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Translating Strategy into Implementation via Capability-based planning

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MASTER THESIS

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1. Introduction

In today's fast moving environment, many organizations experience increasing problems in designing their strategy. In an ideal world, managers could design a long-term strategy totally based on what the organization needs and implement this strategy step by step. However, due to the uncertainties of the environment (e.g. rapid technical change, highly dynamic industries, and global volatility), organizations encounter difficulties when making strategic decisions.

Strategy development is depending on the capabilities of the organization and their position in the market. Michael E. Porter said, "The broadest level formulating competitive strategy involves the consideration of four key factors that determine the limits of what a company can successfully accomplish." (Porter, 1980) The limiting factors include both external and internal ones. The internal factors "company strengths and weakness" and "personal value of the key implements" relate to the organization's capabilities. Therefore, Porter stated, "The value of resources and capabilities is inextricably bound with strategy." (Porter, 1980) For developing a successful strategy, it is necessary to identify resources and capabilities.

After the strategy has been defined, the next challenge is to implement it. Translating strategy into action may be even harder. The Economist Intelligence Unit conducted a global survey of 587 senior executives in March 2013, which shows that around 88% survey respondents believe delivering a strategic plan is important. However, 61% of them admitted that their organizations were struggling with bridging the gap between strategy formulation and strategy implementation (The Economist Intelligence Unit, 2013). Therefore, it is essential for an organization to find a way to translate high-level strategy into the implementable activities.

As a response to the dynamic environment, capability-based theories can be used to complement the strategic management. Scott stated that capabilities could link strategy to action because according to capability analysis, organizations can define what they must be able to do to successfully execute their strategy. Furthermore, capabilities can provide a foundation for assessing and prioritizing the strategic mission, and linking executive intent with operational activities (Scott, 2014). Capabilities can be used as the business-oriented starting point for any discussion around strategic planning and can help determine the impacts of those plans from an enterprise perspective (Ulrich & Rosen, 2011). Thus, knowing what kinds of capabilities are fit for the organization's strategy is crucial for executing the strategy.

Capability-based planning (CBP) is originally proposed by the Department of Defence (DoD) in United State and it is used in military agencies. However, from Enterprise Architecture and IT perspective, CBP could be a powerful mechanism to ensure that the strategic business plan drives the enterprise from a top-down approach (The Open Group, 2011). It is centered on realizing strategic goals by focusing on what an organization can do, rather than how it can do it (Aldea, 2014). Thus, CBP can also be used in commercial organizations for business planning based on the strategic needs.

Papazoglou proposed a method for performing CBP in TOGAF. He refined the CBP process model that is created by The Technical Cooperation Program (TTCP) and drew a clear picture regarding the individual steps of CBP (Papazoglou, 2014). In the work of Papazoglou, the method for performing CBP has been divided into three phases: Strategy Validation, Capability Analysis, Capability Development and Delivery. Capability heat map and capability maturity assessment have been used for analyzing the capability gap during the capability analysis phase. However, there is no clear metric to assess how well the capability performs. The current

methods for performing CBP are not easy to adopt for organizations. Thus, the research of this study will focus on developing a method for CBP and identifying the required inputs and possible outputs for each phase of this method. This could help an organization to have a better understanding of the gap between their current capabilities and target capabilities, so as to give the direction to an organization for developing their capabilities based on their strategic needs.

In order to develop a practical method for performing CBP, the assessment tools that are used for assessing the capability will be designed in this study. Consequently, the main goal of this study is the design of a practical method for aligning strategy development with implementation by using capability-based planning. This method should help organizations with translating their strategy into implementation.

The purpose of this chapter is to provide the background information and the motivation of this research. Section 1.1 discusses the problem statement of this research. Section 1.2 describes the goal of this research. Section 1.3 formulates the research questions based on the research goal. Section 1.4 illustrates the research methodology addressed to help us to answer the research questions. And finally, section 1.5 outlines the structure of this thesis.

1.1 Problem Statement

Both literature and practical studies show that CBP can be used for aligning capabilities with strategy (TTCP, 2004). However, there are not so many researches that can be used in practice so far.

Papazoglou proposed a methodology for implementing CBP in TOGAF framework. It divided the process into three phases, which includes Strategy validation, Capability analysis and Capability development and delivery (Papazoglou, 2014). The steps of the delivering process are clearly identified, but no specific input and result are defined, which could make it difficult to be used directly by organizations. The capability heat map and capability maturity level analysis are not adequate for quantifying capabilities.

TTCP has developed a guide for performing CBP and built a model that included generic steps of CBP. TTCP stated, CBP was a systematic approach to force development that helped the defence department to choose the most appropriate force options to meet government priorities. The generic process of CBP starts from the government guidance and the defense priorities, and comes up with the plan of the capability improvement. In this guideline, TTCP defined the input, the assessment tool and the desired outcomes of CBP (TTCP, 2004). However, the method is too general and more related to defence need, it is not specific for the commercial organizations. Similar to this CBP method, Davis proposed a model for assessing capabilities in a Mission-System Framework. It is rather a depiction of when the capability does well, marginally, or poorly in different scenarios (Davis, 2002). Since it is also for the military use, the model is more focused on risk management and scenario analysis. Thus, to implement CBP in practice, a new method for analyzing is requisite.

For assessing capabilities, there are a few preconditions that must be fulfilled. The artifact of this research will be formulated based on the CBP activities proposed by Aldea et al.: Map, Access and Plan (Aldea et al., 2014). For mapping, CBP starts in the later phase of strategic planning. The related capabilities of the organization need to be identified in the mapping phase. Then, in the assessing phase, relevant metrics/indicators derived from strategy will be used for scoring the capabilities. This step is important for gap analysis, because it helps with identifying the current state and the desired state of the required capabilities. After that, an organization can make the plan to improve its required capabilities to their desired level, which is a useful input for implementing its strategy.

Since the purpose of this research is to help organizations to translate their strategy into action, the input of the CBP method should be derived from strategy, and the output should contribute to strategic implementation. Thus, the proposed CBP method in this research should be linked to the strategy model closely.

1.2 Research Goal

Grant stated that the capabilities and resources of an organization form the foundation for building competitive advantage. And establishing the competitive advantage of the organization requires formulating and implementing a strategy, which exploits the specific resources and capabilities of an organization (Grant, 2010). Therefore, specific resources and capabilities are required for implementing a strategy of an organization.

Furthermore, Capability-based planning (CBP) could help an organization to identify the

required capabilities for executing a specific strategy. And it provides the suggestion for an organization on the most appropriate options to meet their strategic priorities. Therefore, to facilitate the strategy implementation, the research goal of this thesis is to design a CBP method to translate strategy into implementation. The method should be practical and easy to be adopted by commercial organizations. It includes three phases:

A. Mapping capabilities to strategy: This phase helps organizations to find out what are the capabilities they need for realizing their strategies. In this phase, the required capabilities and the missing capabilities will be identified.
B. Assessing related capabilities: The assessment will be based on the KPIs/metrics derived from strategy and the performance of the capabilities will be identified. This phase helps organizations to understand their current state of these required capabilities and how well their capabilities should be in order to fit their strategies.
C. Capability planning: Developing a roadmap for capability increments. After the gap analysis of capabilities, organizations should make plan to improve their capabilities to fit their strategic needs.

By using this method, organizations can gain a clear view of their current situation and the target situation that they should achieve. The CBP method can help an organization to have a better performance of their strategy implementation by giving them a direction for developing the required capabilities.

