# Research on the Implementation Path of Digital Transformation Planning in the Background of Digital Economy

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**Abstract**—With the development of the digital economy, enterprises have formulated digital transformation development strategies, but there is currently no mature method system for how to accurately and effectively implement digital strategies. The article focuses on the key links of strategic implementation, innovatively proposes the alignment and promotion path of digital transformation from "planning" to "project" by combining architectural models, econometric models, and other methods, and analyzes it with specific cases. The study provides a method for transforming planning achievements into actionable and implementable projects, enriching the theoretical system of digital transformation practice.

**Keywords-**Digital Transformation; Planning Implementation Path; Architecture Model; Metrology Model

## 1 Introduction

In recent years, with the deepening development of the new generation of technological revolution and industrial transformation, digital transformation has become an inevitable trend of the times. Enterprises are seizing important historical opportunities, actively responding to the national digital economy deployment, and elevating digital transformation to the core strategic level for top-level planning and systematic promotion. Digital transformation is a complex system engineering, and planning is the top-level design of this system engineering. A good plan should align with the business strategy upwards, depict the vision and blueprint of enterprise digitalization, and form a consensus on the direction of the company from top to bottom; Define specific measures, landmarks, and projects downwards, clarify the responsible parties, and guide implementation. That is to say, planning should play a connecting role in digital transformation, and the implementation of digital transformation achievements ultimately needs to be supported by one to multiple transformation projects through step-by-step disassembly. However, there is no systematic method for enterprises to promote the implementation of digital transformation projects, resulting in low utilization of information systems and return on investment of digital assets, which affects the effectiveness of digital transformation.

MSIEID 2023, December 08-10, Guangzhou, People's Republic of China

DOI 10.4108/eai.8-12-2023.2344471

TOGAF adopts an enterprise architecture model and architecture development method (ADM) to ensure alignment between IT strategy and business strategy [1] [8], providing a framework and basic reference for strategic alignment and implementation work [4] [5]. Siemens and other companies have conducted relevant explorations based on architecture theory. However, due to factors such as industry and enterprise differences, there are no specific methods and steps to refer to.

Considering that the implementation of digital transformation strategy is a complex and gradual process, which generally includes links such as "strategy planning project solution", taking the "Three Determinations" process as an example, the implementation process of digital transformation planning is shown in Figure 1. The article selects the "planning project" link to conduct research on the implementation and alignment methods of this link, in order to provide theoretical and methodological support for the efficient implementation of digital transformation strategy.

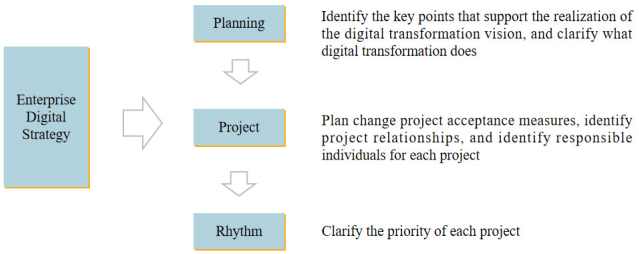


**Figure 1** The process of "Three Determinations"

## 2 Introduction to methods and models

Combining existing research and practice, the planning and implementation process involves multiple matters such as solution development, project dismantling, and project priority determination[2], and requires a systematic promotion that combines subjectivity and objectivity. Here, several typical methods are introduced to address the above issues as the basis for subsequent path development.

### 2.1 Architectural model

In the process of scheme planning and design, compared to natural language description, model language can better describe business requirements and more effectively communicate between business and technical personnel. Therefore, in the implementation process of digitalization related projects, using model language to describe relevant requirements is the best choice. Taking the gap analysis matrix as an example, a brief introduction to the model method is provided.

Gap analysis matrix is a tool that analyzes the gap between the current situation and goals in the form of a matrix, as shown in Table 1. The gap analysis matrix needs to use the same dimensional perspective to determine and record the differences between the current situation and goals, and the element content listed in the rows and columns should meet the MECE

principle. The gap analysis matrix is both an analysis tool and an inspection tool. On the one hand, it can identify gaps and guide the implementation work; On the one hand, it can check whether the current elements have been taken over in the target elements, guiding the iterative revision of the planning plan.

