Business Architecture for Nan Shan Life Insurance via Beyond Lab

A Case Study by:

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A Case Study by:

Government EA Work Group

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Nan Shan Life Insurance Company, Ltd.

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Foreword

Standards are useful only when they are put to use; i.e., adopted. While standards represent a solution to a common industry problem, their benefits are fully derived when organizations embrace standards and use them to build solutions to address their specific problems. Therefore, it is imperative to understand that the adoption of standards will vary depending on the industry sector, size of the organization, maturity, organizational structure, leadership, resources, motivation, and purpose. These factors also influence the extent of benefits that organizations derive. There is no winning or magic formula. That said, we are aware that organizations can learn from examples and that is what we endeavor to achieve through these case study publications.

The Open Group India Awards is a platform to uncover, discover, and showcase the successful adoption of our standards, from across the globe. Here, organizations get the opportunity to highlight various critical aspects of adoption, including how well the problem or priority is articulated, the implementation approach, the business and technical solution adopted, the results and outcomes achieved, the impact and stakeholder engagement. These dimensions are given due importance and are documented in these case study publications. The intent is to emphasize the importance of these dimensions, how they are being addressed, and what insights readers can gain from these examples. There are no better examples than real-life case studies. Over the past few years we have been fortunate to build up a very significant compilation of case studies, spanning various aspects and nuances of adoption.

We strongly encourage you to read and refer to this case study and make the most out of it. We would be delighted if it triggers the adoption of our standards in your organization and will be happy to support you in your journey. Your organization can also be a member (if it is not already) of The Open Group and start contributing to the development of future standards. Developing standards is an aspiration for many organizations, and we provide a platform to realize that. Our motto being: *Don't stop at learning from examples; become one.*

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Executive Summary

This document introduces Business Architecture to Nan Shan Life Insurance through a Minimum Viable Enterprise Architecture (MVEA) using the TOGAF® Standard. To support Digital Transformation, the dotSHAN Enterprise Architecture Framework (EAF) was developed by the Beyond Laboratory (abbreviated as Beyond Lab) team, aligning strategic goals with Business, Application, and Technology Architectures under a unified governance mechanism. The framework adopts the TOGAF Architecture Development Method (ADM) and the ArchiMate® Specification, incorporating a simplified model to streamline architecture communication and execution based upon Layered Structure Diagrams (LSDs); Use Case diagrams, Sequence diagrams, and Business Process Model and Notation™ (BPMN™) diagrams, known collectively as USB diagrams; and selected Unified Modeling Language™ (UML®) diagrams.

dotSHAN EAF is a business-centric, process-driven architecture tailored for stakeholders including underwriters, claims adjusters, and general staff. Business process architecture serves as the foundation, supported by formal modeling to identify and improve operational pain points. Ten core problems were analyzed, and requirements were prioritized into actionable goals and work packages.

Beyond Lab led the planning and modeling effort, emphasizing a process-centric approach. The project has successfully delivered five Enterprise Architecture initiatives, including Single Sign-On (SSO), Intelligent Customer Service, Intelligent Claims Work Platform, Mobile Payment, and Electronic Form Design, laying a foundation for sustainable enterprise transformation. In this respect, the practice of Enterprise Architecture covered in this document supports The Open Group vision: **Boundaryless Information Flow™**.

Introduction

About Nan Shan

Founded in 1963, Nan Shan is one of the most established insurance companies in Taiwan. According to the latest data, it has a market share of 11% measured by first year premiums, ranking third among life insurance companies in Taiwan. According to updated company profiles as of December 31, 2023, we have 4,176 employees including 3,623 general staff, 355 underwriters, 185 claims adjusters, and 13 actuaries. At the end of 2023, Nan Shan's total assets exceeded NT$4.5 trillion. With over 11 million effective insurance policies, Nan Shan provides top-quality protection and insurance planning services to more than six million policyholders through its extensive service network nationwide, including 25 branch offices and over 350 agency offices.

About This Project

The aim of this project is to introduce Business Architecture to Nan Shan Life Insurance using the Minimum Viable Enterprise Architecture (MVEA) approach based on the TOGAF® Architecture Development Method (ADM) [C220]. In response to Digital Transformation in the insurance industry, we have developed the dotSHAN Enterprise Architecture Framework (EAF). Our project's primary business opportunities and challenges stem from Beyond Laboratory (abbreviated as Beyond Lab), which is a process mining mechanism.

There are two stages to accomplishing this Enterprise Architecture project: preliminary and implementation. The preliminary stage is to build dotSHAN EAF and the implementation stage is to construct the Business Architecture, which focuses upon the process review, process analysis, and process modeling. By adopting international standards like the TOGAF Standard and the ArchiMate® Specification [C226], the design philosophy of dotSHAN EAF aligns with Nan Shan's Architecture Vision. It focuses on core layers including business, application, and technology layers. To streamline the architecture method and modeling process, the Mini Set of view diagrams within dotSHAN EAF is comprised of three main parts:

1. One Layered Structure Diagram (LSD), created using the ArchiMate modeling language to offer an overview
2. Three diagrams encompassing Use Case diagrams, Sequence diagrams, and Business Process Model and Notation™ (BPMN™) diagrams, known collectively as USB diagrams, specifically for Business Architecture
3. Several limited Unified Modeling Language™ (UML®) diagrams, selected based on system requirements for system architecture

The highlight of this Enterprise Architecture project is that we use the TOGAF ADM and ArchiMate Specification to construct motivation, project, and Business Architectures of dotSHAN EAF using the modeling tool: Archi®. Projects such as Single Sign-On (SSO), Intelligent Customer Service, Intelligent Claims Work Platform, Mobile Payment, and Electronic Form Design are scheduled as the implementation tasks in the Beyond Lab within the current Enterprise Architecture project.

Background and Motivation

Beyond Lab

Our project's primary business opportunities and challenges stem from Beyond Lab. The major function of Beyond Lab is the process mining mechanism, utilizing methods to transform business operations into actionable process insights. The flow of process mining within Beyond Lab is depicted in Figure 1. The ultimate goal of Beyond Lab is to achieve process excellence through automation and machine learning, such as Robotic Process Automation (RPA) and Artificial Intelligence (AI). This journey starts with reviewing the current process (as-is), followed by process analysis and the creation of a process model (to-be). The outcomes of process mining serve as valuable insights into the organization's business and mission. These insights help to:

- Understand the current state of processes
- Compare them with the initially designed processes
- Identify bottlenecks for optimization
- Assess the potential benefits of digitalization to enhance operational efficiency

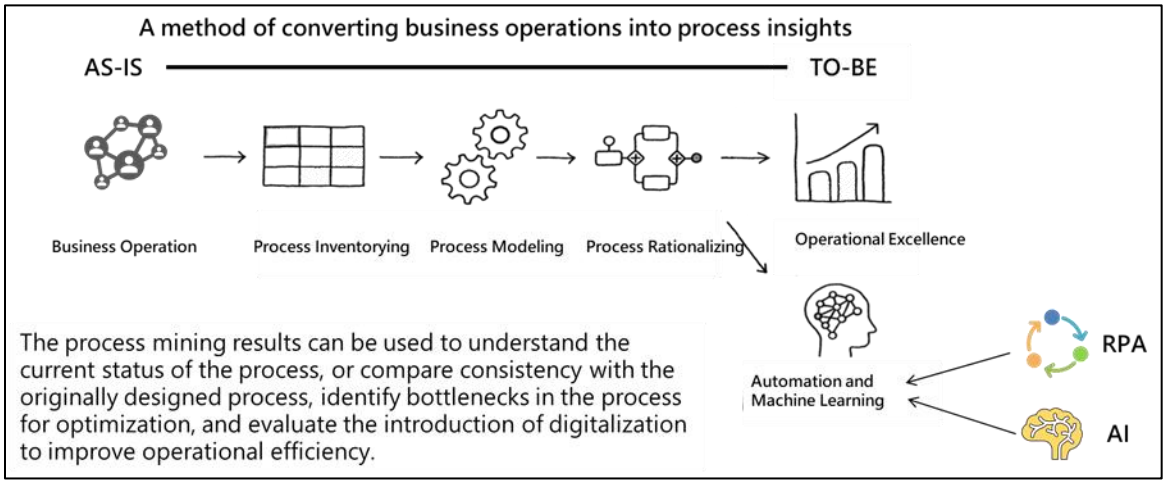

Figure 1: The Flow of Process Mining in the Beyond Lab

Key Stakeholders

In this Enterprise Architecture project, we collaborate with various stakeholders (Executives, Digital Development team, Technology and Application team, Business Unit, Customer, Agent, and Employee), whose primary roles, working relationships, and communications are shown in Figure 2. The Enterprise Architecture project team falls under Digital Development and has been tasked with initiating Enterprise Architecture projects. Being organized by Nan Shan's senior management, this Enterprise Architecture project is expected to be ongoing and will continually involve stakeholders.

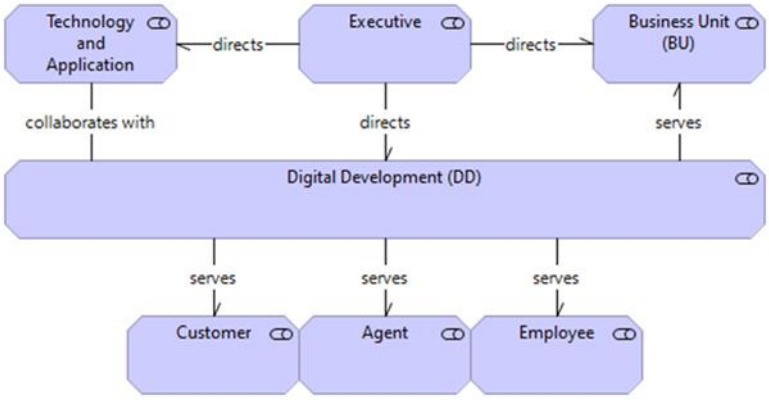

Figure 2: Key Stakeholder Roles

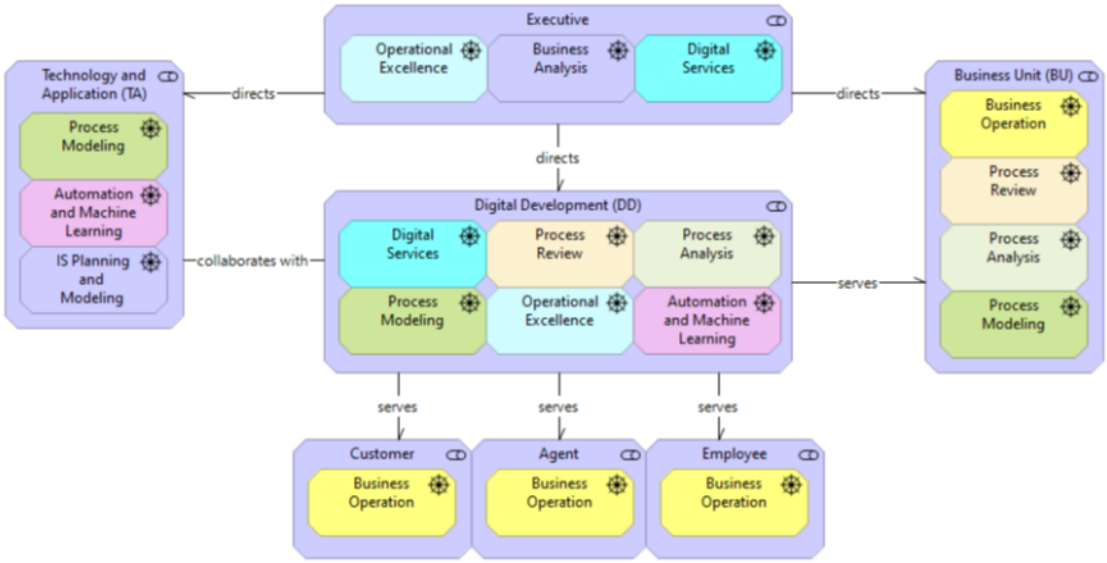

Figure 3: Primary Concerns of Key Stakeholders

Key Stakeholders' Primary Concerns

Within Beyond Lab, the primary concerns of key stakeholders, as indicated by a Nan Shan survey, are the driving force behind this Enterprise Architecture project. Each concern originates from distinct stakeholders, shaping the business opportunities or challenges within this Enterprise Architecture project.