1.3 Research Questions

Based on the problem statement and research goal that described in the previous sections, the following research question is formulated:

How to develop a capability-based planning method to support strategic alignment?

Strategic alignment can be also considered as "fit", which is the process or a notion of linking the business strategy with the functional operations of an organization (Reich & Benbasat, 1996). Rondinelli et al stated that the alignment could facilitate the acquisition and deployment of resources that are required for the organization's competitive needs.(Rondinelli, Rosen, & Drori, 2001) Furthermore, Fuchs et al. noticed that the problem always occurred in strategy implementation when an organization did not align the execution capabilities with the organization's direction (Fuchs, Mifflin, Miller & Whitney, 2000). The research goal of this thesis is using CBP to translate strategy into implementation. Therefore, the method for performing CBP should support organizations to align capability development with strategy implementation, which means this method should support the strategic alignment.

In order to answer the main research question, a number of sub-questions are formulated:

- RQ1: What is the relationship between strategy implementation and capability?
- RQ2: How to design a method to link strategy and capabilities?
- RQ3: How to define indicators based on strategy to assess capabilities?
- RQ4: How can an organization develop and arrange a set of capability development projects based on the strategic needs?
- RQ5: How can the method be applied in practice?

RQ1 is based on the literature study. The design and development of the strategy in an organization should be depended on their capabilities. Therefore, the relationship between the process of strategic planning and the capabilities of the organization is required to be

answered in RQ1.

RQ2, RQ3 and RQ4 are following the activities of CBP defined by Aldea: Map, Assess and Plan. (Adina et al., 2014)

To answer RQ2, a method for aligning capability to strategy will be developed. This method helps organizations to identify the capabilities that are related to their chosen strategy. This step is called Map. After the required capabilities have been found, the organization can continue to assess their capabilities.

To answer RQ3, the indicators that based on the strategy will be designed to assess the quality of the required capabilities. The relevant metric/KPIs are derived from strategic requirements for the capabilities. This step is called Assess. The current and desired performance of the required capabilities can be identified after the capability assessment.

The RQ4 is about planning. After analyzing the gap between the current statement and the target statement of the capabilities, the organization can realize the direction to plan the increments of the required capabilities. Therefore, the organization can achieve a better implementation roadmap of its strategy.

In order to make sure that the method works, this research should answer the RQ5. In this study, we would like to use a case study to validate the method that is defined in the previous sections to see if the method works for the real business case or not. Furthermore, we could evaluate the method through asking the opinions from the external experts who have the experience in related area to see if the method is useful for facilitating the strategy implementation.

1.4 Research Methodology

Since the main topic is about a design problem, this research could follow the Design Science Research Methodology (DSRM). Design problems are related to the real world problems that require an analysis of actual or hypothetical stakeholder goals. A solution for this kind of problems is a design, and there are usually many different kinds of solutions (Wieringa, 2014). Design science that is used in Information System research was first introduced in the early 1990s by IS researchers (Peffers et al., 2007). It involves a rigorous process to design artifacts to solve the design problems and make the research contribution. Furthermore, the result will be evaluated and communicated to the appropriate audiences (Hevner, March, Park, & Ram, 2004). Thus, the research approach of this thesis will follow the DSRM Process Model proposed by Peffers et al., which includes the following steps: problem identification and motivation, define the objectives for a solution, design and development, demonstration, evaluation, and communication (Peffers et al., 2007). The DSRM Process Model is shown below:

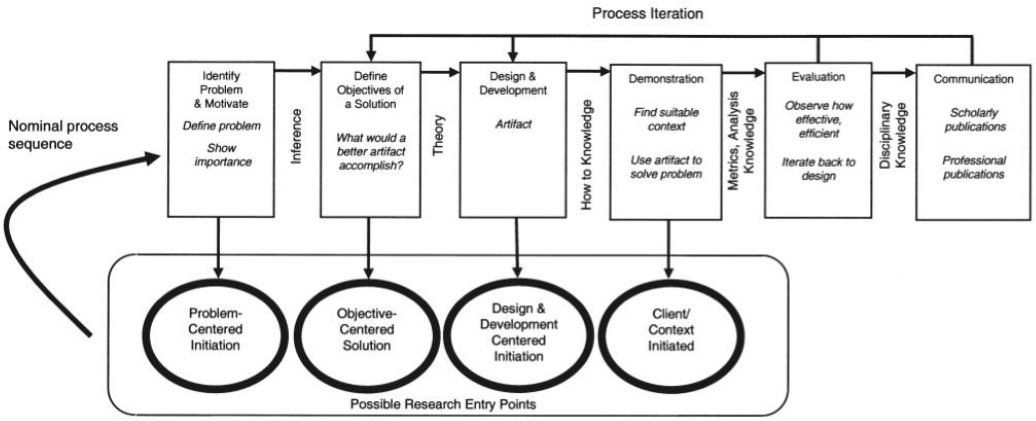


Figure 1: DSRM Process Model (Peffers et al., 2007)

The research steps and the research questions of this research match to the activities of DSRM Process Model. The match of the chapters/sections with the steps will be described below, to show the overview of the research approach of this thesis:

Problem Identification and Motivation: In this phase, the research problems will be identified and the proposed solutions will be justified. We formulate the research questions of this thesis and related them to the problem statement and the motivation of this research and the problem identification will be described in chapter 1.

Define the objectives for a solution: Following the previous step, the next step is to define the objectives of the solution. It is based on the defined problem and the studies of previous literatures. The solution should be quantitative and qualitative. Thus, this part will be described in chapter 1.5.

Design and development: Depending on the literature review, the solution will be designed and developed in the following chapters. The method for linking strategy to capability will be designed in chapter 3. And based on the result of chapter 3, the indicators that is used for quantifying the strategic related capabilities will also be defined in chapter 3.

Demonstration: After the method has been designed and developed, the usability of it should be demonstrated by solving one or more problems. This could be done by the experimentation, simulation, cased study, proof, or other appropriate activity. The method will be used in this thesis and be described in chapter 4.

Evaluation: To observe and measure how well the method supports the solution of the defined problems. This step aims at comparing the objectives of the solution to the result from the use of the method, which will include the interview of the experts in this area. This part will be described in chapter 5.

Communication: The communication step will be done in the end after the thesis is published and the thesis defence is finished.

1.5 Research Approach

The research is accomplished in several steps. These steps are basically following the DSRM process model, which provides a road map and research mechanism for researching. In

general, the research approach of this thesis can be divided into three phases: Literature review, design and evaluation.

In the first phase, this research starts from the literature review to gather the existing knowledge of practices and theories related to the research topic. And the second step is to categorize the knowledge that is gained from the previous step, to provide a systematic view of the information on the aspects related to this thesis topic. After that, in the third steps, the defined problem and the solution of this thesis will be refined based on the literature study.

The next phase is design. In the fourth step, the knowledge will be used to support the development of the new method, which includes the process model and the capability assessment metrics. And then comes the fifth step, the demonstration. A case will be chosen to demonstrate the method.

In the evaluation phase, in order to prove that this method can be the solution of the defined problem, the result of the case study and the method itself will be evaluated, which is the sixth step. Finally, the seventh step is the conclusion.

Table 1 shows the overview of the research approach and how these individual steps relate to the chapter/section of this thesis.

Table 1: Research Approach

Research Phase	Research Step	Chapter
Literature Review	Literature study	Chapter 2
	Categorizing the information	Chapter 2
	Refine research problem	Chapter 1, 2
Design and Development	Designing new method	Chapter 3
	Demonstration	Chapter 4
Evaluation	Evaluation	Chapter 5
	Conclusion	Chapter 6

2. Literature review

The aims of the literature review are to provide the further insight on the context and search for the theoretical and empirical methodologies from the domains of both strategy and Capability-based Planning sides.

