Seven Steps to Digital Scenario Innovation

Shu Liu[a]*, Fangqi Dong[b], Mian Wang[c], Boya Shang[d]

CATARC Automotive Industry Engineering, Tianjin 300300, China

[a*]liushu@catarc.ac.cn, [b]dongfangqi@catarc.ac.cn,
[c]wangmian@catarc.ac.cn, [d]shangboya@catarc.ac.cn

Abstract. As an important driving force for the digital transformation of enterprises, digital scenarios have become the main fronts for innovation and change among enterprises. However, the lack of innovative guidance methods in corporate practices has constrained the scope and degree of scenario innovation. Based on the internal construction logic and external driving logic of digital scenarios, this article tailors the TOGAF enterprise architecture process method to the scenario level, providing seven steps and 14 measures to guide enterprises to complete the innovation overall process from target definition, value analysis, form analysis, product analysis, to scheme design, project planning, and construction implementation.

Keywords: digital scenario; scenario innovation; enterprise architecture; innovation process.

1 Introduction

As digital transformation enters the landing stage, digital scenario as the link between strategy and implementation, the link between operation and service, as the value carrier, landing carrier, evaluation carrier, iteration carrier of digital transformation, has been widely concerned. The State Council's "14th Five-Year Plan for the Development of the Digital Economy" points out that it is necessary to promote the integration and innovation of digital technologies, application scenarios and business models, and to form a development pattern that promotes the improvement of total factor productivity with technological development, and drives technological advancement with application in the field[1]. However, due to the lack of operational methods to drive the digital transformation of enterprises with digital scenarios, the design, development and construction measures taken by the government and enterprises for the scenarios appear simple and rough, lacking systematicity, effectiveness and operability.

In practice, it is found that enterprise architecture theory can bring substantial breakthroughs to scenario innovation research, which can help change subjects to identify and transform scenarios in a structured way, and at the same time, can realize the connection between scenario innovation and the overall digital transformation of enterprises. Since Zachman published his paper in 1987, enterprise architecture has emerged as a professional field for more than 30 years. On the basis of Zachman's enterprise

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architecture ontology, enterprise architecture methodologies such as DoDAF, FEA, and TOGAF have gradually appeared and have been widely used, and the digital architecture design has also become a core link in the landing of the enterprise digital transformation strategy[2]. Although in traditional enterprise architecture, scenarios are often used only as a means to measure the reasonableness of architectural decisions or as an external representation of the results of enterprise architecture[3-5]. In TOGAF, "enterprise" is defined as any collection of organizations with common goals, which makes it possible to apply the enterprise architecture process methodology at the scenario level[6].

2 Scenario-based Morphing of Enterprise Architecture Process Methods

2.1 Scenario Innovation Convergence Enterprise Architecture and Innovation Mesh

Enterprise Architecture, as an important tool for the top-level design of digital transformation, TOGAF has designed a set of tailorable, iterative, and extended borrowing Architecture Development Method (ADM) for it, which includes: preliminary, A architecture vision (A), business architecture (B), information systems architectures (C), technology architecture (D), opportunities and solutions (E), migration planning (F), implementation governance (G), architecture change management (H), and requirements management[6] . Following the tailoring rules of ADM amplification, it can be simplified into the scenario level as seven steps and 14 measures, which includes: 1) Define the scope of scenario and unify goals and visions; 2) Analyze the value process and confirm ability foundation; 3) Analyze scenario form and abstract key processes; 4) Analyze input and output and identify key objects; 5) Explore change opportunities and design improvement plan; 6) Design system architecture and plan change projects; 7) Control implementation process and realize value goals. As shown in the left half of Figure 1, where the first step corresponds to preparation, vision and requirements; the second and third steps correspond to B; the fourth step corresponds to the first half of C; the fifth step corresponds to E; the sixth step corresponds to the second half of C, D and F; and the seventh step corresponds to G and H.

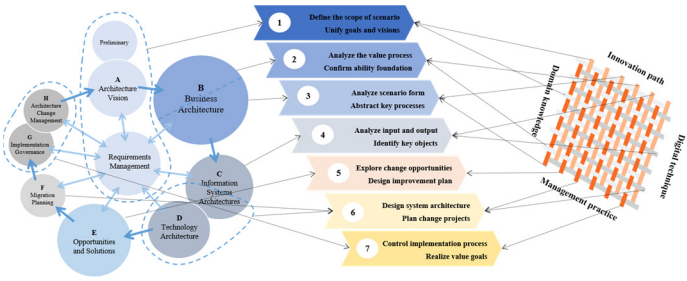

Fig. 1. Enterprise architecture and innovation mesh supporting the seven steps to scenario innovation

The right half of Figure 1 represents the various tools and methods of the innovation mesh playing a role in the seven steps. The innovation mesh is inspired by the management mesh and consists of four dimensions: 1) Innovation paths, such as new products and services, new processes and methods, value process reengineering, scenario-based experiences, platform-based operations, and cross-contextual transfers, etc.; 2) Domain knowledge, such as industrial synergy, enterprise management, automotive research and development, painting processes, service marketing, and financial management, etc.; 3) Management practices, such as enterprise architecture, lean management, agile development, information security, data governance, integration, etc.; 4) Digital technologies, such as cloud computing, big data, internet of things, digital twin, artificial intelligence, etc.[7].