The primary concerns of key stakeholders are visualized in Figure 3, color-coded in the same tone alongside the basic light purple color where stakeholders share identical concerns:

- The Executives, holding the highest position, are primarily concerned with Nan Shan's IT governance, focusing on operational excellence, business analysis, and digital services
- The Digital Development team is responsible for digital governance and transformation through process mining, with a focus on digital services, process review, analysis, and modeling to achieve operational excellence, automation, and machine learning using RPA and AI technologies
- The Business Unit encompasses a vast array of business processes related to its functional areas, showing concerns about business operations, process review, analysis, and modeling
- The Technology and Application team, responsible for software development, is concerned with process modeling, automation, machine learning, and Infrastructure Sustainability (IS) planning and modeling
- Customers, Agents, and Employees play crucial roles across various business processes, expressing concerns about their respective business operations

dotSHAN EAF via MVEA

To implement Beyond Lab, we introduced the TOGAF Standard to Nan Shan and explored ways to engage every unit within the organization. However, during the planning of Nan Shan's Enterprise Architecture (dotSHAN EAF), we realized that we needed to reduce the complexity of architecting across various dimensions through an effective approach, MVEA, as illustrated in Figure 4.

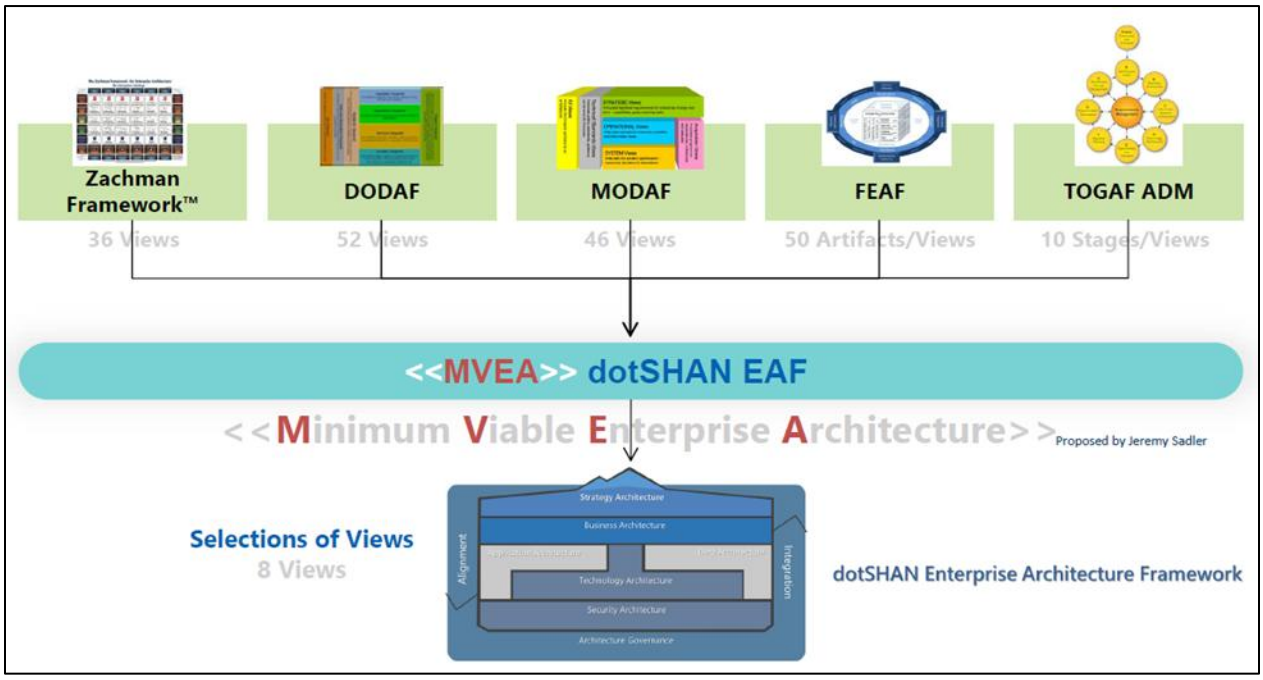

Figure 4: dotSHAN EAF Simplified by MVEA Approach

1. Scope Dimension 1: Types of Enterprise Architecture, such as organization-based and project-based Enterprise Architecture

   Project-based Enterprise Architecture is the focus of the current Enterprise Architecture project.

2. Scope Dimension 2: Stages of the TOGAF ADM

   The Business Architecture of TOGAF ADM, including motivation and project architecture, forms the framework of the current Enterprise Architecture project.

3. Scope Dimension 3: Modeling languages including UML, BPMN, and the ArchiMate Specification

   The USB approach and LSDs are the chosen artifacts for the current Enterprise Architecture project.

4. Scope Dimension 4: Modeling tools for Enterprise Architecture

   Archi and Draw.io®, along with a user-defined scratchpad, are designated as the modeling tools for the current Enterprise Architecture project.

5. Scope Dimension 5: Projects for Architecting Business Architecture

   Projects such as SSO, Intelligent Customer Service, Intelligent Claims Work Platform, Mobile Payment, and Electronic Form Design are scheduled as the core tasks for the process review, analysis, and modeling within the current Enterprise Architecture project.

Advanced Digital Governance Architecture of Nan Shan

Constructing an Enterprise Architecture for a life insurance company, given the complexity of its business processes within ecosystems, poses significant challenges. Nan Shan is no exception to this complexity. We are currently focused on developing project-based Enterprise Architecture tailored for Digital Transformation and governance within life insurance ecosystems. Nan Shan's intricate architecture is conceptualized as the advanced Digital Governance Architecture; see Figure 5. This architecture is part of the dotSHAN Digital Transformation framework and comprises various architectural layers. These layers (Strategy, Architecture, Project, and Support Layers) are realized through top-down planning and bottom-up implementation approaches. The complexities within this Enterprise Architecture project manifest across the architecture framework layers as shown in Figure 5 and described in the text that follows.

Business Architecture for Nan Shan Life Insurance via Beyond Lab

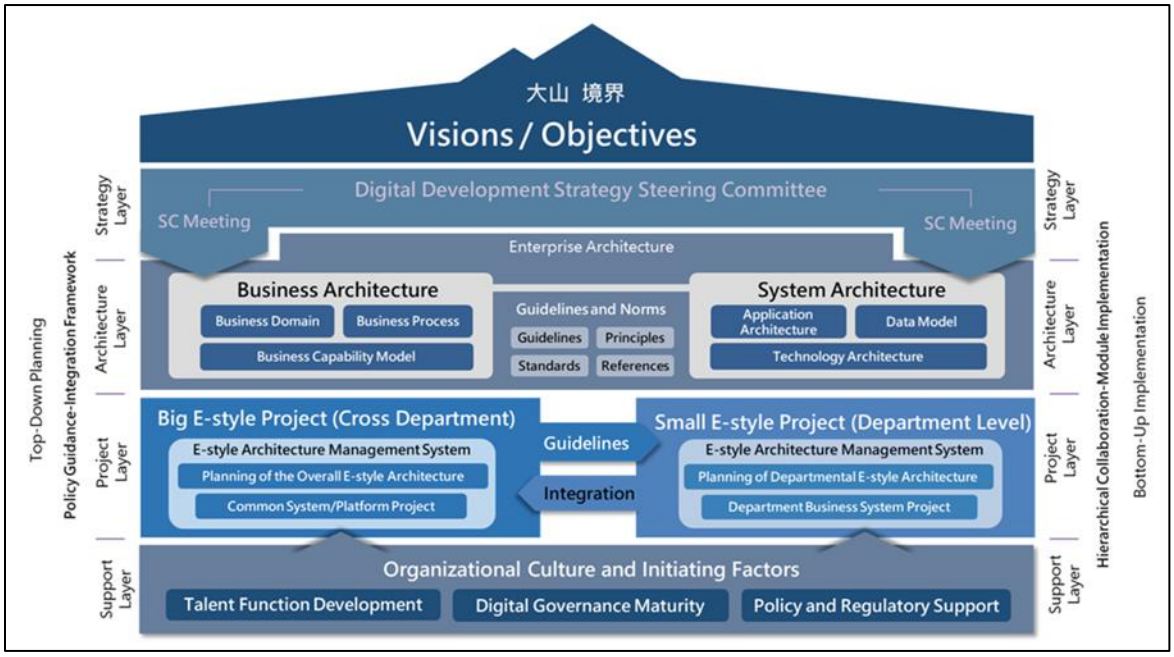

Figure 5: Advanced Digital Governance of Nan Shan

1. Strategy Layer

   The Strategy Layer encompasses Nan Shan's visions and objectives. The Digital Development Strategy Steering Committee (SC), consisting of Executives, General Manager, and functional managers, plays a crucial role in guiding projects proposed by sponsors.

2. Architecture Layer

   Within the Architecture Layer, the Business Architecture defines the business domain, processes, and capabilities. The system architecture, guided by principles, standards, and references, develops Application, Data, and Technology Architectures.

3. Project Layer

   In the Project Layer, the complexity lies in managing innovation projects. Proposals for innovation projects are presented in the Steering Committee Meeting, which oversees both large-scale, cross-departmental projects and smaller, department-level projects.

4. Support Layer

   The Support Layer complexity includes factors such as organizational culture, talent development, digital governance maturity, and policy and regulatory support.

These layers and their associated complexities are integral to the successful implementation of Enterprise Architecture within Nan Shan's Digital Transformation and governance initiatives.

Project Formation with Goals

When gathering the primary concerns from key stakeholders, as illustrated in Figure 6, we can gain insights into the current state of Digital Transformation within the organization and identify potential issues related to this Enterprise Architecture project. These insights officially translate into the requirements of the Enterprise Architecture project, as shown in Figure 7, which can be obtained through discussions, brainstorming sessions, or meetings and then categorized into short-term, mid-term, and long-term requirements through assessment processes. As we embark on constructing the motivation architecture for this Enterprise Architecture project, each requirement can be translated into specific goals and sub-goals, as shown in Figure 8.