This chapter gives an overview of the previous studies in this field. This information can be used for providing the background knowledge and the theoretical basis for the further research. According to the requirements of the research, the structure of the literature review is determined by the key concepts, which includes: Strategy implementation, Capability-based Planning (CBP), the relationship between strategy and CBP, Enterprise Architecture (EA).

The purpose of this research is to help organizations translating their strategies into implementation via CBP. Therefore, strategy implementation would be an important concept of this research. Section 2.1 starts with the discussion of the concept strategy and strategic planning. The background knowledge of strategic planning could provide the insight for us about strategy implementation. The strategy models that are discussed in this section could provide the possible strategy inputs for the proposed method. Section 2.2 discusses how capabilities can be related to strategy. The Strategic fit model, which is defined in the previous studies, can prove that the capability of an organization can influence the performance of their strategy implementation. This fit model provides the theoretical foundation for us to design the CBP method to facilitate the strategy implementation. In section 2.3, we discuss the former CBP method and the related capability tools. Our design of the CBP method will be built based on this knowledge. The last section of this chapter describes how to relate EA with CBP and how to use ArchiMate language to model capability and formulate the proposed CBP method. The EA framework and the ArchiMate language help the organization use CBP in practice.

2.1 Strategy implementation

Hill and Jones defined strategy implementation as a task of putting strategies into action, which required the organization taking actions consistent with the chosen strategies in different operating level. (Hill&Jones, 2012) Many organizations find that strategies are easy to make but hard to implement. In today's fast changing environment, many organizations fail in the implementation of strategies. Therefore, this research would like to investigate and find a way to help organizations to implement their strategies. Thus, this literature review would start with answering the question 'What is strategy'.

2.1.1 Strategy

The word 'Strategy' is derived from the Greek military vocabulary, which can be defined as 'a plan, method, or series of maneuvers or stratagems for obtaining a specific goal or result'. (Dictionary, 2012b)

For Business usage, Quinn identified strategy as "the pattern or plan that integrates an organization's major goals, policies and action sequence into a cohesive whole". Furthermore,

he also stated, "A well-formulated strategy helps to marshal and allocate an organization's resources into a unique and viable posture based on its relative internal competencies and shortcomings, anticipated changes in the environment, and contingent moves by intelligent opponents."(Quinn & Henry, 1992)

In Porter's five-force model, a strategy helps an organization to understand the underlying forces of their industry in order to determine their competitive advantage. According to his theory, the generic strategy for organizations can be either low-cost, product differentiation or focus. However, there are two kinds of risks in the implementation of these generic strategies: first, fail to reach or maintain the strategy; second, the value of the generic strategy will be decreased because of the industry change. Porter stated, decision making in a strategy should be based on the firm's capabilities. It means to successfully execute each generic strategy, resources, strengths and organizational arrangements should be discussed.(Porter, 1980) However, Porter's theory more focuses on identifying the opportunities and threats from external environment, while the other studies show the internal factors of an organization can also make differences in the performance. Stalk et al. stated, capabilities of a company were often unique and not easy to change, to choose the right capability was essential for executing a strategy. Thus, a capability approach for formulating and implementing strategy has been proposed. (Stalk, Evans & Shulman, 1992)

2.1.2 Strategic planning

Strategic planning is a process of defining a strategy or a direction, and making decisions on allocating resources to pursue the defined strategy. (Quinn & Henry, 1992) The topic of strategic planning process has been studied for years. But in general, Aldea proposed that there was still a common understanding of the main steps, which involved: strategy analysis, strategy formulation and strategy implementation. (Aldea et al., 2014)

Hill and Jones claimed that after an organization had determined their strategic leadership and the competitive advantages they wanted to achieve, the managers of the organization could select and implement a set of strategies to enable their organization to realize their objectives. (Hill&Jones, 2012) According to the previous studies, Hill and Jones observed a typical formal process of strategic planning. This process starts with the mission statement, which shows the fundamental desires of an organization. The process of strategic planning provides a basic framework for the organization.

Strategic planning process includes five steps:

- Select the corporate mission and major corporate goals.
- Analyze the organization's external competitive environment
- Analyze the organization's internal operating environment
- Select strategies, which are consistent with the mission and major goals of the organization.
- Implement the strategies.

The fast-changing industrial environment requires an organization to have an efficient and responsive system to maintain and implement their strategies. Thus, Hill and Jones connected strategy implementation and strategy formulation with a feedback loop.

However, this model does not involve evaluation process. For the supplement, Hunger and Wheelen added an evaluation phase to the strategic planning process. They explained that strategic planning was not only about analytical, but also should be used for dealing with the complex and changing environment. The evaluation of the strategy implementation can be

seen as the feedback system which controls the organization's activities. It ensures the result of the implementation to meet the objectives of the strategies. (Hunger &Wheelen, 2003)

To summarize, Aldea described a strategic planning process could be regarded as five steps: visioning process, strategy analysis, strategy formulation, strategy implementation and strategy evaluation.(Adina et al., 2014) She emphasized the importance of the three main concepts: strategy analysis, strategy formulation and strategy implementation. These concepts are associated with different steps of the strategic planning process. (Adina et al., 2014) The strategic planning process can be modeled as Figure 2:

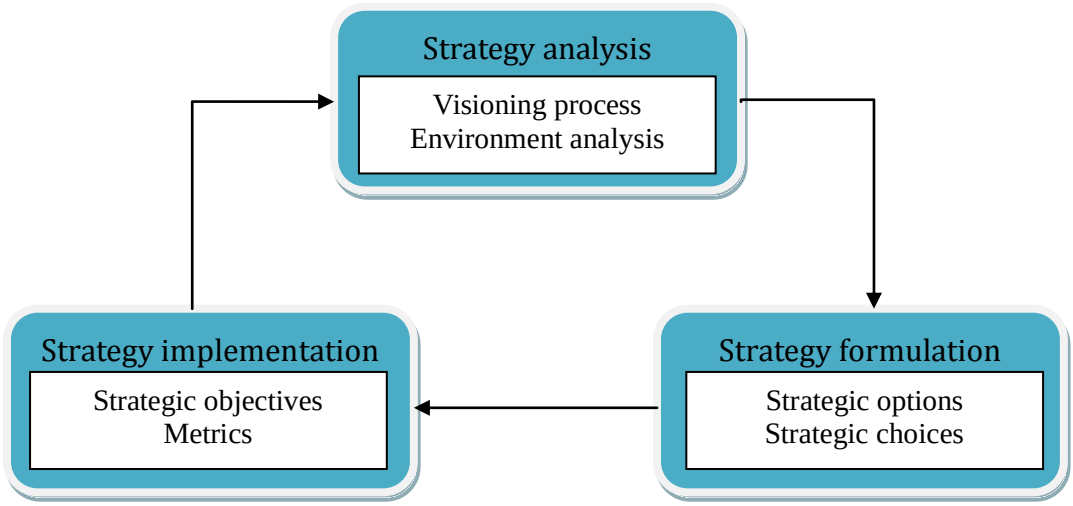


Figure 2: Strategic planning process (Adina et al., 2014)

In regard to the topic of this study, the most relevant part of the strategic planning process is the strategy implementation. Once the strategy analysis is done, the organization can create and select the strategies according to the analysis which is conducted in the previous step. To translate the selected strategies into implementation, the organization needs to categorize these strategies into specific, measurable objectives. (Kaplan&Norton, 1992) Therefore, the selected strategies should be measurable and precise, which helps an organization to realize their desired future.