**Table 1** Gap Analysis Matrix

| Current Elements | Target Elements | | | | |
|---|---|---|---|---|---|
| | Element1 | Element2 | Element3 | … | Vanishing element |
| Element A | | | | | |
| Element B | | | | | |
| Element C | | | | | |
| … | | | | | |
| New element | | | | | |

In addition to the gap analysis matrix, the gap solution dependency matrix, gap solution dependency priority matrix, solution implementation influencing factors and their risk assessment forms can all form effective support for project implementation in each stage.

### 2.2 MECE principles

The MECE principle is a categorical thinking tool proposed by McKinsey's consultant Barbara Minto in "The Pyramid Principles". The MECE principle can generally be applied through the following four steps: first, determine the scope, clarify what the current issue is, and what we want to achieve; Secondly, search for entry points that comply with MECE, namely classification standards; Thirdly, consider whether MECE can be used for further segmentation; Fourthly, confirm if there are any omissions or duplications. The MECE principle can ensure that the classification results are not missing or overlapping.

### 2.3Analytic Hierarchy Process [9]

Analytic Hierarchy Process (AHP) is a decision-making method that decomposes the problem and its related factors into levels such as objectives, criteria, and plans, and then conducts qualitative and quantitative analysis. The specific process is as follows.

Firstly, invite experts to judge the importance of two indicators based on the 1-9 scale theory, and obtain a subjective judgment matrix for each expert.

Secondly, calculate the consistency ratio $CR$ and perform consistency checks on each matrix. If $CR < 0.1$ , the consistency of the judgment matrix is considered acceptable, otherwise corresponding experts need to modify the judgment matrix. Among them, $s$ is the matrix dimension, and $\lambda_{q\max}^{\eta}$ is the maximum eigenvalue of the matrix.

$$CI = {\lambda_{q\max}^{\eta} - s}\Big/{s-1} \tag{1}$$

$$RI = {\lambda_{q\max}^{\eta}{}' - \mathrm{s}}\Big/{s-1} \tag{2}$$

$$CR = {CI}\Big/{RI} \tag{3}$$

Thirdly, based on the Kendall harmony coefficient, a test statistic $\chi^2$ is constructed to test the concentration of expert opinions. If $\chi^2 > \chi^2_\alpha(s-1)$, it indicates that the opinions of experts are significantly consistent at the $\alpha$ level. Otherwise, the expert opinions should be corrected. Among them, $r^\eta_{q,j}(j=1,2,\mathrm{L},s)$ represents the $q$ -th expert's non repeated ranking of the evaluation indicators of indicator $\eta$ in natural number order based on their relative importance, and $s$ represents the number of indicators under indicator $\eta$.

$$S=\sum_{\mathrm{j}=1}^{\mathrm{s}}(R^\eta_j-RM^{\eta\,2} \tag{4}$$

$$R^\eta_j=\sum_{q=1}^{m}r^\eta_{q,j} \tag{5}$$

$$RM^\eta=1\Big/_{\mathrm{s}}\sum_{j=1}^{s}R^\eta_j=m(s+1)\Big/_2 \tag{6}$$

$$S^\eta{}_{\max}=1\Big/_{12}m^2(s^3-s) \tag{7}$$

$$W^\eta=S^\eta\Big/_{S^\eta{}_{\max}}=12S\Big/_{m^2(s^3-s)} \tag{8}$$

$$\chi^2=m(s-1)W^\eta\sim\chi^2(s-1) \tag{9}$$

Based on the above steps, the subjective judgment matrix $B^\eta_q$ of each expert is obtained through consistency adjustment, concentration adjustment, and entropy value adjustment. Therefore, the consistency matrix $B^\eta$ of indicator $\eta$ and the weightof each indicator $W^\eta$ are obtained under the assumption of "no difference in expert opinions". Repeat the above steps to calculate the single-layer weights of all indicators, and obtain the corresponding combination weights through the following method.

$$B^\eta=\frac{1}{m}\sum_{q=1}^{m}B^\eta_q \tag{10}$$

$$B^\eta W^\eta=\lambda^\eta W^\eta \tag{11}$$

$$W^\eta=\{w_1,w_2,\mathrm{L}\ w_s\} \tag{12}$$

# 3 Implementation path of digital transformation planning

## 3.1 Methodology construction

Using digital asset planning as input[3][10], focusing on the core link of "planning project" in the digital transformation process, and referring to enterprise architecture theories such as Togaf, innovative methods such as Analytic Hierarchy Process (AHP), architectural modeling, and MECE are introduced to establish a method system that combines subjective and objective aspects, supporting the project level decomposition of top-level planning and its precise, stable, and orderly implementation. The specific steps are shown in Figure 2.