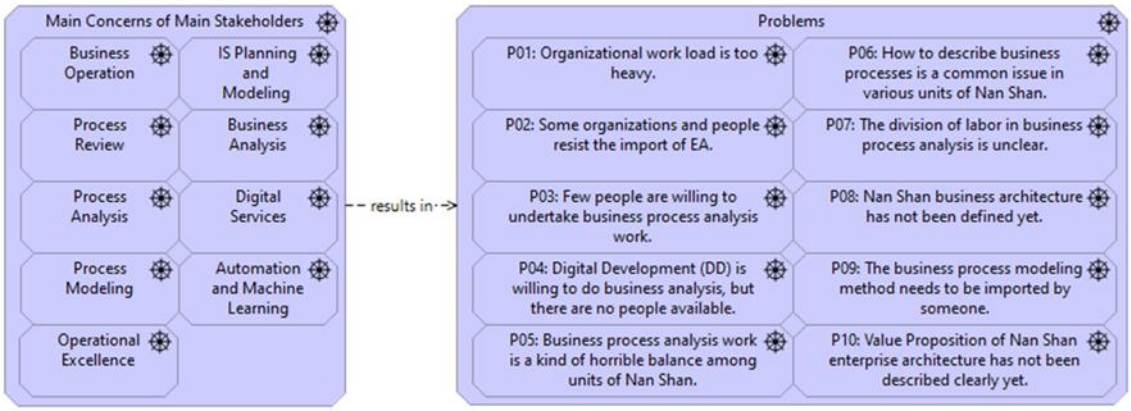

Figure 6: Problems

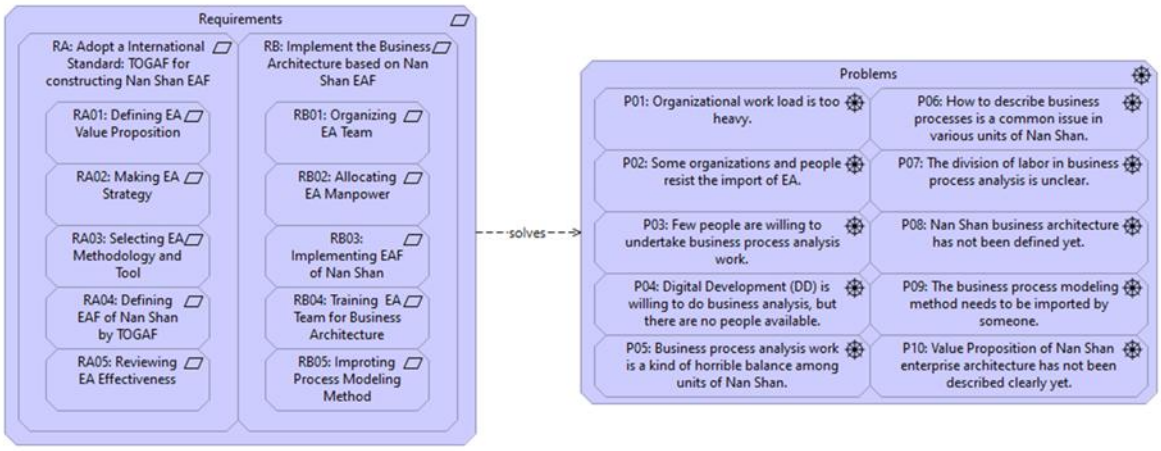

Figure 7: Requirement Formation: Problem Solving

Business Architecture for Nan Shan Life Insurance via Beyond Lab

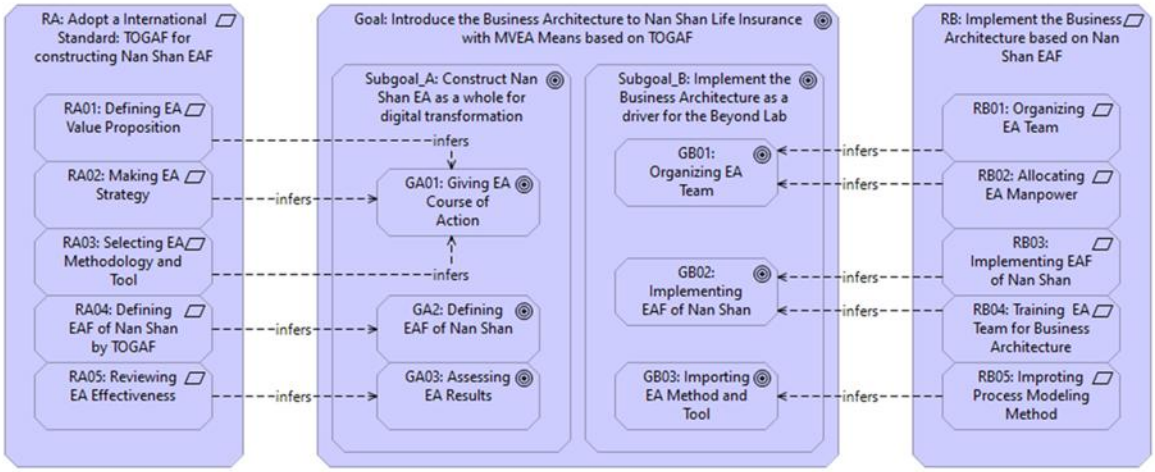

Figure 8: Goal Formation

For this Enterprise Architecture project, we have set an annual goal:

- Introducing Business Architecture to Nan Shan using the MVEA approach based on the TOGAF ADM

Along with two sub-goals:

- Developing Nan Shan Enterprise Architecture comprehensively for Digital Transformation
- Leveraging Business Architecture as a catalyst for Beyond Lab initiatives

Following discussions between our Enterprise Architecture team and stakeholders, the achievement of the annual goal and two sub-goals will be evaluated based on success criteria established from a global perspective, as depicted in Figure 9.

These explicated success criteria include:

1. Early identification of potential business process issues and bottlenecks
2. Reduction of business errors and enhancement of insurance product or service quality
3. Elimination of redundant steps and improvement of work efficiency
4. Improved control over business activities to mitigate risks
5. Enhanced transparency in critical business areas to foster information sharing and team collaboration
6. Overall improvement in organizational performance, cost savings, and resource utilization

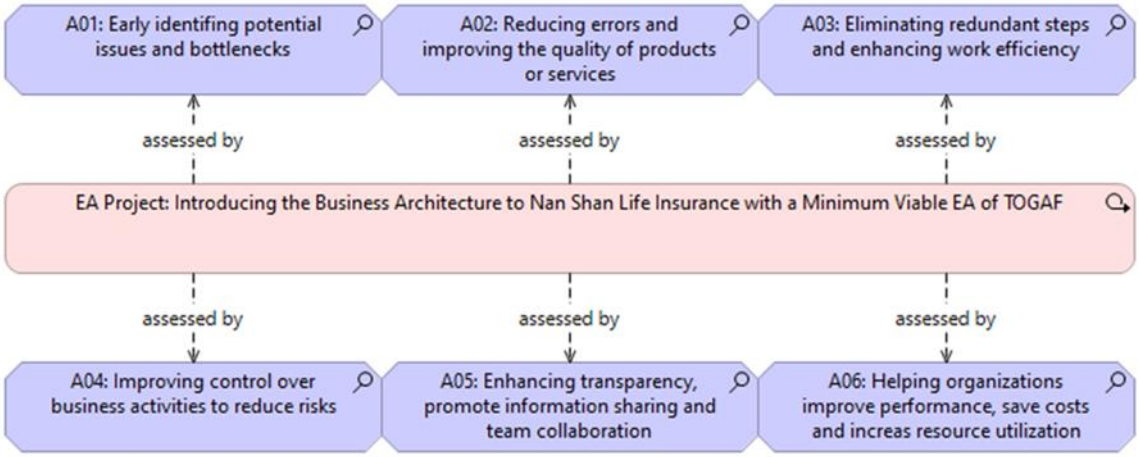

Figure 9: Assessment: Critical Success Factors

Numerous efforts have been made within the Nan Shan Digital Transformation using Enterprise Architecture methodology, and our internal colleagues are well-versed in the success criteria established by various stakeholders for this Enterprise Architecture project.

For instance, consider the intelligent claims settlement project as an example to illustrate the success criteria used for internal communication:

1. Business analysts identified potential issues and bottlenecks based on stakeholder concerns
2. The claims department manager proposed the intelligent claims settlement project to reduce errors and enhance product/service quality
3. Enterprise Architects and Business Architects mentored the team to streamline processes and improve work efficiency
4. Process discovery, review, and modeling were used to enhance control over business activities and mitigate risks
5. Completion of Business Architecture view diagrams will enhance transparency and promote information sharing

This Enterprise Architecture implementation project is expected to significantly improve organizational performance, reduce costs, and optimize resource utilization, aligning with Nan Shan's public Digital Transformation statement regarding intelligent claims settlement.

Significant Challenges

Over the past decade, our extensive observations have led us to recognize the TOGAF ADM as an outstanding Enterprise Architecture methodology. It provides a comprehensive solution for architecture modeling, implementation, and governance across various entities, including companies, organizations, enterprise groups, and government bodies. Instead of being daunted by challenges, we focus on finding ways to overcome them effectively. In this Enterprise Architecture project, we encountered several significant challenges which we have successfully addressed, as outlined in the following sections.

Business Architecture for Nan Shan Life Insurance via Beyond Lab

Process Analysis

Before introducing Enterprise Architecture, one of our main challenges was empowering colleagues to model their business operations. Process analysis acts as a bridge between process review and process modeling. To address this challenge, we established Beyond Lab, utilizing process mining to achieve process excellence. Beyond Lab serves as a virtual organization, bringing together different units and stakeholders to review, analyze, and model their Business Architecture; see Figure 10.

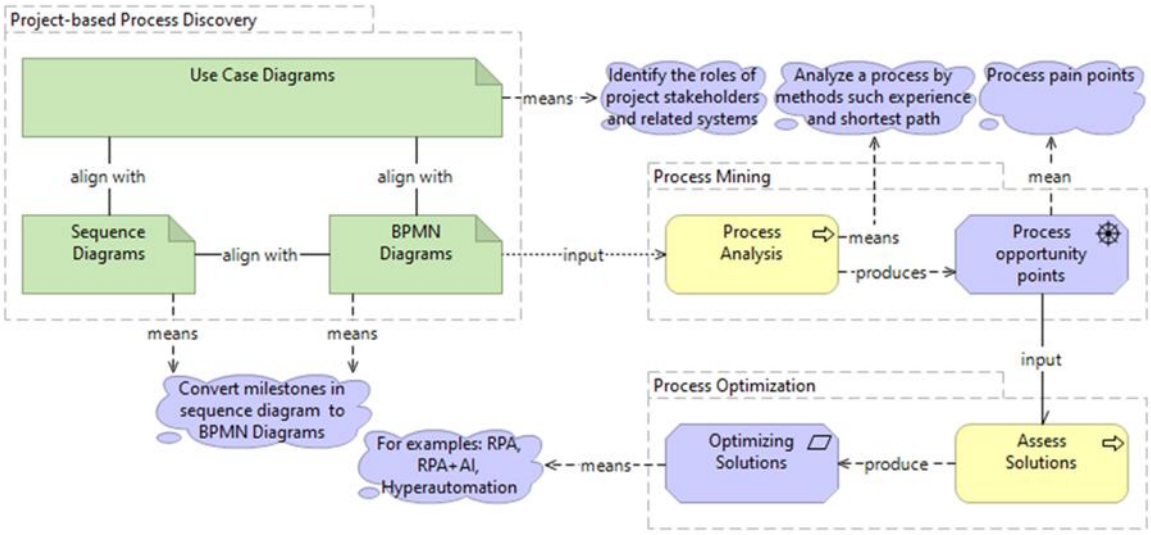

Figure 10: Process Mining Flow in the Beyond Lab

Process Method

Nan Shan's insurance and financial processes are highly complex. We explored various approaches to construct the Business Architecture, focusing on minimizing resistance within business units. The MVEA concept guided us to streamline TOGAF ADM's Business Architecture into a project-based business process architecture, temporarily disregarding other architectures. After completing the project-based business process architecture, we plan to construct other architectures based on stakeholder and system behaviors. Additionally, we introduced a simplified modeling language called the USB scratchpad, based on selected UML and BPMN elements, to assist business analysts and architects.