Accompany with the measured targets, these objectives state the specific outcomes that the organization wants to achieve. The metrics of the specific objectives provide the indicators for the organization to measure the performance of the strategy. (Kaplan&Norton, 1996) Therefore, in order to translate strategy into implementation via Capability-based planning, the objectives and the measurements for a specific strategy should be identified first. The techniques and models that can be used for identifying the strategic objectives and measurements will be discussed in the following section.

2.1.3 Strategy models

The purpose of this section is to review the strategy models that can be used for identifying the strategic objective and metrics of a chosen strategy.

Based on the previous study of Aldea, the strategic planning process can be defined as five steps (visioning process, strategy analysis, strategy formulation, strategy implementation and strategy evaluation). To link strategic planning process to Enterprise Architecture via strategy models, she refined the five-step strategic planning process into nine phases (Figure 3). Each phase could include at least one strategy model (Adina et al., 2013).

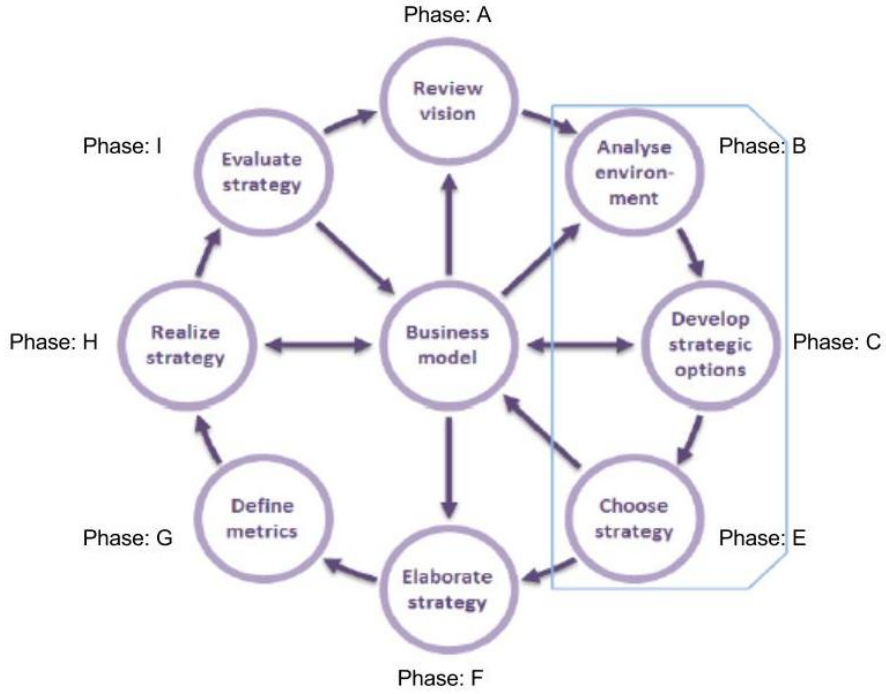


Figure 3 : The method of strategic planning (Aldea et al, 2013)

Figure 3 shows the nine phases of the method. After choosing a strategy (Phase E), the organization needs to identify the strategic objectives and the measurements of these objectives for the chosen strategy. To fulfill this task, Aldea suggested to use Strategy Map to specify the chosen strategy into achievable objectives. And the Balanced Scorecard (BSC) could be used for translating these objectives into executable actions. To find the strategic objectives and their measurements & metrics can be achieved in phase F and G. Moreover, since this study focuses on translating the selected strategy into action, and the phase F, G and H of this method can be seen as the strategy implementation steps of the strategic planning process. Therefore, the following study elaborates these three phase in more details.

First, in strategy elaboration phase, the chosen strategy will be specified into several strategic objectives. To complete this task, Aldea proposed to use Strategy Map and Balance Scorecard (BSC) to help organizations determine the objectives of their strategies. For the next phase, measurements & metrics, the task of this step is to decide how to measure the performance of the objectives that are determined in the previous step. It provides the benchmark for an organization to assess their strategy related capabilities. Finally, the chosen strategies should be implemented. Aldea introduced Enterprise Architecture (EA) with ArchiMate modeling language to model the targets, constraints and objectives that were determined in the previous steps. In this phase, with the Capability-based planning (CBP), EA supports the organization to realize the gaps between their current situation and their desired situation that based on its strategy objectives (Aldea et al., 2013). And the tools that Aldea mentioned in these three phases could be also used as the supporting techniques in our proposed CBP method. This part will be discussed in chapter 3. In the following sections, we would like to introduce these strategy models.

2.1.3.1 Strategy Map

Strategy Map is an internal communication tool that is developed to link intangible and tangible assets with the strategic objectives. It uses a diagram to describe how an organization

creates value by connecting strategic objectives in the cause and effect relationship with each other among the four Balance Scorecard (BSC) perspectives (Financial, Customer, Internal, Learning and growing). (Kaplan & Norton, 2004) Strategy Map provides a consistent way to help the organization to establish and manage its strategy at the operational level, like:

- Describing how value is created internally and from the learning and growth perspectives.
- Describing the critical few processes that have greatest impact to the strategy.
- Describing how to measure the intangible assets of an organization, it includes human, information and organization capital.

Strategy Map is part of the BSC. It links strategy to the high level goal of an organization and provides a visual framework to help people to understand their strategies better. With the BSC approach, Strategy Map provides a robust structure for organizations to express their strategic objectives. It also shows how an organization creates value from these four key perspectives. An organization can use these strategy models to ensure their objectives in each perspective are consistent and internally aligned to each other.

Figure 4 shows the basic structure of Strategy Map, which includes four different layers that derive from BSC. They are Financial perspective, Customer perspective, Internal perspective and Learning and Growth perspective.

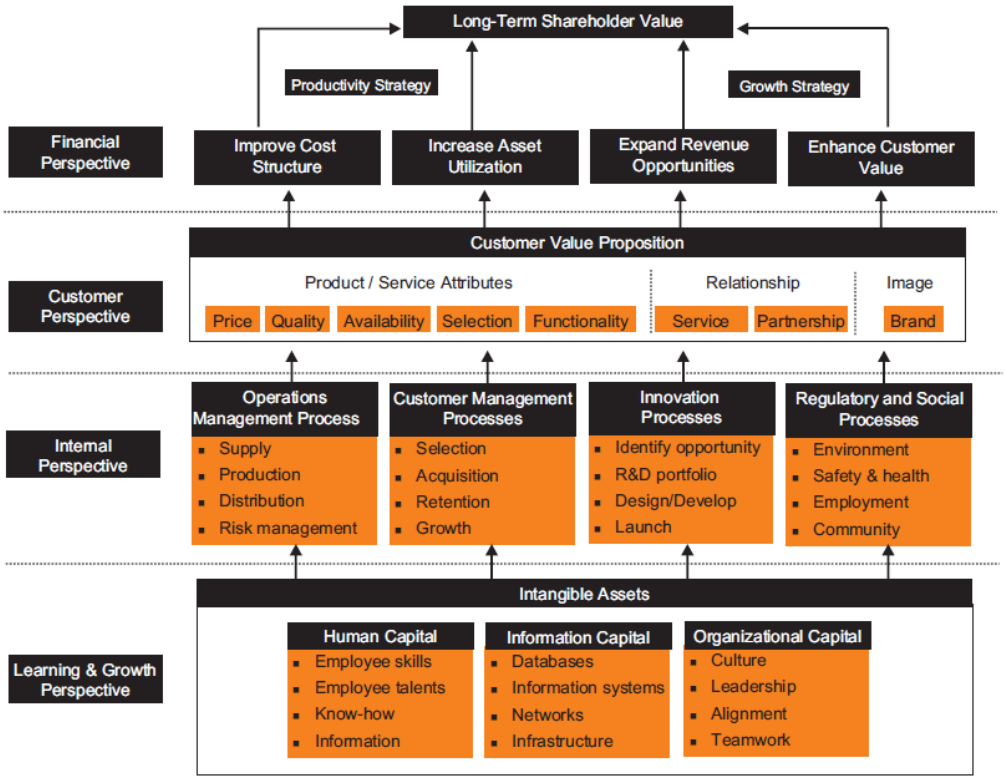


Figure 4 : Basic templates for a Strategy Map (Kaplan&Norton, 2004)

Comparing with the BSC, Strategy Map emphasizes the cause-and-effect relationship among the objectives from different perspectives.

