource in the Business Model Canvas; farm-level supplier data required by the partnership concern	None in the baseline model	Customer Retention (owner/management and customer); Long-term Partnership (supplier)	Gap; addressed as G2 and G3 in the roadmap

This analytical result does not establish that the architecture is useful, feasible, or understandable to the practitioners who would adopt it, and the paper makes no such claim. External validation is required, and the protocol for it is specified here so that it can be executed and reported in a follow-up study. The planned instrument draws on four respondent profiles: independent coffee shop owners or managers, shift supervisors or head baristas, a procurement or supplier-relations representative, and enterprise architecture practitioners with modelling experience. Respondents are presented with the Business Model Canvas, the three business-process views, and the roadmap, and rate each on five dimensions on a five-point scale: completeness of the modelled processes relative to real coffee shop operations, correctness of the actor and process assignments, clarity of the notation for a non-technical reader, feasibility of the proposed migration horizons under typical small-enterprise budgets, and perceived usefulness of the model as a planning instrument. Closed responses are summarized by median and interquartile range, open comments are coded thematically, and any element that a majority of respondents marks as incomplete or infeasible is revised before the model is presented as a validated reference architecture. Until that study is completed, the architecture reported in this paper should be read as a conceptually grounded design proposal supported by internal analytical assessment only.

DISCUSSION

The integrated EA model set out here departs from earlier coffee-shop and retail EA work in three respects. First, whereas the EA model for a comparable coffee shop chain concentrates on the customer- and management-facing application layer (Budiman et al., 2025), the present model pushes the architectural boundary upstream to bring the coffee-farmer and distributor actors into the same business-process diagrams, granting the architecture end-to-end visibility from bean to cup instead of leaving the supply side as an unmodeled external context. Second, whereas most UMKM-oriented TOGAF-ADM studies model only a single product or service line (Andry et al., 2022; Maita et al., 2022; Sari et al., 2025), this study explicitly models three parallel product lines and shows, by way of the recurring Supplier/POS/Database pattern, that these lines can share a compact set of common application and data components rather than demanding separate systems, a result of direct practical value to operators weighing how to spend limited IT budgets. Third, by modeling three stakeholder concern-chains together with the driver-goal-requirement chain, the architecture exhibits a traceable line of sight from strategic vision to particular application components, which speaks to the alignment factor identified as a key moderator of EA's contribution to digital transformation success (Alghamdi, 2024).

Two qualifications apply to the whole of this discussion. First, the comparative claims above concern the structure of the models, not their measured performance: the assertion is that the present architecture represents actors, processes, and components that earlier models leave outside their

boundary, and that assertion can be checked against the diagrams. Second, the operational benefits associated with the design, namely improved scalability, better-informed inventory forecasting, stronger customer retention, and lower duplication of systems, are expected benefits derived from the cited literature and from the internal logic of the model. They have not been observed in an operating enterprise, no performance measurement was conducted, and no efficiency figure is claimed. Readers should treat them as design intentions to be tested rather than as findings.

The study also carries limitations that double as threats to validity. The most fundamental is that the architecture is a conceptual reference model reconstructed from secondary sources and from patterns reported in earlier studies of independent coffee shops, rather than an architecture elicited from an observed enterprise; the baseline against which gaps were identified is consequently a reference baseline, and the gap analysis inherits that status. Second, the model was assessed through an internal coverage-and-traceability self-assessment defined and executed by the authors, so it offers analytical rather than statistical generalization, and expert validation with coffee shop practitioners and enterprise architects, following the protocol specified earlier, remains a necessary next step before any claim of practical validity. Third, the transfer of the model to larger multi-branch chains or franchise arrangements, where the Supplier and POS components might need to split into branch-specific and headquarters-level variants, has not been tested. Fourth, the architecture stops at Phase F, so implementation governance and architecture change management are outside its evidential reach. Future work should execute the validation protocol, extend the model into Phases G and H alongside a partner enterprise, broaden the Opportunities and Solutions phase into a formal architecture-maturity assessment along the lines of earlier TOGAF-based SME studies (Sari et al., 2025), and, given the reported value of data-driven business architecture (Alghamdi, 2024) and of mobile-application-based supply chain traceability (Petrillo et al., 2025), model an artificial-intelligence-driven demand-forecasting or personalization capability on top of the shared Database POS layer.

CONCLUSION

This study has put forward an integrated Enterprise Architecture model for a coffee shop that unites supply chain processes and customer interaction processes across three product lines within one ArchiMate-based architecture developed through the phases of the TOGAF Architecture Development Method, from the Preliminary Phase to Migration Planning. The enterprise modelled is a representative conceptual case rather than a single observed firm, so the outcome is a reference architecture rather than a diagnosis of one business. Addressing the research problem, the Architecture Vision phase established a traceable chain from the concerns of three stakeholder groups and three strategic drivers to the components that realize them (Integrated POS Management, Customer Service Management, and Smart Inventory Management), while the Business Architecture phase demonstrated, through a Business Model Canvas and three business-process views, that the three product lines share a consistent procurement-inventory-preparation-sales pattern and converge on a common Supplier and POS application layer instead of requiring separate systems for each line. The Information Systems and Technology Architecture phases named the components that deliver this convergence, and the Opportunities and Solutions and Migration Planning phases identified three gaps, namely scalability, supply chain traceability, and customer loyalty management, together with a phased roadmap for closing them. A preliminary self-assessment against coverage and traceability criteria indicates that the model is internally consistent, while expert validation remains outstanding and the reported benefits remain expected rather than measured. The main contribution is a reusable reference architecture that independent coffee shops and small food-and-beverage enterprises can adapt when planning structured digital transformation, thereby carrying TOGAF-ADM-based enterprise architecture research into the specialty-beverage and food-service domain. Future research should execute the expert validation protocol, test the model across multi-branch and franchise settings, extend it into Implementation Governance and Architecture Change Management, and enrich it with formal architecture-maturity assessment and analytics-driven customer-personalization capabilities.

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