Modeling Languages and Tools

While the ArchiMate Specification and the TOGAF Standards are ideal for depicting Enterprise Architecture, few individuals in Nan Shan are familiar with the ArchiMate modeling language and Archi. Nevertheless, we believe that an Enterprise Architecture cannot be constructed without adhering to these standards. Our solution involves combining three modeling languages: the ArchiMate modeling language using Archi for LSDs, USBs, and UML diagrams by Draw.io. This combination enables us to effectively architect the Business Architecture with USB elements.

Architecting Division

During the implementation stage of constructing Nan Shan Enterprise Architecture, we faced challenges with human resource allocation. To address this, we divided Enterprise Architecture personnel into distinct roles:

business architects and analysts focusing on Business Architecture, and system architects, designers, with analysts and Test Engineer focusing on system architecture. This division of labor ensures efficient system development and testing, as illustrated in Figure 11.

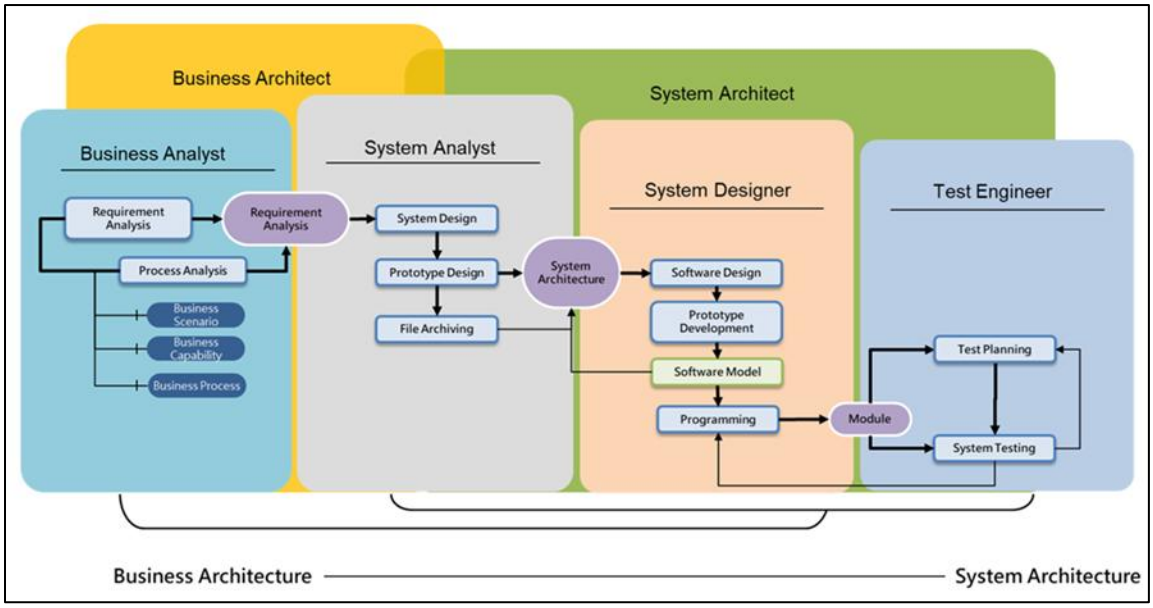

Figure 11: System Development Cycle and Division of Labor

By addressing these challenges head-on and implementing effective solutions, we are successfully advancing the Nan Shan Enterprise Architecture project towards its goals.

Project and Approach

Work Package with Deliverables

The rationale behind key choices in the work packages can be traced back to stakeholder concerns and business problems. The primary concerns of key stakeholders, including digital services, business operations, process review, process analysis, process modeling, operational excellence, automation and ML, IS planning and modeling, and business analysis, are depicted in Figure 3. By studying the current pain points in organizational operations, we have concisely identified the following business problems as the reasons for acquiring requirements for work packages in this Enterprise Architecture project, as shown in Figure 6:

1. Heavy organizational workload
2. Resistance from some organizations and individuals toward adopting Enterprise Architecture
3. Reluctance of individuals to undertake business process analysis
4. Lack of available resources for Digital Development to conduct business analysis
5. Balancing issues among units within Nan Shan during business process analysis
6. Common difficulties in describing business processes across various units in Nan Shan
7. Unclear division of labor in business process analysis
8. Undefined Business Architecture in Nan Shan
9. Need for someone to import the business process modeling method
10. Lack of a clear description of the Value Proposition of Nan Shan's Enterprise Architecture

Based on these identified business problems, we have established the requirements for the work packages with deliverables in this Enterprise Architecture project, as briefly outlined in Figure 12:

1. Formation of the Enterprise Architecture team
2. Definition of Enterprise Architecture Value Proposition
3. Strategic planning for Enterprise Architecture
4. Selection of Enterprise Architecture methodology and tools
5. Division of labor within Business Architecture
6. Definition of dotSHAN EAF
7. Implementation of dotSHAN EAF
8. Training and education on Enterprise Architecture
9. Empowerment of Business Architecture
10. Review and improvement of Enterprise Architecture

These requirements have been derived from the rationales behind the identified business problems, aiming to address the key concerns and challenges faced within the organization.

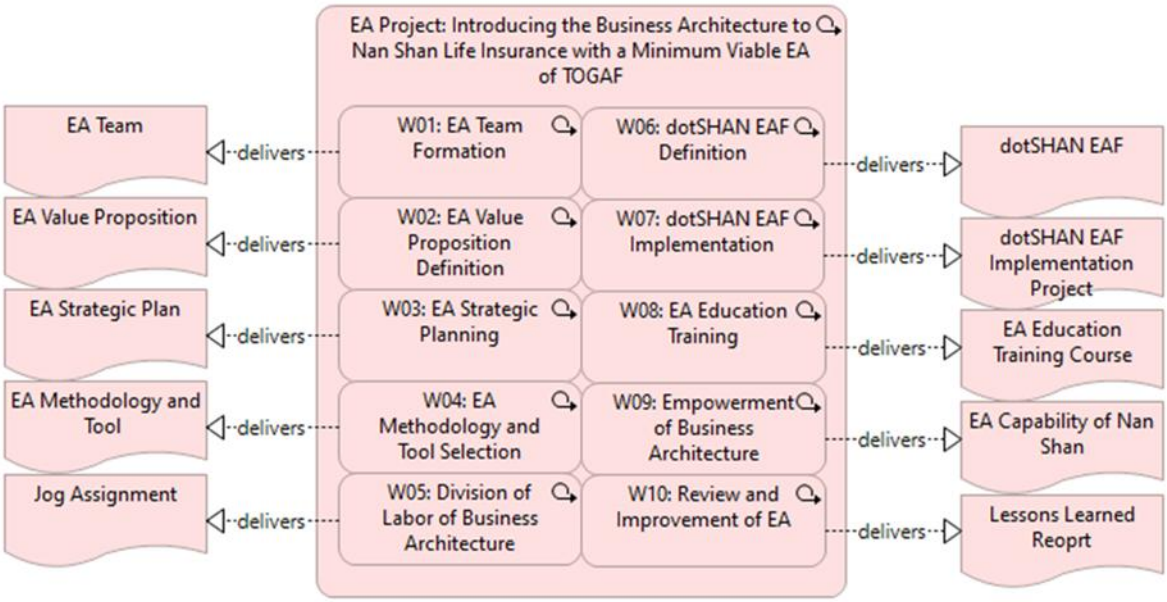

Figure 12: Work Packages with Deliverables

Main Alternatives

Selecting alternative solutions that align with the requirements of work packages in this Enterprise Architecture project is a time-consuming process. Due to limitations in annual resource allocation within Digital Development, including manpower, materials, production, finance, and time, not all solutions can be implemented as Enterprise Architecture requirements. Therefore, it is crucial to plan and illustrate alternatives regarding various aspects of the Enterprise Architecture in advance. Below is a breakdown of the alternatives along with descriptions and diagrams.

Business Processes

Our vision for Enterprise Architecture engineering aims to facilitate an orderly Digital Transformation. In this Enterprise Architecture implementation project, we adopt architecture-driven development processes with blueprint-driven planning using dotSHAN EAF. We steer away from problem-solving development alternatives to ensure a stepwise evolution of Digital Transformation, as depicted in Figure 13.

Applications

Nan Shan faces challenges with legacy systems, causing pain points post-AI implementation due to interoperability issues. To address this, we opt for using application components of Microservices Architecture (MSA) with Application Programming Interface (API) calls based on relative business processes, avoiding monolithic systems.

Components

For constructing dotSHAN EAF in this annual Enterprise Architecture project, our component selections focus on Enterprise Architecture components related to Business Architecture. We specify USB components for constructing Business Architecture, discarding alternatives like UML activity diagrams, Entity-Relationship (ER) model diagrams, or infrastructure diagrams related to system architecture. These components are illustrated in Figure 14.

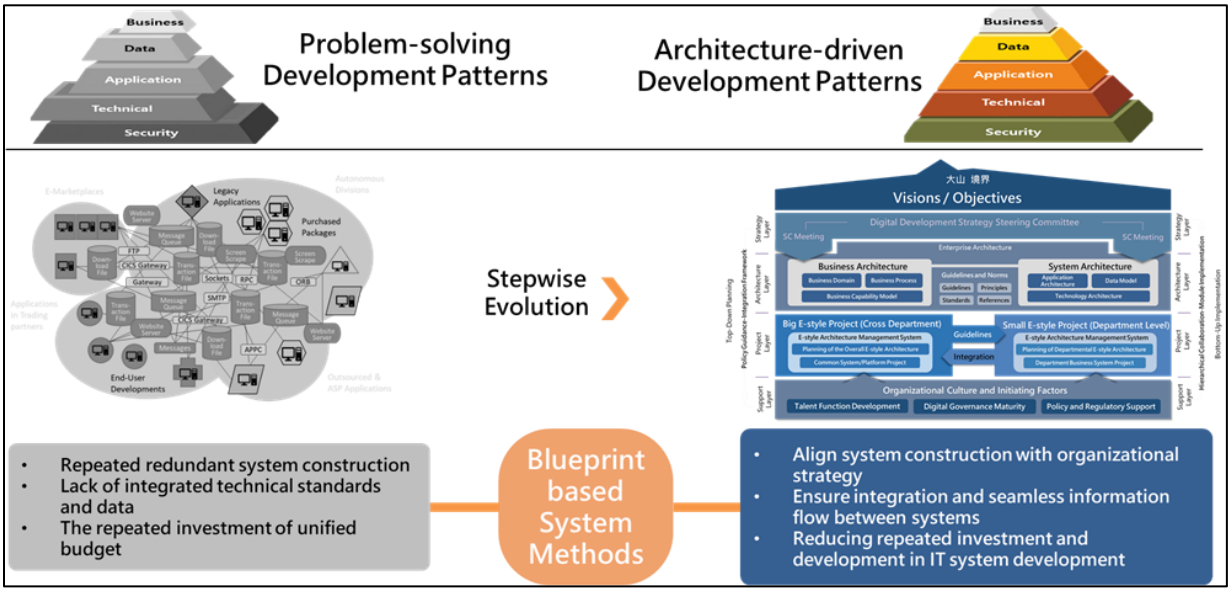

Figure 13: Enterprise Architecture Methodology for Promoting Orderly Transformation