Intangible assets:

From the bottom-up point of view, Learning and Growth perspective is the foundation of Strategy Map. In this perspective, organizations are required to identify their intangible assets and align them with the strategic objectives to the value creating processes. To define, measure and manage these intangible assets, Strategy Map categories these assets into three capitals, which can be specified into Human capital, Information capital and the Organizational capital.

Kaplan and Norton stated that the intangible assets were valued only when they were aligned to the chosen strategy. The Learning & Growth strategic objectives define the intangible assets are needed to enable organizational activities and customer relationships to be performed at the higher levels of performance. (Kaplan & Norton, 2001) Thus, in Learning & Growth perspective, Strategy Map measures these capitals by their contributions to the achievement of the strategic objectives. Furthermore, organizations should figure out what they should learn and improve in order to achieve their vision. Therefore, Learning & Growth perspective is the foundation of any long-term and sustainable change, which relates to the intangible assets of an organization.(Kaplan &Norton, 2001)

Value-creating process:
The second perspective of Strategy Map is Internal perspective. A Strategy Map helps an organization to ensure their internal process for the value creation is well executed and aligned with the intangible assets and the customer value proposition. (Kaplan & Norton, 2004) Kaplan and Norton defined the key internal processes that the organization created value are:

- Operations management processes
- Customer management processes
- Innovation processes
- Regulatory and social processes

Strategy Map links these key business processes of the organization to the organizational outcomes in internal perspective, which provides the foundation for the strategic objectives from customer perspective by figuring out the process of how to satisfy their customer and helps the organization to improve the right things. Therefore, for each process, it is necessary to have the value creation objectives and the measurement tool for measuring their performance.

Customized Strategy Map
Internal perspective is the foundation of customer perspective. Value is created through the internal processes and delivered to the customer. In customer perspective, an organization needs to look for the customer value proposition. It is the foundation of financial perspective to ask how an organization must look to their customers to achieve a long-term objective.

To achieve the strategic objectives is following the bottom-to-up sequence. However, to determine these objectives is from up-to-bottom. Kaplan and Norton claimed that the overall strategic objective of a commercial organization can be presented in financial perspective. Financial perspective supports the overall business strategy by identifying the long-term shareholder value. Therefore, the financial objectives should be set up in the beginning, to determine how much short-term increased productivity and cost reduction should be achieved and how much long-term revenue growth the organization wants.

After identifying the overall financial objective, an organization needs to figure out what is the customer value proposition. In this step, the customer objectives should be reconciled with the financial growth goals. The third step is to establish the value developing time line. How to implement the strategy and allocate its objectives to different themes will close the value gap. The fourth step is to identify the strategic theme to show how the internal processes affect the organization to achieve its customer value proposition. The organization needs to establish the quantitative measures and targets for each theme and link these processes to the customer value proposition. The fifth step is to identify and align the intangible assets, which supports the internal process and the organization's strategy. And then, the final step is to specify and fund the strategic initiatives in order to implement the chosen strategy. In this step, the cause-and-effect linkage of the strategy map, BSC and the developing plan for the internal process and intangible assets will be involved.(Kaplan & Norton, 2004)

Strategy map describes the process for transforming intangible assets into tangible customer and financial outcomes. (Kaplan&Norton, 2000) An organization uses Strategy Map for elaborating the objectives that the organization should try to accomplish in order to improve and grow, within the chosen strategy (Aldea, 2013). Only after identifying the objectives, the organizations can select metrics for each objective and use BSC to measure these objectives.

Through designing a Strategy map, an organization could understand their strategic goal better and the structure of their strategic objectives could be also clear. Therefore, the required capabilities for the specific strategy implementation could be aligned in detail level.

2.1.3.2 Balanced Scorecard

Kaplan and Norton defined, "Balanced Scorecard translates an organization's mission and strategy into a comprehensive set of performance measures that provides the framework for a strategic measurement and management system". (Kaplan & Norton, 1996)

BSC emphasizes the linkage of measurement to strategy (Kaplan&Norton, 1993). Figure 5 presents the original structure of BSC. Kaplan and Norton defined the financial metrics as the ultimate outcome measures for company success. But as the complement of the financial objectives, the other three perspectives have been proposed as the drivers for creating long-term shareholder value.

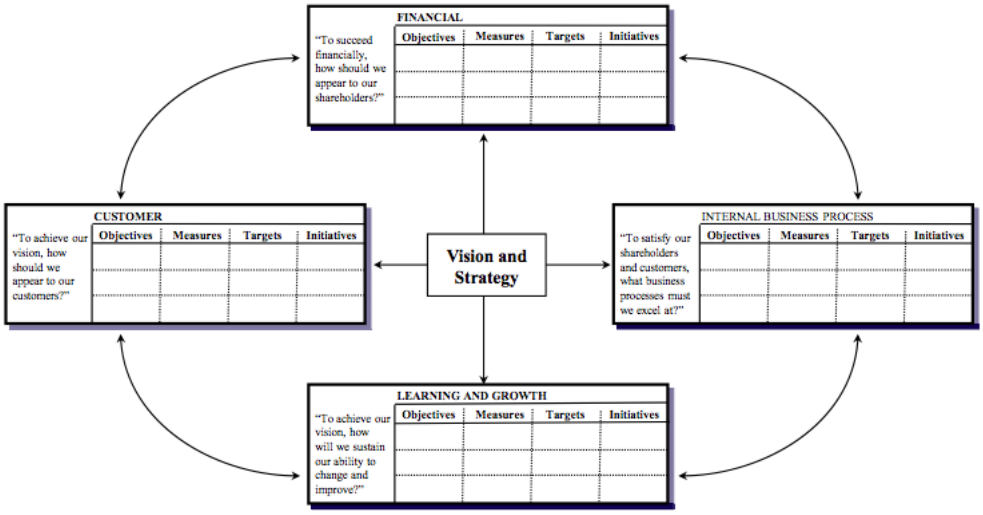


Figure 5 : Translating Vision and Strategy: Four Perspectives (Kaplan & Norton, 1996)

For each perspectives, measure can be established, which are often called key performance indicators (KPIs), and assigned against each objective. These measures lead to the information are needed to measure performance (Ward &Peppard, 2002). These components of BSC are sitting behind the strategic objectives and enable an organization to execute the following strategic management process (Kaplan &Noton, 1996), which are:

- Clarify and translate vision strategy
- Communicate and link strategic objectives and measures
- Plan, set targets, and align strategic initiatives
- Enhance strategic feedback and learning

For an organization, their vision can be fulfilled by their strategies, and a specific strategy could be expressed as an integrated set of objectives and measures (Kaplan & Norton,

1996).Therefore, if Strategy Map is used for identifying the strategic objectives, the role of BSC is to help an organization to determine the measures that will be used to evaluate the chosen objectives.