2.2 An Overview of the Seven Steps to Scenario Innovation

The seven steps to scenario innovation likewise inherit the ADM's characteristics of being tailorable, iterative, and extensible to draw on, with certain actionable deliverables in each segment, and the deliverables of the preceding and following steps are relevantly inherited or associated, as shown in Figure 2: the first step delivers a scenario vision map, the second step delivers a value stream map and a capability map, the third step delivers the scenario form diagram, the process framework, and the key process diagram, the fourth step delivers the object mapping diagram, the fifth step delivers updated foregoing documents, the sixth step delivers various types of architecture diagrams, and the seventh step delivers final products and performance.

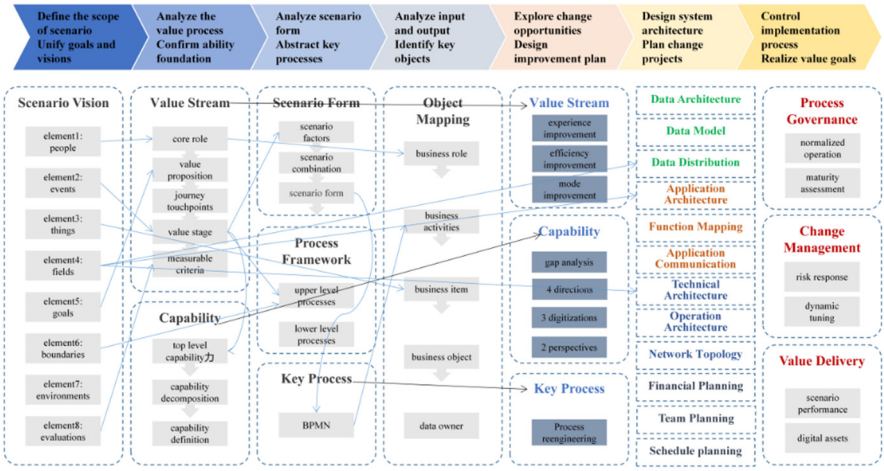

Fig. 2. Overview of the seven steps of scenario innovation

3 Scenario innovation seven-step concrete operation

3.1 Define the Scope of Scenario and Unify Goals and Visions

Firstly, provide a detailed definition of eight elements, namely people, events, things, fields, goals, boundaries, environments, and evaluations.

As shown in Figure 3, defining "people" can use a stakeholder map; The definition of "events" can be divided into the process of value discovery, the process of value creation, and the process of value delivery; Defining "things" can capture potentially valuable products in an open form, preparing for business object identification; Defining "field" can consider physical hardware resources and digital software resources; Defining "goals" requires distinguishing between "value goals to be achieved in the scenario" and "goals to be achieved in the scenario innovation"; "Boundary" can be understood as the threshold of the first five elements; "Environment" can be identified from aspects such as customers, baseline, strategy, industry, technology, etc; "Evaluation" is the indicator decomposition of "goals".

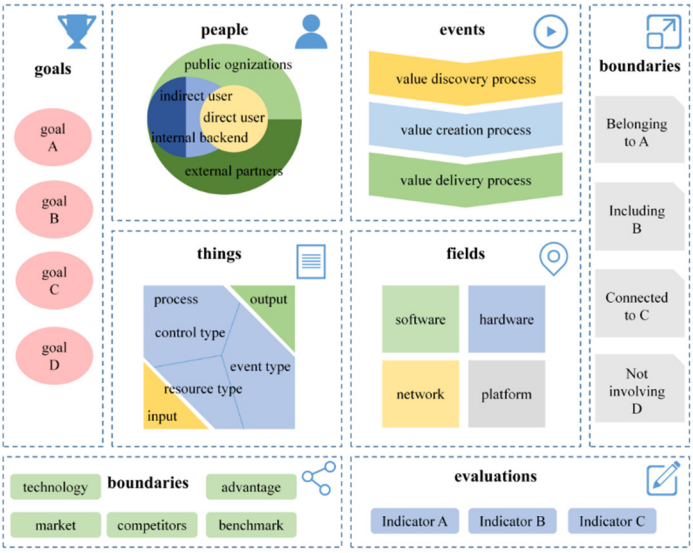

Fig. 3. Presentation of the eight elements of scenario innovation

3.2 Analyze the Value Process and Confirm Ability Foundation

The purpose of value stream and business capability analysis is to define what value digital scenarios can provide to customers and what combinations of capabilities are needed to provide value. Thus effectively identifying the value created by digital scenarios and the required capabilities, clarifying the current foundation and shortcomings of capabilities, and providing ideas for subsequent innovative designs. Customer oriented value stream analysis is currently the mainstream method. Firstly, identify user