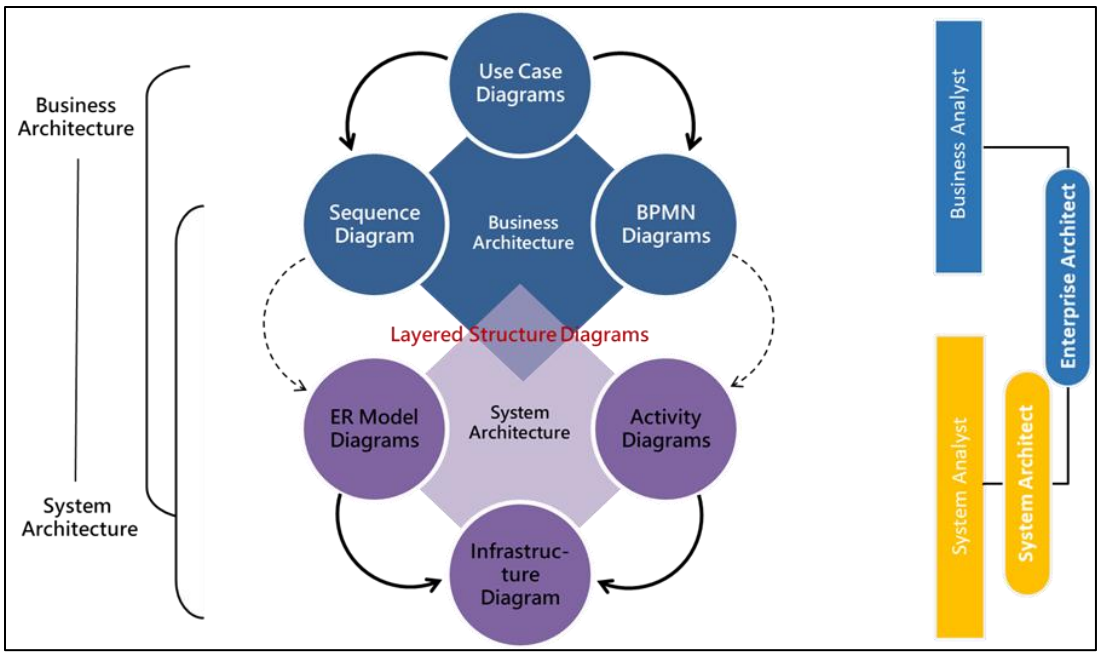

Figure 14: Mini Set of Business and System Architecture

Deployment

Although Technology Architecture is not the primary focus currently, we plan system deployment environments for Digital Transformation needs, especially with AI and RPA projects. We aim to deploy systems in heterogeneous network environments to meet microservice Remote Procedure Call (RPC) requirements, avoiding homogeneous environments, particularly in development or testing phases.

Data

Operational excellence is a long-term goal for advancing Business Architecture in the Beyond Lab. Despite not having a process simulation tool like Software AG ARIS for process mining, we opt for project-based process discovery methods with experience rule analysis instead of organization-based methods focused on data optimization. This approach is depicted in Figure 15.

People

In the system development cycle, roles such as business analyst, system analyst, system designer, and system tester are crucial. To transition roles to Enterprise Architects or system architects, we recruit individuals with Enterprise Architecture capabilities and experiences, discarding the alternatives of business analysts, system analysts, system designers, and system testers for now. Business analysts contribute to implementing Business Architecture solely in this Enterprise Architecture project.

Network

Digital Development aims to build the digital middle platform, including business, data middle platform, and technology platform. We chose a collaborative microservice model over distributed network systems to realize the digital middle platform, discarding monolithic models over internal network systems for individual operation needs.

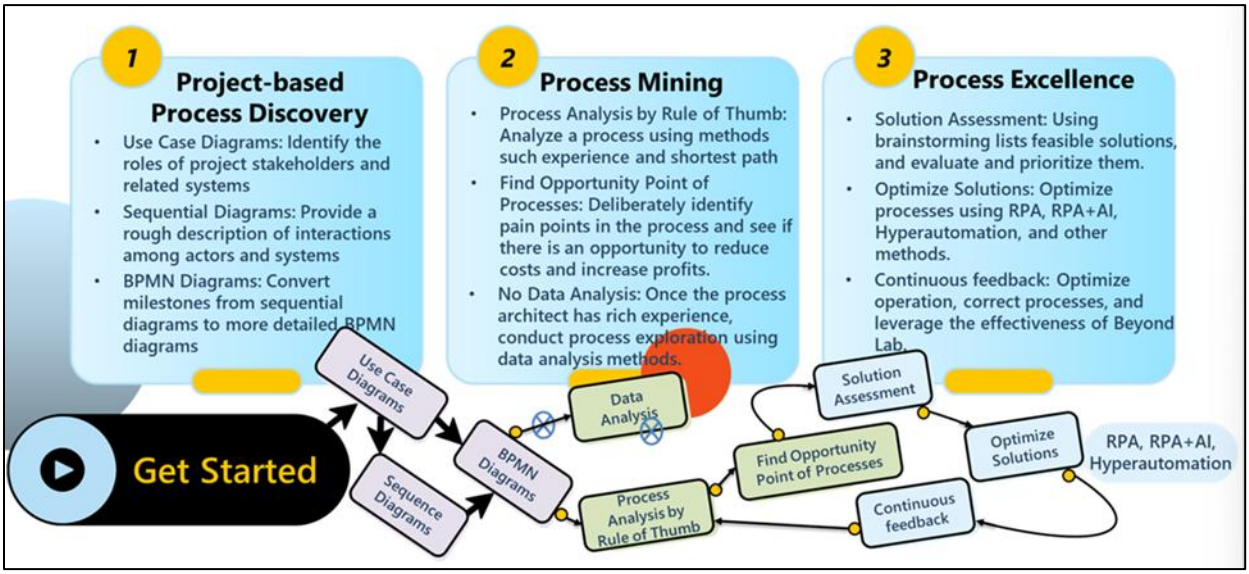

Figure 15: Beyond Lab for Process Excellence

Instrumental Approaches

Formalizing Digital Government Architecture

Referencing *Managing Digital Transformation: The Merits of Formalization* [Pesch et al., 2018], we understand the critical role of formalization in digital government architecture. Consequently, we developed an advanced digital government architecture known as the dotSHAN Digital Transformation framework, as depicted in Figure 5. This framework is specifically designed to formalize the project-based business and system architecture within this Enterprise Architecture project. The project-based architecture is categorized into two types: big e-style projects that span across departments, and small e-style projects confined to departmental levels. The dotSHAN Digital Transformation framework is organized into strategy, architecture, project, and support layers, employing both top-down planning and bottom-up implementation. Top-down planning involves formalizing policy guidance and integration frameworks, while bottom-up implementation adopts a hierarchical collaboration and module implementation approach.

In the strategy layer, all Digital Transformation projects undergo review during Steering Committee meetings and are directed by the Digital Development Strategy Steering Committee in alignment with Nan Shan's visions and objectives. Within the architecture layer, projects undergo formalization using Enterprise Architecture methods. For instance, Business Architecture encompasses business domain, processes, and capability models, while system architecture involves Application, Data, and Technology Architecture, adhering to established guidelines, norms, principles, and standards.

The project layer is managed by the e-style architecture management system, overseeing both big e-style projects, particularly common system/platform projects, and small e-style projects focused on departmental business systems. The support layer provides organizational culture, talent function development, digital governance maturity, policy, and regulatory support, offering guidelines and integration mechanisms for both big and small e-style projects.

Embracing MVEA

The TOGAF ADM outlines ten layers (Preliminary, A: Architecture Vision, B: Business Architecture, C: Information Systems Architectures, D: Technology Architecture, E: Opportunities and Solutions, F: Migration Planning, G: Implementation Governance, H: Architecture Change Management, and Requirements Management) in the construction of Enterprise Architecture. However, in Taiwan, the majority of enterprises are small to medium-sized and lack the resources to create extensive Enterprise Architecture view diagrams or learn ArchiMate languages. This is because constructing Enterprise Architecture with the TOGAF Standard is not a pressing concern for them. Taiwanese enterprises have traditionally used informal or improvisational methods for their Enterprise Architecture, which have proven successful for decades and earned global recognition.

The challenge arises as professionals advance in their careers, necessitating a shift towards formalization. Fortunately, some of them begin to study and introduce Enterprise Architecture to achieve sustainable operational goals with robust alignment and integration mechanisms. At Nan Shan, we have devised the dotSHAN EAF. The dotSHAN EAF is founded on the financial and insurance business and system operations, guided by strategic architecture. It encompasses relevant Business, Data, Application, and Technology Architecture to establish a sustainable business governance system, complementing the existing information security architecture.

Despite scaling down the TOGAF ADM, it remains quite burdensome for Nan Shan. This is why we are considering adopting the MVEA approach to promote the dotSHAN EAF. To foster a favorable Enterprise Architecture environment and minimize resistance, we are focusing primarily on Business Architecture while temporarily setting aside other aspects of TOGAF ADM.

Commencing Business Architecture

Following the introduction of Business Architecture, business process modeling became a routine task in certain departments at Nan Shan, where personnel are responsible for executing system development or integration projects. We aim to integrate roles, systems, scenarios, or scripts – the fundamental elements – into three functional cycles, as shown in Figure 16.

1. Role

   Within Business Architecture, stakeholder roles are defined based on tasks, responsibilities, and interactions required to achieve project objectives. These roles are represented in USB diagrams, serving as the primary drivers for developing insurance and financial industry systems.

2. System

   Most insurance and financial systems at Nan Shan are service-oriented, playing a crucial role in delivering insurance products, financial services, and supporting overall business functions.

3. Scenario or Scripts

   A business scenario can be divided into various subsets, known as scripts, using a virtual storyboard. Each subset/script of a scenario typically represents a specific variation or instance of that scenario. In simpler terms, it refers to a part of the overall scenario that focuses on a particular aspect, condition, or path within the broader scenario. By considering these fundamental elements, scenarios or scripts effectively capture the structure, interactions, and behavior of a system from different perspectives. This helps in understanding the functionality, requirements, and potential usage scenarios or scripts of the system.