Measures on BSC are used for communicating the strategy to business and aligning the individual, organizational, and cross-departmental initiatives to achieve the common goal of an organization. And the four perspectives of BSC permit the balance between short and long-term objectives, between outcomes desired and the performance drivers of those outcomes, and between multiple measurements for the strategic objectives. (Kaplan & Norton, 1996) Thus, BSC provides the target and performance evaluation criteria for strategic objectives.

For strategy implementation, capabilities are needed to enable the delivery of a given strategy. Strategy actions are carried out by an organization's capabilities (Business Architecture Guide, 2014). Therefore, Strategy Map and BSC could be used by an organization to translate their strategy into implementation, and provides the input data for CBP tools.

2.2 Relationship between capability and strategy

As mentioned in the previous section, Porter stated that a strategy helped an organization to understand the underlying forces of their industry in order to determine their competitive advantage. (Porter, 1980) Furthermore, competitive advantages could be possibly generated by an organization's resources and capabilities. According to the figure that defined by Grant, capabilities are the fundamental of an organization's strategy, which are needed to enable the delivery of the chosen strategy. Therefore, this section would like to discuss the relationship between strategy and capability according to the literature review.

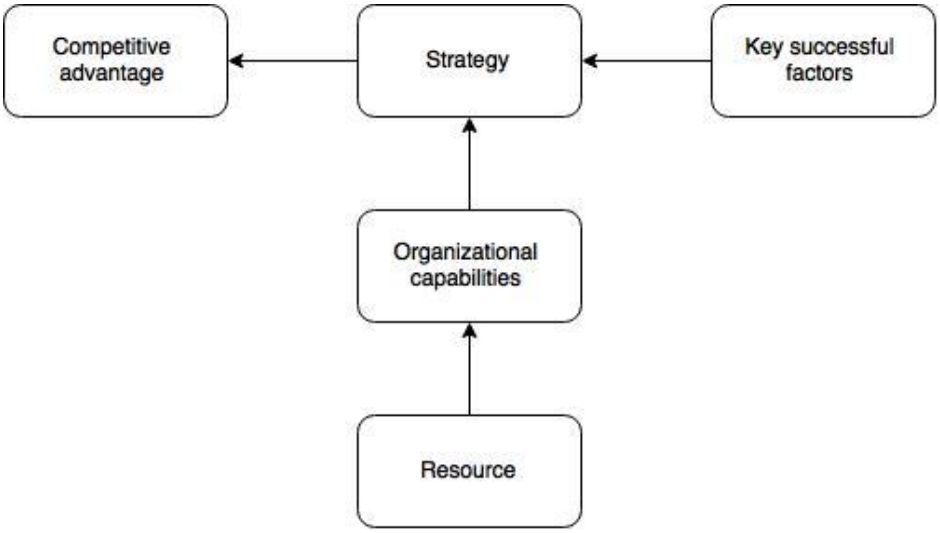


Figure 6 : Simplyfied model of the links between resources, capabilities, and competitive advantage (Grant, 2010)

2.2.1 Capability

There are different views to define the capability. For defence usage, DoD defined the capability as the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. (DoD, 2009) This definition refers capabilities to highly uncertain environment, which is not really suitable for this research.

Therefore, this research would like to use the definition that defined by Iacob et al.

Capability as the ability (of a static structure element, e.g., actor, application component, etc.) to employ resources to achieve some goals (Iacob, Quartel, & Jonkers, 2012).

To link capabilities with an organization's strategy, Teece and Pisano stated that the term "capabilities" emphasized the key role of strategic management in appropriately skills, resources, and functional competences toward changing environment. Furthermore, to be strategic, capabilities have to be boned to a user need, unique and difficult to be replaced (Teece & Pisano, 1994) According to this description, the user's need could be the requirement of a strategy for applying capabilities to strategy implementation. Therefore, this study needs to discuss how to align capabilities to the strategy of an organization.

2.2.2 Strategic fit with capability

Strategic alignment is first introduced as a model for aligning IT with business. It includes strategic fit (the interrelationships between external and internal domains) and the functional integration (integration between business and functional domains). The key factor in alignment is the close linkage of the functional operations and business strategy. (Henderson & Venkatraman, 1993) Therefore, Rondinelli claimed that an organization's direction, market focus and the capabilities must 'fit together'.

Rashidirad et al. created the strategic alignment conceptual framework to demonstrate the successful development and implementation of strategies depend on a proper deployment of dynamic capabilities. (Rashidirad, Soltani & Syed, 2013) Strategic alignment is significantly contributing to performance (Kearns & Lederer, 2003). Rashidirad et al. defined this framework for evaluating the e-business and they thought the main objective of e-business was the value creation. Therefore, they changed the performance to E-business value.

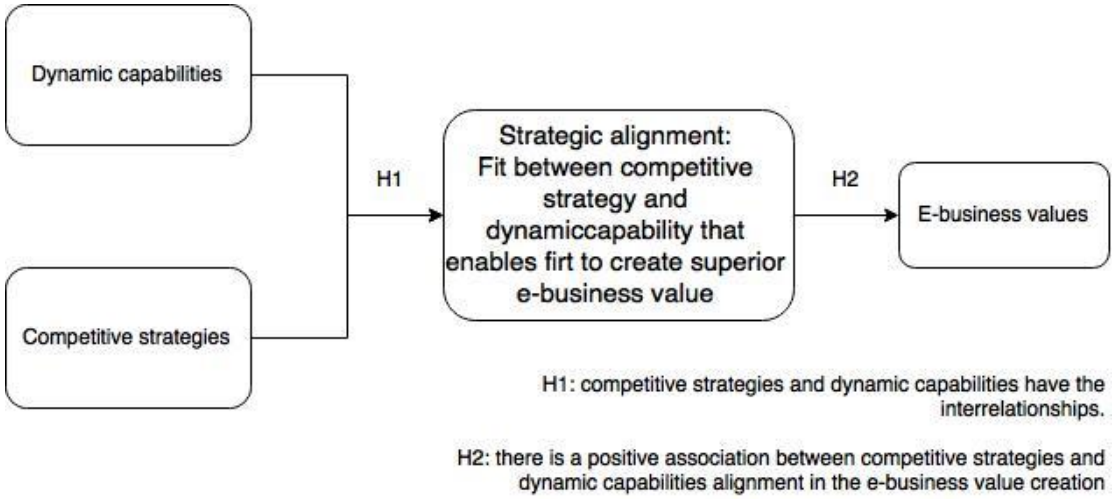


Figure 7 : Strategic alignment conceptual framework (Rashidirad, Soltani&Syed, 2013)

This figure 7 is similar to the Task-Technology Fit (TTF) model. Since TTF model is explaining how technology leads to performance impacts(Thompson & Goodhue, 1995). If referring capabilities as technology and strategies as task, the strategic alignment framework could be also used for describing how capabilities can influence the performance of strategy implementation.

This conceptual framework shows strategies and capabilities can be fitted together. Therefore, the performance of strategy implementation could have the positive association with capabilities.