roles and value propositions, draw user journeys based on user behavior, and analyze milestones and stage gains; Afterwards, identify value touchpoints, identify internal value activities, and form a coherent internal value stream; Finally, aggregate closely related activities into value stream stages, design gates and stakeholders for each stage, and further break down value projects and even contribute elements. The overall presentation status of the value stream is shown in Figure 4.

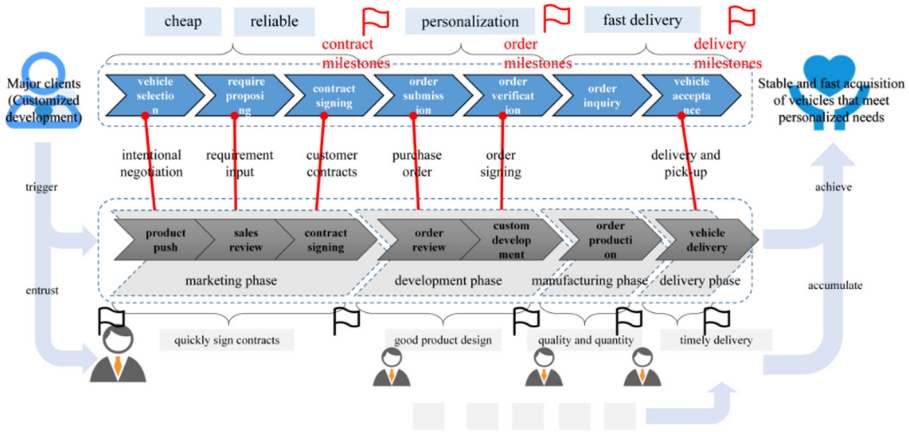

Fig. 4. Value stream of customized car production for large customers

The capability map is an important tool for identifying the foundation of capabilities. Firstly, preliminary identification is carried out from each value stream stage, followed by the decomposition and aggregation of capabilities. Finally, different classification methods are used to display heatmaps of capabilities from different perspectives, in order to identify the capabilities that truly need to be supplemented and improved.

3.3 Analyze Scenario Form and Abstract Key Processes

The selection of scenario forms is to focus more on specific scenario states, reduce the number of variants, and analyze the actual operational processes. The recognition of scenario morphology first requires determining the scenario factors, conducting a combination analysis of the multiple factors with the greatest impact, and selecting the truly existing scenario morphology among them. As shown in Figures 5 and 6, the identified six scenario factors can form 324 different scenario forms, but after screening and analysis, only three forms are truly present. This process can make the scenario more specific, thereby supporting the presentation of subsequent key processes. It is recommended to model according to the BPMN specification method during the process design phase.

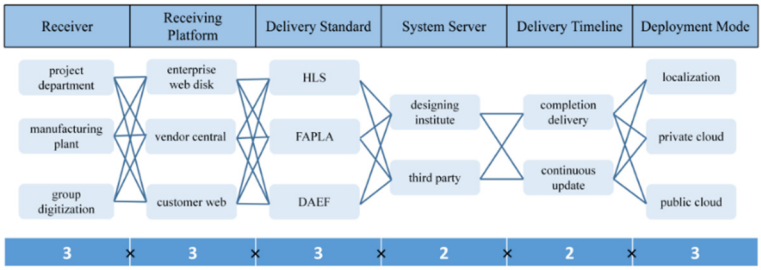

Fig. 5. Selection process of customized delivery scenario form for automotive factory design

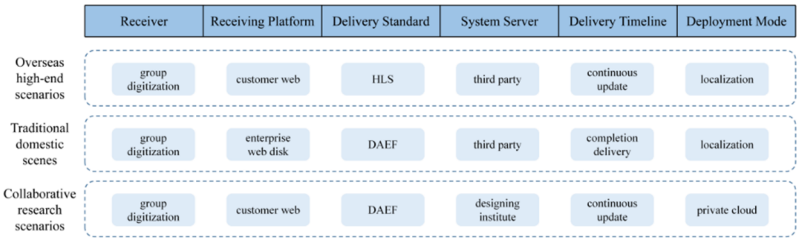

Fig. 6. Automotive factory design customized delivery scenario form selection results