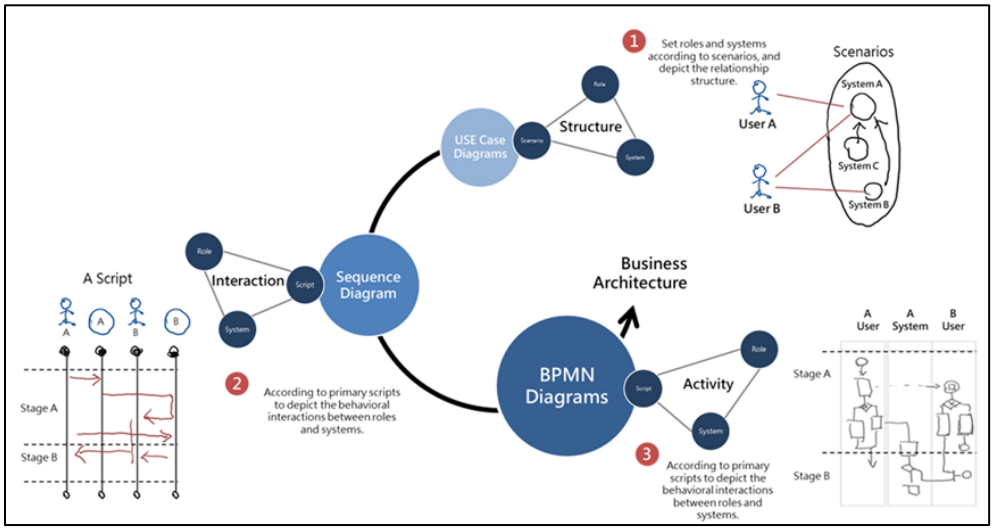

Figure 16: Business Process Modeling Methods and Steps

Business Architecture for Nan Shan Life Insurance via Beyond Lab

Utilizing the USB Approach

The USB approach is a business process modeling method based on an architecture-specific cycle and can be categorized into three perspectives.

1. Structure

   Use case diagrams are utilized to define roles and systems based on scenarios and illustrate the relationship structure among them using the structure-cycle modeling method of role, system, and scenario.

2. Interaction

   Sequence diagrams are employed to portray the behavioral interactions between roles and systems according to primary scripts, using the interaction-cycle modeling method of role, system, and script.

3. Activity

   BPMN diagrams expand on the various activity processes between roles and systems based on primary scripts, using the activity-cycle modeling method of role, system, and script.

   The business process modeling process follows a path from the structure-cycle through the interaction-cycle to the activity-cycle, facilitating the construction of the Business Architecture.

Introduction of External and Internal Resources

To achieve the realization of dotSHAN EAF, we have engaged external and internal expertise as detailed below:

1. a|EA, Taiwan Chapter, and a|CEA

   In addition to recruiting individuals with Enterprise Architecture capabilities and experiences as enterprise architects, we have empowered our Enterprise Architecture team to leverage external resources from organizations like the Association of Enterprise Architecture (AEA),[1] Taiwan Chapter,[2] and the Chinese Association of Enterprise Architecture (a|CEA).[3] These non-profit organizations in Taiwan are renowned for promoting Enterprise Architecture, and we have utilized their services including speeches, lectures, consultations, projects, certifications, residency programs, online teaching, and more. The SBC+SNA Framework 1.0, which they released in 2023 [Harn, 2023] was also referenced in this Enterprise Architecture project.

2. External experts

   Dr. Yuhong "Bob" Chu, former Chief Architect of Kingdee and Huawei in China, was invited to lecture on business process architecture in April 2024. He conducted a four-day online course introducing Enterprise Architecture, Business Architecture, MVEA, and USB diagrams. Dr. Chu possesses expertise in the TOGAF ADM, the ArchiMate modeling language, as well as extensive experience in process modeling for

[1] Refer to: https://www.globalaea.org/.

[2] Refer to: https://www.aeataiwan.org/about/.

[3] Refer to: https://www.aeataiwan.org.

Chinese enterprises. Currently, he is developing an MVEA system to manage and store Draw.io files of Enterprise Architecture artifacts. We plan to assess the functionality of his MVEA system in the near future and provide feedback for potential improvements.

3. Internal resources

   This year, Nan Shan has organized a series of offline Business Architecture courses to train various personnel, including Management Associates, Business Analysts, and System Analysts. These courses aim to promote business process analysis and information system inventory, which includes component review, interactive analysis, and dynamic behavior modeling. Management Associates at Nan Shan, new to the industry, are undergoing courses on insurance finance. Furthermore, personnel such as Management Associates, Business Analysts, and System Analysts will participate in business process architecture courses this year to form an internal team for implementing their respective Enterprise Architecture projects. The external team roles will act as external experts alongside Digital Development instructors or mentors.

Key Deliverables

We are excited to present key achievements, including the dotSHAN EAF with view diagrams and Business Architecture models using the USB approach. This framework supports business process analysis and system development. As the Enterprise Architecture project nears completion, we aim to deliver achievements in five major areas, as listed below.

dotSHAN EAF

Defined and Implemented by the project leaders and core team members:

EA1: Nan Shan Digital Governance Architecture

EA2: dotSHAN EAF

EA3: Modeling Methods of dotSHAN EAF

EA4: Mini Set of Business and System Architecture of dotSHAN EAF

EA5: Methods and Steps of Business Process Modeling

EA6: dotSHAN Enterprise Architecture Architecting Flow

EA7: Division of Labor between Business Architects and System Architects

EA8: The Flows of Process Mining

EA9: Governance Tech/Tools Deployment Framework

EA10: IS Planning & Modeling for Business and System Architecture

Business Architecture for Nan Shan Life Insurance via Beyond Lab

Motivation Architecture of dotSHAN EAF

Developed by project leaders and core team members and referred to the SBC+SNA Framework 1.0:

M1: Key Stakeholders

M2: Concerns of Key Stakeholders

M3: Issues

M4: Requirements

M5: Goal Formation

M6: Goal Realization

Project Architecture of dotSHAN EAF

Developed by project leaders and core team members and referred to the SBC+SNA Framework 1.0:

P1: Work Packages

P2: Deliverables

P3: Gantt Charts

P4: Team Members

P5: Roles

P6: Job Assignments

P7: Final Deliverables

Business Process Architecture of Five Enterprise Architecture Implementation Projects Based Upon the USB Approach

Developed by business units and Digital Development:

B1: Use Case (U) Diagrams for As-Is and To-be Versions

B2: Sequence (S) Diagrams for As-Is and To-be Versions

B3: BPMN (B) Diagrams for As-Is and To-be Versions

Outcomes and Results

Outcomes

Reflecting on the current progress achieved within the scheduled timeframe, we are confident in our ability to successfully achieve the strategic goals established prior to initiating this Enterprise Architecture project. We are poised to accomplish all strategic goals gradually in business terms, with critical success factors assessed and depicted through the following perspectives.

Stakeholder Satisfaction

The primary stakeholders of this Enterprise Architecture project encompass roles such as Executive, Digital Development, Technology and Application, Business Unit, Customer, Agent, and Employee, as depicted in Figure 3. While they share some common concerns regarding this Enterprise Architecture project, they also have distinct priorities. However, their satisfaction hinges on consistent communication views. Prior to the establishment of dotSHAN EAF, they expressed a long-standing desire for a formal method to streamline their business workflows. For instance, some business analysts within the business unit have already utilized the business process USB to develop their Business Architecture. Although a small subset of them has independently created BPMN view diagrams, their proficiency in diagram creation was honed through online BPMN learning resources. We observed their enthusiasm for participating in training sessions conducted by our Enterprise Architecture project team and refining their original BPMN view diagrams under the guidance of our mentors to ensure uniform communication standards.

Attainment of Objectives

The achievement of objectives in this Enterprise Architecture project unfolds in two stages: the preliminary stage and the implementation stage. The primary objective of the preliminary stage is the establishment of the dotSHAN EAF, to facilitate the subsequent implementation phase of this Enterprise Architecture project. Besides dotSHAN EAF, we have completed the majority of pivotal project components in the preliminary stage, including Nan Shan Digital Governance Architecture, Mini Set of Business and System Architecture, Governance Tech/Tools Deployment Framework, among others. Moving forward to the implementation stage, our focus shifts to constructing the Business Architecture of Nan Shan Life Insurance, with a specific emphasis on process review, analysis, and modeling. We aim to gain deep insights into the current process operations within business units and further identify linkages to application services for the development of web service APIs.

Ultimate versus Proposed Cost and Schedule

Strict control over project cost, time, and risk within Nan Shan is enforced by the respective business units and overseen by the board of directors. The board strictly prohibits projects from exceeding budgetary constraints, surpassing deadlines, or resulting in failure. Each business unit conducts multiple routine meetings monthly to evaluate performance metrics and adjust action plans accordingly. Thus, from a business standpoint, it is imperative to ensure that the ultimate cost and schedule remain within the proposed budgets and timelines.

Qualitative and Quantitative Findings

Numerous research and experimental efforts have been undertaken in this Enterprise Architecture project to introduce Enterprise Architecture to Nan Shan, and the implementation results thus far have been exceptional. We have amalgamated our qualitative and quantitative findings from this Enterprise Architecture project comprehensively as outlined below.

Enhancing Business Process Artifacts Style

We have improved the style of business process artifacts by transitioning from one informal BPMN view to three formal USB views.

Reducing Communication Time and Costs

Utilizing USB views, we have decreased communication time and costs by approximately one-third during discussions on practical work or projects occurring in daily seminars or biweekly meetings.

Achieving Business Excellence Goals with RPA and AI

We have achieved business excellence goals in the business process architecture through five projects employing Robotic Process Automation (RPA) and Artificial Intelligence (AI) across various domains, including SSO, Intelligent Customer Service, Intelligent Claims Work Platform, Mobile Payment, and Electronic Form Design projects.

Establishing Division of Labor for Business Process Architecture

The division of labor within the Enterprise Architecture team has been determined, comprising five core team members responsible for planning and designing dotSHAN EAF, Business Architects, system architects, and other key roles within the Enterprise Architecture implementation projects.

Advancing Capability Maturity Model® (CMM®) Integration (CMMI®) Levels

We have advanced CMMI levels, nearing Level 4, characterized by evidence of process mining with quantitatively managed processes.

Enhancing Process Mining Capability through Qualitative Analysis

The capability of process mining has been enhanced through qualitative analysis methodologies in the Beyond Lab, complemented by training programs for five business architects.

Refactoring Business Artifacts in Enterprise Architecture Implementation Projects

Original business artifacts created through 30 informal BPMN diagrams have been reviewed and refactored into nearly 100 formal view diagrams to meet process excellence requirements.

Defining Internal Architectures of dotSHAN EAF

The internal architectures of dotSHAN EAF have been clearly defined across six layers encompassing strategy, Business, Data, Application, Technology, and safety Architectures.

Designing Modeling Methods for Business and System Architecture

Modeling methods for Business Architecture and system architecture have been designed, utilizing upper and lower cycles with six specific views to guide implementation.

Business Architecture for Nan Shan Life Insurance via Beyond Lab

Utilizing Modeling Tools of dotSHAN EAF

Two modeling tools, Archi and Draw.io, have been employed to construct dotSHAN EAF and implement Business Architecture in Enterprise Architecture projects.

Selecting Scratchpad Viewpoint Elements for Modeling Tools

114 scratchpad viewpoint elements have been carefully chosen to streamline the modeling process and reduce the time spent searching for icons.

Enhancing Drawing Effectiveness of View Diagrams

The drawing effectiveness of view diagrams has been improved through the adoption of 30 reference patterns for Business Architecture and system architecture.

Elevating Stakeholder Satisfaction

Stakeholder satisfaction has been significantly elevated as evidenced by high satisfaction rates: 95% from workshops and oral investigations.

Injecting Knowledge, Skill, and Ability in Business Architecture

Colleagues have been equipped with knowledge, skill, and ability in Business Architecture through four various training courses and workshops.

Continuing Execution Capability of Business Architecture

The execution capability of Business Architecture continues to increase with 50 ongoing projects proposed by business units for the next stage.