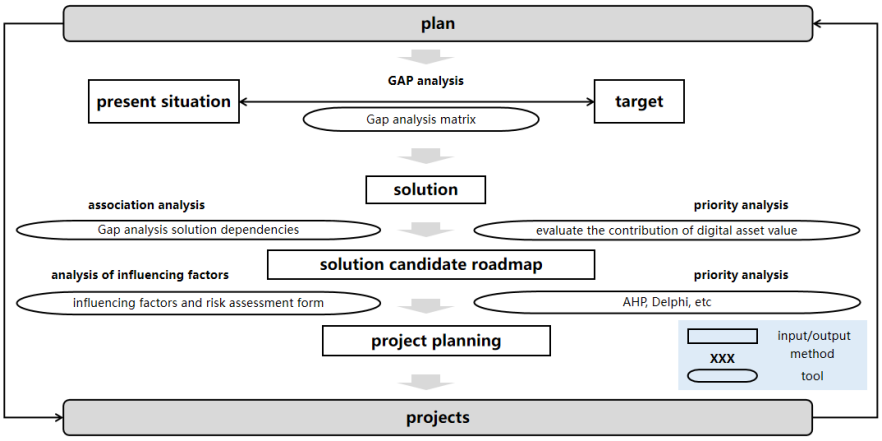


**Figure 2** Holistic methodology

(1) Gap analysis: Starting from the current situation, identify the gaps between the current situation and the goals, and implement these gaps into specific action plans.

- Targeted, determine the classification criteria for gap analysis elements, and combine the classification criteria to determine the current status and target elements [6];
- Conduct research on the current situation and goals of the enterprise based on factors;
- Combine the steps of using the gap analysis matrix to analyze the gap and form corresponding solutions.

(2) Clear candidate roadmap: Determine the relevance and priority of the proposed solution implementation in the gap analysis based on the architecture model.

- Analyze the dependency relationships between gap analysis solutions;
- Returning to the essence of digital assets, determine the order of solution implementation based on the value and quality of the solution, from high to low.

(3) Forming project planning: Projects are the key to implementing gap solutions, and enterprises should track and plan the progress of project implementation to grasp the progress of gap solutions. [10]

- Integrate gap solutions, analyze and plan implementation projects to promote gap solutions;
- Conduct priority analysis and impact factor analysis on the project;
- Determine the project implementation roadmap based on the analysis results.

Through the above steps, the abstract business plan can be decomposed into independent, implementable, and executable projects.

### 3.2 Methodology Practice

Taking the implementation of digital marketing planning achievements in enterprises as an example, introduce the implementation steps of the above methods [7]. The purpose of digital

marketing planning is to connect the data of users' entire lifecycle journey and empower enterprises' marketing decisions. Firstly, based on business planning, analyze the gap between the achievements of enterprise digital asset planning and the current situation. Select the "business object model" in enterprise architecture theory as the analysis element, the dependency matrix for digital asset gap solutions obtained (non comprehensive analysis) is shown in Table 2.

**Table 2** Dependency Matrix for Digital Asset Gap Solution

| Element | Solutions | Dependencies |
|---|---|---|
| User business object | **Reconstruct the model**<br>Part of the data comes from the 'User Information' database<br>Partial data is automatically collected through marketing campaigns | User Journey Business Object (High)<br>Media Business Object (High) |
| Media Business Object | **New Model** | User Journey Business Object (High)<br>User Business Object (High) |
| User Journey Business Object | **New Model**<br>Part of the data comes from the 'User Information' database<br>Partial data is automatically collected through marketing campaigns | User business object (low)<br>Medium Business Object (Low) |

After completing the dependency analysis of the gap solution, we can obtain the preliminary priority order for the implementation of digital asset planning results: "User Journey" business object, "Media" business object/"User" business object. Due to the inability to obtain a very clear priority order based on the dependency relationship of the business object model, the final order is determined from the perspectives of compliance management and implementation difficulty: "User Journey" business object, "Media" business object, and "User" business object. Three projects are planned for the above solution:

Project 1: Deployment of data collection touchpoints.

Project 2: Construction of a data integration platform.

Project 3: Building a precision marketing model.