3.4 Analyze Input and Output and Identify Key Objects

After the process becomes clearer, it is necessary to refine and identify the data in the process. It includes three processes: first, identify business items in the converged business activities, namely the input and output objects of each business activity in the process, including data entities and tables, certificates, documents, books, etc. that carry data; Afterwards, identify business objects from business elements that achieve similar business objectives, carry similar business behaviors, contain similar logical data structures and attributes, and have similar lifecycle and state changes; Finally, identify the data owners of each business object based on the principles of "who is most painful, who will manage" and "who is close, who will manage".

3.5 Explore Change Opportunities and Design Improvement Plan

Through the first four steps, the value status, process status, and data status of this scenario are all presented more directly. In the exploration stage of improvement opportunities, there are differences in the methods of enterprises with different maturity levels.

For enterprises with high digital maturity, the first four steps focus on baseline analysis, and individual key optimizations are carried out by identifying value defects, process bottlenecks, and data redundancy; for enterprises with low digital maturity, the first four steps need to focus on goal design, aligning the value stream and operational status of the goals, starting from basic object digitization, process digitization, and rule digitization, gradually enhancing capability as digital connectivity, process reengineering, equipment intelligence, and knowledge insight; for enterprises with relatively

vague maturity, both target and baseline charts can be drawn simultaneously, and change measures can be identified through gap analysis.

The process is shown in Figure 7. After completing the gap analysis, the scenario is located in the scenario map to determine its feature type, select applicable capability improvement methods, and design improvement plans.

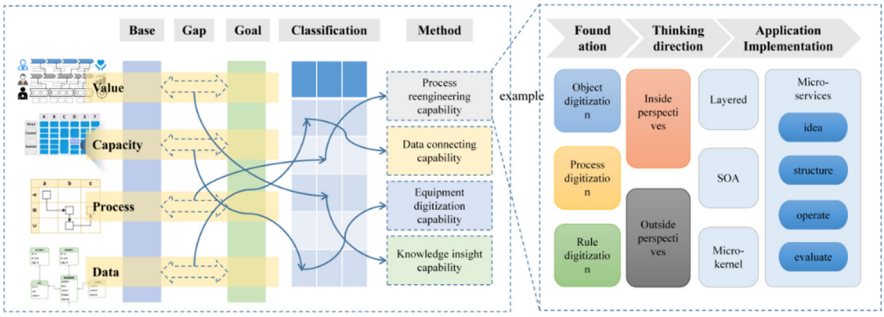

Fig. 7. General process from gap to solution

3.6 Design System Architecture and Plan Change Projects

After completing the fifth step, the business analysis and goal analysis have been basically finished, and the sixth step starts the design of the technical level in order to realize the change goal. Among them, the data level can consider data architecture analysis, data model analysis and data distribution analysis; the application level can consider application architecture analysis, function mapping analysis, application communication analysis; the technical level can consider technical architecture analysis, operation and maintenance architecture analysis, network topology analysis and so on. The above work will be run in the form of a project, which requires synchronized financial planning, team planning and schedule planning.

3.7 Control Implementation Process and Realize Value Goals

Finally, this change is realized by project planning, which can be done by using the Digital scenario Innovation Maturity Model to monitor and evaluate the overall operation process, while focusing on risk management and change management, as well as the innovation performance generated and the data assets deposited.

4 Conclusion

Aiming at the lack of methods and slow results of the current digital scenario innovation, this paper has been inspired by the enterprise architecture and innovatively applied to the scenario level, has been inspired by the management mesh and innovatively designed the innovation mesh, and combined the two to form the seven-step method of

digital scenario innovation. Enterprises can work at the operational level to realize digital scenario innovation through seven steps and 14 initiatives, such as defining the scope and unifying the vision, judging the value and analyzing the capability, locking the form and abstracting the process, sorting out the products and identifying the data, exploring the opportunity and designing the scheme, developing the structure and planning the project, controlling the process and realizing the goal.

This study still has some limitations. First, enterprise architecture theories are evolving synchronously, and architecture convergence is a more mainstream development direction at present, and architecture convergence in digital scenarios is expected to be a breakthrough in enterprise-level architecture convergence, but the degree of convergence of business, data, and technology in digital scenarios is not deep enough in the current operational approach. Second, the innovation mesh is a set of large-scale toolkit, which needs to be continuously enriched and accumulated, especially in the fifth step of exploring the change opportunities and designing the improvement plan, the categorization system of the scenarios, and the system of the direction of change of the capabilities still need to be enriched.

Acknowledgements

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