Lessons Learned

doSHAN EAF Definition

We have defined the dotSHAN EAF by drawing insights from frameworks like TOGAF ADM and United States (US) Federal Enterprise Architecture Framework (FEAF). The internal structure of dotSHAN EAF encompasses various architectures such as strategy and security architectures and Business, Data, Application, Technology Architectures, all enveloped by architecture governance that emphasizes integration and alignment strategies. This structure is depicted in Figure 17 as the internal architectures of dotSHAN EAF.

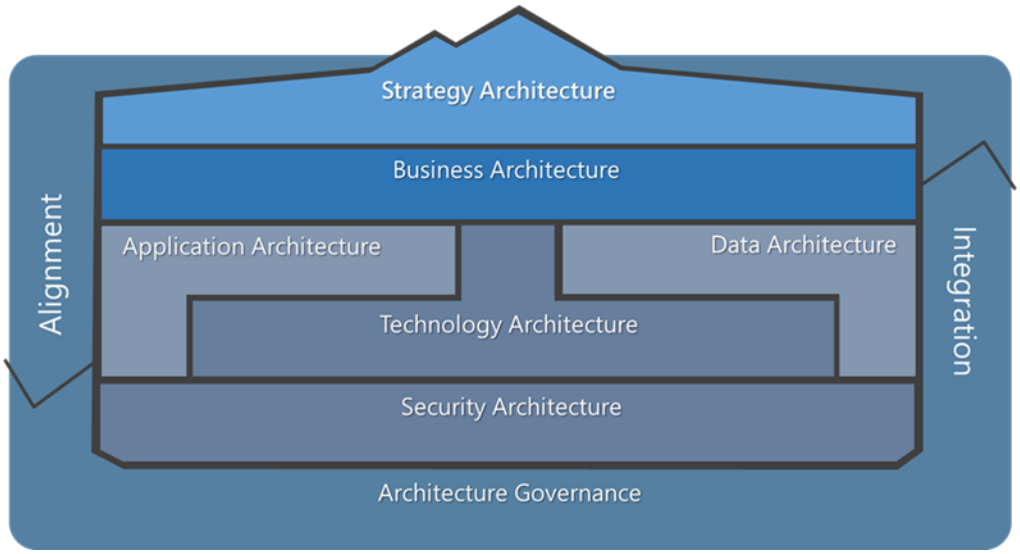

Figure 17: Internal Architectures of dotSHAN EAF

The integration and alignment approaches within dotSHAN EAF are not limited to a one-way direction of either bottom-up or top-down governance. Instead, these approaches involve bi-directional operations to govern the components within these internal architectures. When introducing a new component into any architecture, we consider how it aligns with or integrates into other components situated within their respective architectures, creating a well-structured relational hyper-graph model.

For instance, when creating application services within the Business Architecture, we ensure they are utilized by related business tasks and are implemented by application components within the Application Architecture. This interconnected approach ensures coherence and synergy across different architectural domains within dotSHAN EAF.

Business Architecture and Implementation

In our Enterprise Architecture project, we may not be able to complete the implementation of all planned projects across the internal architectures defined by various departments within Nan Shan. This year, our primary focus is on constructing the Business Architecture, specifically emphasizing process architecture modeling, which we term “business process architecture”.

Within Beyond Lab, we have outlined a clear path for process mining to achieve process excellence through automation and machine learning techniques such as Robotic Process Automation (RPA) and Artificial Intelligence (AI). Implementing a business process architecture involves a project-based approach rather than an organization-based one. This project incorporates organizational structures, employee roles, business events, and business processes, among other elements.

Initiating a project-based approach for business process architecture is a common task in enterprises during the Digital Transformation era. We have found that the most efficient way to approach this is through process review, analysis, and modeling. Once the artifacts of the business process architecture project are completed, the system analysis and design tasks can proceed based on these artifacts. Therefore, the implementation of a business process architecture must precede that of Application and Data Architecture.

Modeling Method

It is impractical to utilize the extensive views provided by architecture frameworks like the Zachman® Framework, the US Department of Defense Architecture Framework (DODAF), the British Ministry of Defence Architecture Framework (MODAF), the US FEAF, or the comprehensive stages of the TOGAF ADM to model the Enterprise Architecture of a typical organization. Considering limitations in resources such as human resources, production capacity, financial constraints, decision-making capabilities, information availability, and time constraints, we needed to find a more streamlined approach. To address this issue, we adopted the concept of MVEA, proposed by Jeremy Sadler [Sadler, 2019]. MVEA advocates a focus on the essential aspects of Enterprise Architecture that are crucial for organizational needs, without overwhelming complexity.

Our MVEA experiences can be summarized as follows:

1. Architecture frameworks

   We chose the TOGAF ADM and the US FEAF as our reference paradigms due to their global standards and government-level robustness. However, we tailored these frameworks to create dotSHAN EAF, focusing on core layers such as Business, Data and Information, Application, and Technology Architecture.

2. Architecture scopes

   Our focus in this Enterprise Architecture project is on the Business Architecture scope, particularly emphasizing business processes derived from the Beyond Lab, which serves as a solid foundation for our approach.

3. Architecture views

   We reviewed various architecture views suitable for depicting business process architecture. The USB views form the upper cycle of our Business Architecture. Additionally, the Structure Layer Diagrams depicted by the ArchiMate Specification integrate these views comprehensively.

4. Architecture tools

   Initially, we chose Archi as our modeling tool due to its robust features, although the learning curve was significant. However, recognizing the preference for simpler tools among many users, we strongly recommended using Draw.io for business analysts to construct their business process architecture using USB diagrams. Archi remains the tool of choice for Enterprise Architects for more complex tasks.

By streamlining our architectural thinking and focusing on essential aspects, we have been able to effectively model our Enterprise Architecture within the constraints of our resources and goals.

Labor Division

The stakeholders' roles related to this Enterprise Architecture project consist of Business Architects, system architects, business analysts, system analysts, system designers, and test engineers, as depicted in Figure 11.

The labor division regarding Enterprise Architecture was initially unclear at the start of this Enterprise Architecture project. Since the project's core mission revolves around setting processes as a priority, we needed to persuade individuals with strong business knowledge and experience to engage in constructing business process architecture. Prior to this Enterprise Architecture project, no one, including Project Management (PM) and Business Unit personnel, was enthusiastic about taking on process analysis tasks. This reluctance stemmed from a lack of acknowledgment among PM and Business Unit members regarding their involvement in process review, analysis, and modeling.

While our colleagues in Digital Development were suitable candidates for constructing business process architecture, they lacked the necessary resources to take on process analysis tasks. Moreover, business process analysis seemed to have been overlooked by business analysts in Nan Shan. Consequently, clarifying the labor division during the system development cycle became an urgent matter. To address this, we introduced the concept of the Beyond Lab as a platform for integrating business process architecture, fostering consensus, and defining labor division. Within the Beyond Lab, two roles were established: Enterprise Architects responsible for Business Architecture; and system architects responsible for system architecture. Business analysts from business units collaborated with Enterprise Architects to create the business process architecture through requirements and process analysis. Similarly, system analysts from Technology and Application worked alongside system architects, system designers, and test engineers to create the system architecture through steps such as system design, prototype design, and file archiving.

Through project executive solutions, we successfully assigned Enterprise Architecture work to different types of individuals based on their roles and expertise.

Executive Solution

Regarding executive solutions, Enterprise Architects hold a higher position than Business Architects and system architects, focusing on the overall static structures and dynamic behaviors of implementing the Enterprise Architecture project. Business Architects concentrate on business aspects such as business scenarios, scripts (actors, tasks, time, message flows), while system architects focus on system aspects related to digital innovation projects, including system component activities, triggered sequences, interfaces, states, and data objects. In this Enterprise Architecture project, Enterprise Architects occasionally take on a crucial role as Business Architects, primarily due to job assignments related to the executive solutions for Business Architecture. We have outlined two executive solutions for Business Architecture, referred to as Solution A (see Figure 18) and Solution B (see Figure 19).

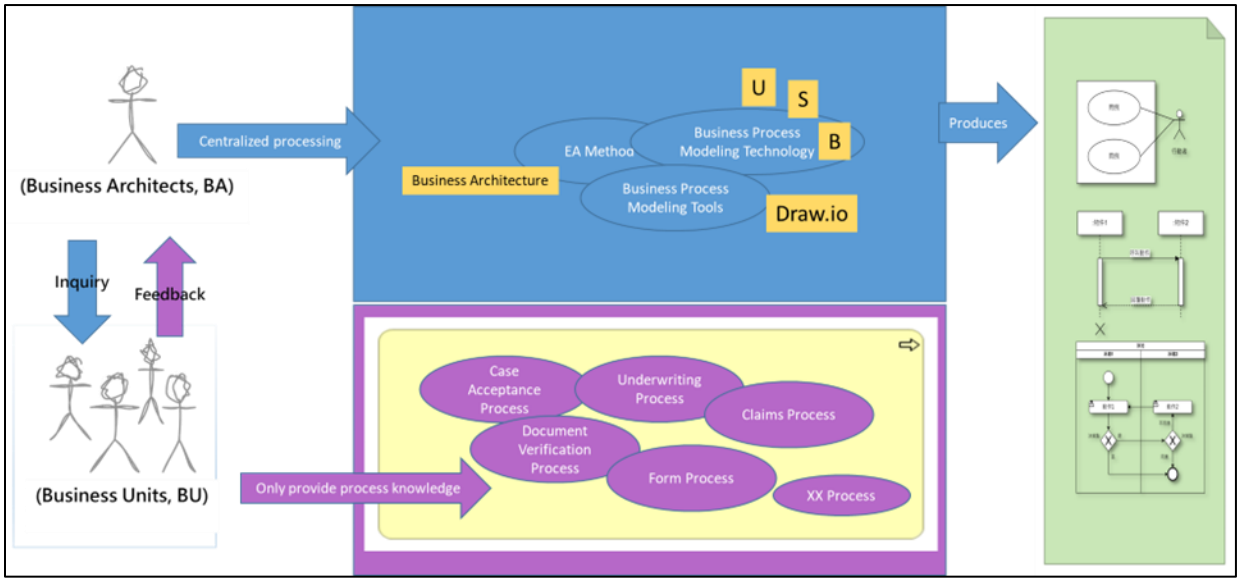

Figure 18: Executive Solution A of Business Architecture: Centralized Processing

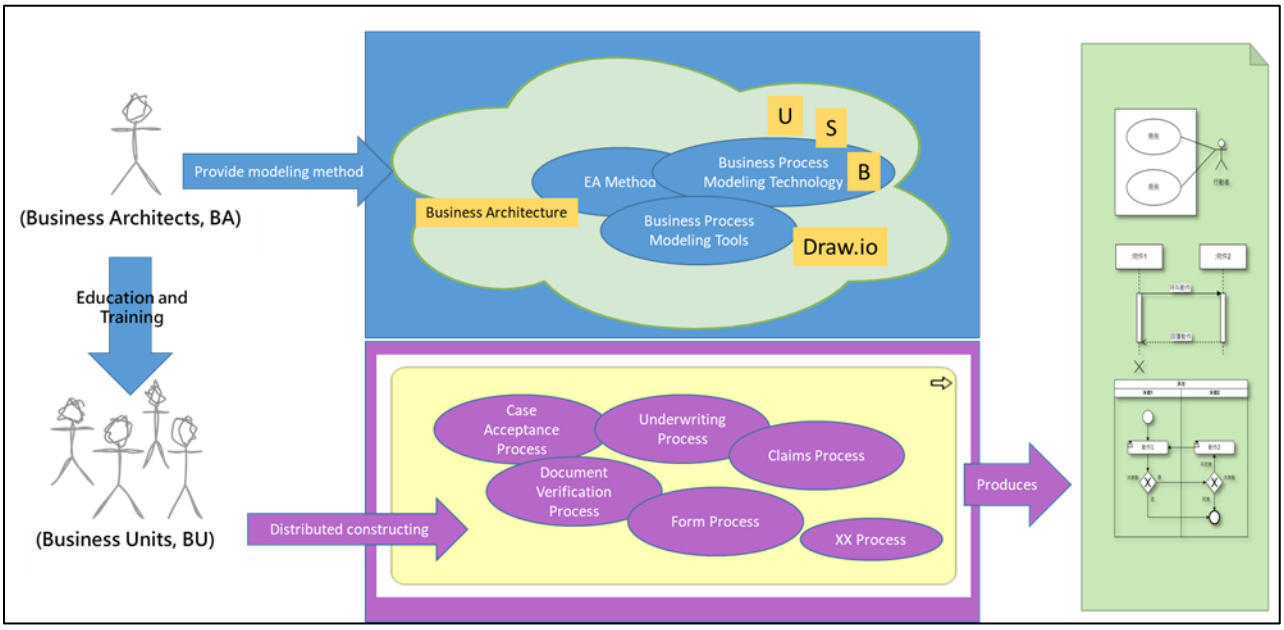

Figure 19: Executive Solution B of Business Architecture: Distributed Constructing