To determine the priority order of project implementation, experts are invited to rate the importance of the project from dimensions such as urgency, value, project cycle, audience scope, and potential risks. The importance weights of each indicator are determined using the AHP method. Based on the expert scores, the scoring order of the three projects is determined as follows: data collection touchpoints, precision marketing models, and data integration platforms. Through the above methods, the disassembly from planning to project was achieved.

## 4 Conclusions & Discussion

With the development of the digital economy, enterprises have formulated digital transformation development strategies, but there is currently no mature method system for how to accurately and effectively implement digital strategies. Starting from the best practices of Siemens

enterprises, this article focuses on the alignment between strategy and implementation in the digital transformation process, focusing on the "planning project" link. Architectural models such as gap analysis, mathematical models such as AHP, and consulting tools are introduced into the strategic implementation practice, creating a new project implementation path. Firstly, starting from the current situation, the gap between the current situation and the goal is identified, And implement these gaps into specific action plans; Secondly, combining the model to determine the relevance and priority of the implementation of the solutions proposed in the gap analysis; Thirdly, grasp the progress of gap resolution solutions by tracking the implementation of planned projects. And combined with the specific case of the implementation of digital marketing planning achievements, the method was simulated and validated from planning to projects. The digital marketing planning was preliminarily decomposed into three feasible projects according to innovative methods and the implementation sequence of the projects was determined. The research has filled the theoretical gap in the strategic alignment process of digital transformation practice and enriched the methodology system of digital transformation. Combining the innovative methods proposed in the article, this innovative theory can be applied in the following transformation stages.

Firstly, project approval should be viewed upwards. The project description based solely on the project name and plan is difficult to accurately identify project boundaries, increasing the understanding of project difficulty and project cost prediction by management and execution. During the project initiation process, enterprises can refer to the above methods to align the project upwards to the corresponding planning, supporting precise control and management of the project.

Secondly, looking back at the implementation of the strategy. The process of strategy implementation involves many links and entities, which can easily lead to deviations between strategies and projects, affect the effectiveness of strategy implementation, and cause waste of organizational resources. During the project execution process, quantitative and qualitative methods should be combined to carry out periodic and normalized project alignment to ensure consistency in strategic implementation.

Thirdly, looking back at asset management. Digital transformation and construction are difficult to achieve overnight, and the achievements of digital asset construction also require continuous iterative optimization. In the case of limited resources, how to orderly promote transformation iteration in stages should also align with the strategic demands of the organization.

Of course, this method only selects one link in the strategic landing chain and does not consider linkage with other links. In the future, more in-depth research is still needed to focus on front-end strategic alignment and back-end solution development, exploring integrated solutions for strategic landing.

## References

[1] Babar Z , Yu E .Enterprise Architecture in the Age of Digital Transformation[C]//Conference on advanced information systems engineering.2015.

[2] Yu, G.Y. The Value and Methods of Strategic Implementation[J]. Management observation, 2016(32):3..

[3] Yi C ,Lam,Rocky,et al.A Stage-by-Stage Assessment of Enterprise Resource Planning Implementation: An Empirical Study from Hong Kong[J].Journal of global information technology management, 2016.
[4] Rozo D , Moreira J L R , Sinderen M V .Examining Enterprise Architecture for Digital Transformation.[C]//I-ESA Workshops.2020.
[5] Al W F A E .Leveraging Enterprise Architecture for Digital Transformation Adaptation Challenges in Higher Education Institutions[J].Turkish Journal of Computer and Mathematics Education (TURCOMAT), 2021.
[6] Guo, S.X.,Zeng, Z.G. Enterprise Architecture and Digital Transformation Planning and Design Tutorial [M]. Tsinghua university press, 2022.
[7] Fang, X.B.,Zhang, Y.W. Research on the Implementation Path of Digital Transformation in Manufacturing Industry[J]. Southern Agricultural Machinery, 2022, 53(10):4.
[8] Fu, X.Y.. Enterprise Architecture Driven Digital Transformation[J]. China Financial, 2023(1):2.
[9] ]Wang, Z.H.,Ren N.N.,Zhou, Y.,etc.Optimizing the Performance Evaluation Model of Influencing Factors in Multilevel Analysis[J].Computer Engineering and Design, 2023, 44(7):2039-2046.
[10] Wu S .Research on the Implementation Path of Enterprise Strategic Property Management from the Perspective of Technological Innovation[J].Journal of Information & Knowledge Management, 2023, 22(02).