The Executive Solution A of Business Architecture entails a centralized processing approach, where Business Architects seek process expertise from Business Units, and Business Units provide feedback to Business Architects. Business Architects centrally manage Enterprise Architecture implementation projects using Business Architecture methods, USB business process modeling technology, and the business modeling tool Draw.io to create Business Architecture views comprising the USB diagrams. On the other hand, Executive Solution B involves a distributed processing approach, where Business Architects provides education and training courses to Business Units. Business Architects offer different modeling methods related to Business

Architecture methods, USB business process modeling technology, and the business modeling tool Draw.io to help the Business Unit create their own Business Architecture views, comprising of USB diagrams.

Based on our practical experiences, we strongly recommend Executive Solution B as the preferred course of action for considering modeling methods. The reasons for this recommendation, as shown in Figure 20, include:

1. Simplicity and ease of learning
2. Strong emphasis on business-intensive features
3. Lower cost with better effectiveness
4. Business Architect acting as a coach, teaching fishing methods
5. Business Unit becoming familiar with the Draw.io tool and drawing their own processes

We believe that providing the fishing rods (tools and training) is more beneficial than simply providing the fish (completed processes).

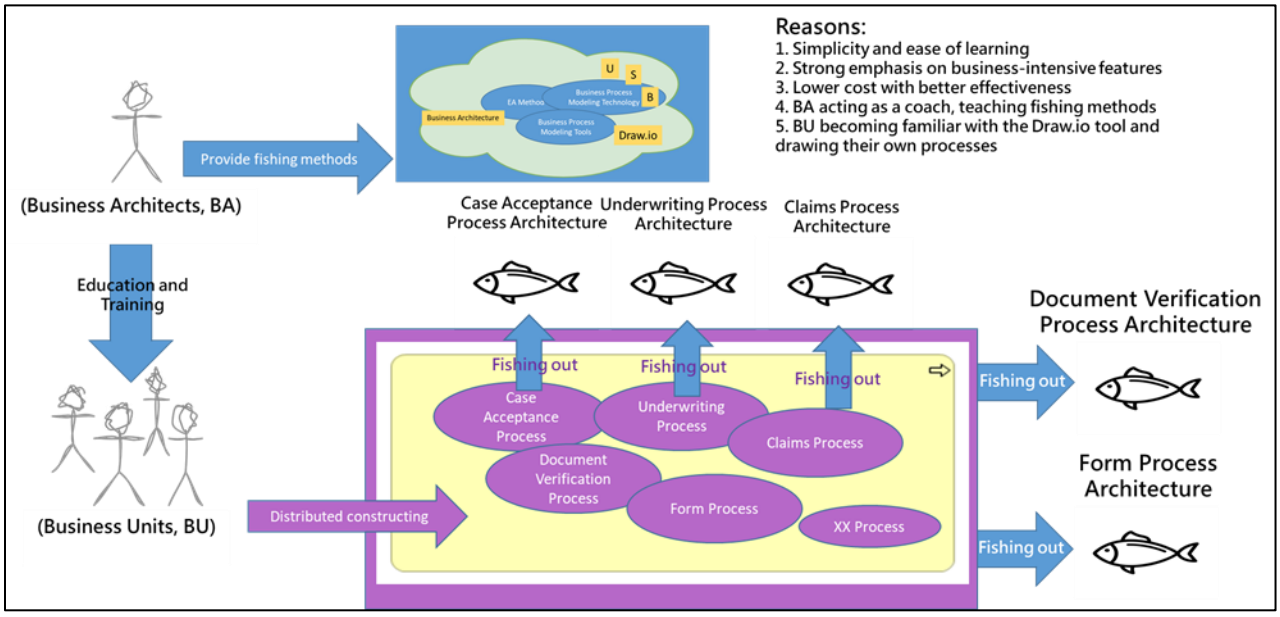

Figure 20: Executive Solution of Business Architecture: Suggestion of Distributed Executive Method

Acronyms and Abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
BA	Business Analyst
BU	Business Unit
DD	Digital Development
DODAF	Department of Defense Architecture Framework
EAF	Enterprise Architecture Framework
FEAF	Federal Enterprise Architecture Framework
IS	Infrastructure Sustainability
LSD	Layered Structure Diagram
MA	Management Associate
MODAF	Ministry of Defence Architecture Framework
MSA	Microservices Architecture
MVEA	Minimum Viable Enterprise Architecture
PM	Project Management
RPA	Robotic Process Automation
RPC	Remote Procedure Call
SA	System Analyst
SD	Sequence Diagram
TA	Technology and Application
UCD	Use Case Diagram
USB	Use Case, Sequence, and BPMN diagrams

Referenced Documents

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

[C220] The TOGAF® Standard, 10th Edition, a standard of The Open Group (C220), April 2022, published by The Open Group; refer to: www.opengroup.org/library/c220

[C226] ArchiMate® 3.2 Specification, a standard of The Open Group (C226), October 2022, published by The Open Group, October 2022; refer to: www.opengroup.org/library/c226

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The following documents are not directly referenced but are valuable reading in support of this document:

[W180] IT4IT™ Business Value: Providing Operational Value with the IT4IT Standard (W180), January 2018, published by The Open Group; refer to: www.opengroup.org/library/w180

[Y235] Taipei City Government Enterprise Architecture (Y235), May 2023, published by The Open Group; refer to: www.opengroup.org/library/y235

Project Award Details

The Open Group India Awards 2024

Category:	TOGAF® Standard/Enterprise Architecture
Award Type:	Promising Project of Future potential
Citation:	Nan Shan Life Insurance Co. Ltd. has demonstrated very high enthusiasm and sincerity in their efforts to adopt Enterprise Architecture. The initiatives implemented by the organization to this effect toward extensive capability building and human capital development in the domain of Enterprise Architecture have set the stage for a holistic adoption of Enterprise Architecture for business value realization and transformation in the future.

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- Dr. Hsin-Ke Lu, Project Leader, Vice President, Chief Digital Officer, Nan Shan Life Insurance Company, Ltd.
- Dr. Meng-Chyi Harn, Senior Enterprise Architecture (EA) Consultant, Nan Shan Life Insurance Company, Ltd.

The Open Group gratefully acknowledges the contribution of the following key members of the Enterprise Architecture team:

- Dr. Peng-Chun Lin, Senior Enterprise Architect, Nan Shan Life Insurance Company, Ltd.
- Dr. Chi-Hung Tsai, EA Implementation Project Manager, Nan Shan Life Insurance Company, Ltd.
- Chun-Chi Lin, EA Implementation Project Manager, Nan Shan Life Insurance Company, Ltd.
- Ping-Yen Chen, Enterprise Architect, Nan Shan Life Insurance Company, Ltd.
- Tso-Ling Chen, EA Implementation Project Manager, Nan Shan Life Insurance Company, Ltd.
- Chia-Hsin Hsieh, EA Implementation Project Manager, Nan Shan Life Insurance Company, Ltd.
- Elwood Chen, Enterprise Architect, Nan Shan Life Insurance Company, Ltd.
- Kuang-Tsu Han, EA Director, Nan Shan life Insurance Company, Ltd.
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Dr. Hsin-Ke Lu

Dr. Lu currently serves as the Chief Digital Officer (CDO) at Nan Shan Life Insurance, where he is responsible for the company's Digital Transformation agenda by restructuring the digital ecosystem and applying value-added data initiatives. His expertise includes data science, information governance, and Enterprise Architecture methodologies (such as the TOGAF® ADM), and he has extensive experience in advancing Digital Transformation within organizations.

He holds a Ph.D. from National Taiwan University and has more than 20 years of experience as a university professor. In 2019, he was appointed as the Commissioner of the Department of Information Technology at the Taipei City Government, concurrently serving as Deputy Chief Information Security Officer (CISO) and Executive Director of the Taipei Big Data Center. In these roles, he actively led Taipei's Digital Transformation efforts, helping the city achieve fourth place in the IMD Smart City Index published in Switzerland. For his contributions, he was named the 2022 IDC CIO of the Year. He also currently serves as a municipal advisor to both the Taipei City Government and the Hsinchu City Government, supporting the development of smart cities.

Dr. Meng-Chyi Harn

Dr. Meng-Chyi Harn is currently the Senior Enterprise Architecture (EA) Consultant at Nan Shan Life Insurance Company, Ltd., where he oversees the implementation of dotSHAN Enterprise Architecture using The Open Group standards, including the TOGAF® Standard, the IT4IT™ Standard, and the ArchiMate® Specification, in collaboration with the Beyond Lab's Enterprise Architecture Group.

Dr. Harn has over 39 years of experience in IT and management since 1986. He earned his Ph.D. in Computer Science from the Naval Postgraduate School, USA, in 1999, and later served in the National Defense University of Taiwan. His research interests span architecture theory, Structure-Behavior Coalescence (SBC) architecture, Semantic Network via the ArchiMate Specification (SNA), C^4ISR, DoDAF, EA^3 Cube Framework, the TOGAF Standard, formal methods, Artificial Intelligence, Expert Systems and network-centric systems.

After retiring from military service in 2004, he joined Takming University of Science and Technology (TMUST) as an Associate Professor, General Director, and Dean of the College of Informatics. He later trained over 170 Enterprise Architecture Chief Architects and thousands of Domain Architects at the Industrial Technology Research Institute (ITRI) and led several government Enterprise Architecture projects.

He authored Enterprise Architecture Guidance: Blue Ocean Layout and Practice Strategy in 2015 and currently serves as Honorary Chairman of a|CEA and Deputy Chairman of a|EA Taiwan Chapter.

About The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards and open source initiatives by fostering a culture of collaboration, inclusivity, and mutual respect among our diverse group of 900+ memberships. Our membership includes customers, systems and solutions suppliers, tool vendors, integrators, academics, and consultants across multiple industries.

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