2.3 Using CBP for strategy implementation

The Department of Defence proposed Capability-based planning (CBP) as "planning, under uncertainty, to provide capabilities suitable for a wide range of modern-day challenges and circumstances while working within an economic framework that necessitates choice." It is originally used for enabling military agencies to develop forces and allocate resources based on program needs and a specific threat (Davis, 2002).

However, CBP can be also used for commercial organizations to structure their strategies. According to the definitions of the capability that mentioned in the previous section, the capabilities are crucial for an organization to gain the sustainable competitive advantage and successfully to implement their strategy in today's market.

The Open Group proposed, "CBP focuses on the planning, engineering, and delivery of strategic business capabilities to the enterprise. It is business-driven and business-led and combines the requisite efforts of all lines of business to achieve the desired capability. " From an Enterprise Architecture and IT perspective, CBP is a powerful mechanism to ensure that the strategic business plan drives the enterprise from a top-down approach.(The Open Group, 2011)Thus, CBP can serve as the method for translating strategy into action.

2.3.1 Original CBP method

Capability-based Planning is first introduced in the Defence sector. The Technical Cooperation Program (TTCP) published the guideline in 2004, in order to help the defence department to use Capability-Based Planning system for long-term force structure planning(TTCP, 2004).This guide points out that CBP is developed as an alternative to threat-based planning, which is a systematic approach to force development for the defence department. It aims to advise the most appropriate force options that should meet the strategic objectives and minimize the cost and risk and comply with the constraint.

Figure 8 is the generic process of the CBP method that defined by TTCP. The first part of this process is finding the objective and the goal capabilities of the defense department. It starts from the government guidance and the defence priorities. These defence policy and priorities help the defence department to determine multiple scenarios for dealing with uncertainty circumstances. After that, the department can decide the capability goal in order to meet the requirements of these scenarios.

The second part of this process is to identify the gap between current and planning capability and the capability goals. The operational concept, which describes how a force plans to operate in the future, will combine with the capability goals to determine how to assess these capabilities. The outcome of this part is to find the mismatched capabilities and give the direction to the defence department to design the capability development plan.

The final part of the CBP process is to explore the options for the affordable capability investment projects. The end of the CBP will come up with a capability development plan, which can help the department to mitigate the gap between current capabilities and the desired level capabilities.

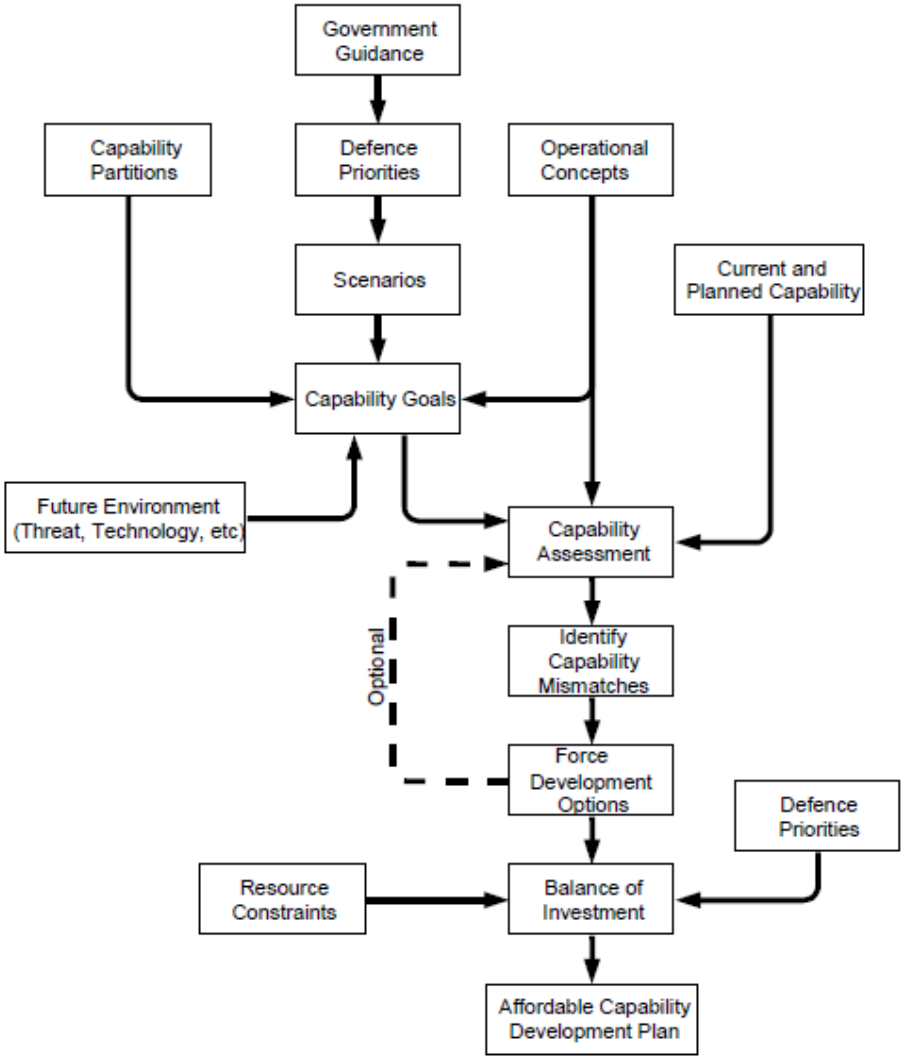


Figure 8 : Generic Process Chart of Capability-Based Planning (TTCP, 2004)

In order to accomplish the whole CBP process and get the desired investment plan. TTCP claimed that the CBP requires a large amount of information. The generic inputs to CBP normally include:

- Objectives: The objectives of different scenarios that associated with the defence strategy. And the understanding of the future strategic environment.
- Context: Information about the allied capabilities and the competitors' capabilities. The scenarios that defined by the objectives and the operational concepts.
- Constraints: Resource and the process constraints.
- Framework: Accurate inputs to the capability of the required information and divide the capability partition.
- Force Characteristics: The characteristics of the force elements and the experience from the previous activities.

However, the inputs that defined by TTCP for the CBP were highly relevant to the defence use. For the commercial usage, the force characteristics should change to the other related business characteristics. Furthermore, the importance of the uncertainty environment will also be decreased.

Similar to the TTCP approach, the Capabilities-Based Process that was proposed by the Joint Defense Capabilities Study also follows the top-down logic. The goal of the process is to

move the defense department from where it is now (as is) to a desired end state (to be) through acquiring the capabilities that needed to achieve the defense strategy. The Secretary of Defense (SecDef) from the U.S. Department of Defense (DoD) proposed the process to get the end state capabilities and achieve the strategic objectives can follow the steps that shows in Figure 9:

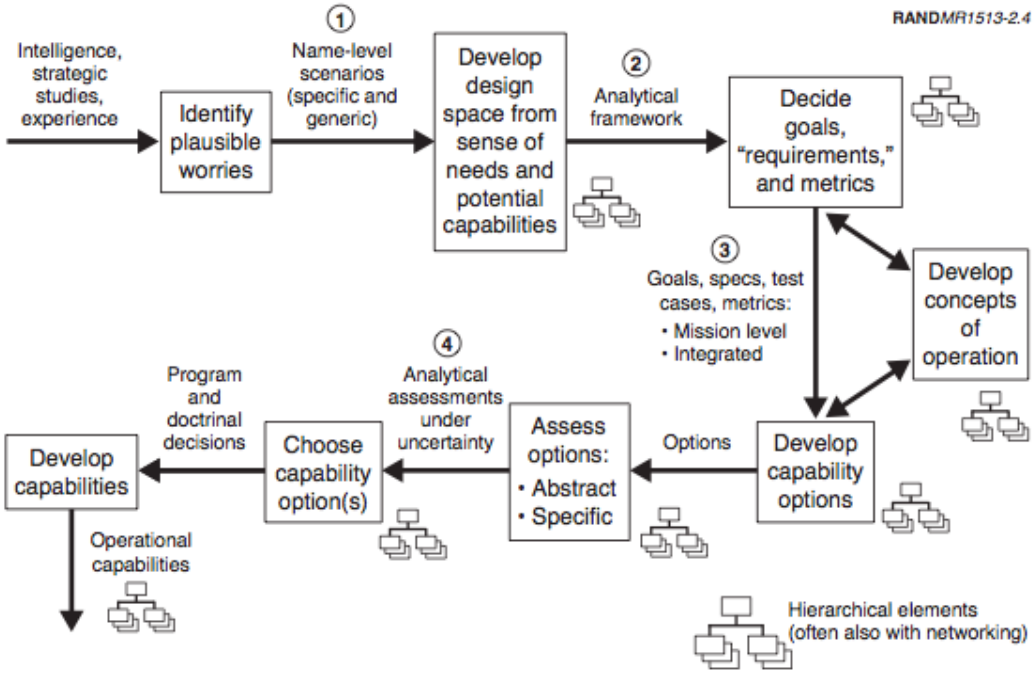


Figure 9 : A Process Model for Capabilities-Based Planning (Davis, 2002)

This diagram shows how to use the Capabilities-Based Approach to achieve the strategic objectives of a defense department. It supports the top-down capabilities planning, which includes four elements: Strategy, Planning, Resourcing, and Execution & Accountability. By following these steps to achieve the desired capabilities will also answer the question "what to do", "how to do it" and "how well did we do".

2.3.2 The CBP tools

Figure 10 illustrates the generic activities of the CBP, which includes the Map, Assess and Plan. (Alder et al., 2014) To implement the CBP, there are some models or techniques that an organization could follow. And these tools could relate to these three generic activities.

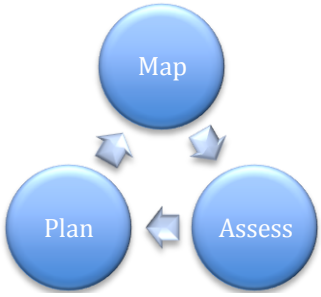


Figure 10 : Capability-based Planning Method (Aldea et al., 2014)

2.3.2.1 Capability map

Ulrich and Rosen stated the Capability Map as the blueprint of capabilities for a given business.(Ulrich & Rosen, 2011) According to Forrester research, Capability Map is a model of a firm associating the business capabilities, processes, and functions required for business success with the IT resource that enables them (Scott, 2010). Thus, the Capability Map is a common way for the organization to document and visualize its capabilities.

Scott said that the Capability Map was the center of a strategic dialogue. The Capability map is the foundation for strategic discussions and it provides the connection between strategy, processes and resources.(Scott, 2009) Besides, Scott stated that mapping capabilities should focus on the specific problems. Therefore, Capability Map can have different level in order to meet the requirement of the business.

The starter of building a Capability Map is to define and understand capabilities. Capabilities of an organization can be decomposed. To realize the high level capabilities, the low level capabilities have to be completed. Figure 11 shows the common three-level capability decomposition. The reason for using the decomposition approach is to help the organization to align the capabilities to business in an appropriate level.

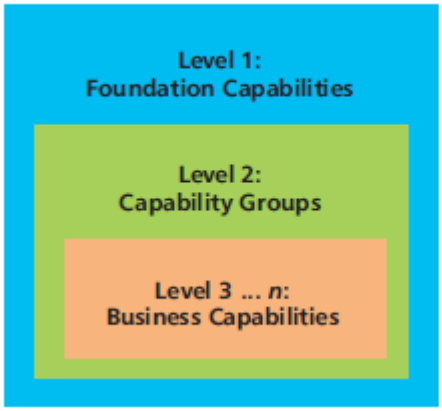


Figure 11 : Three-level capability decomposition (Ulrich & Rosen, 2011)

Figure 12 is an example of level 1 Capability Map. It includes a set of capabilities that related to a certain business. In high-level, a fully well developed Capability Map can represent the capability portfolio of the whole organization. In a detail level, the Capability Map can only represent the capabilities that are required for certain business.

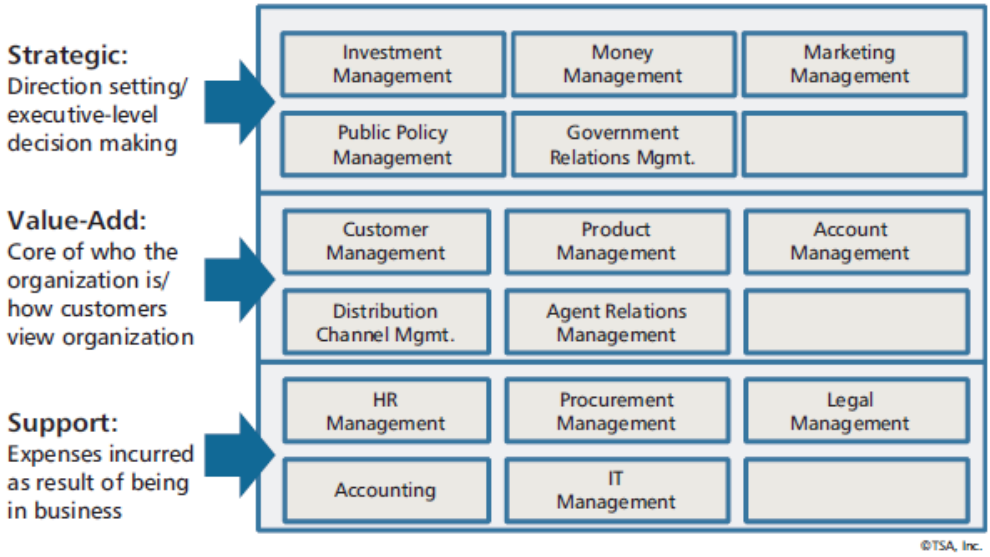


Figure 12 : Level 1 Capability Map (Ulrich & Rosen, 2011)

Therefore, the Capabilities Map can play an important role in strategic planning. It can be used for grouping the capabilities of an organization that are relevant to a specific strategy. Furthermore, it helps the organization to find the missing capabilities. The Capability Map can be the technique that is used for finding the capabilities in both "as is" and "to be" state in the Capability-Based Planning.

2.3.2.2 Capability assessment

To successful implement a strategy and its tasks, a certain set of capabilities are needed. However, the performance level of the required capabilities could be also essential for an organization to achieve their goals. Therefore, an organization needs to answer the question, "What level of capability is needed to perform a critical task?" To solve this problem, an organization can use a set of capability assessment tools to find or set the capability goals and assess the current state of the existing capabilities.

U.S Department of Homeland Security stated that a capability could provide a means to achieve a measurable outcome resulting from performance of one or more critical task(s), under specified conditions and performance standards (Homeland Security, 2009). The conditions and performance standards are defined by the setting objectives of the tasks. In the opposite way, the capabilities of an organization are also needed to meet these performance standards and conditions to help the organization to achieve the objectives of these tasks. Therefore, an organization needs to use capability assessment tool to reveal the capability gaps to implement their strategy.

Papazoglou used the capability maturity level to represent the performance of a capability. (Papazoglou, 2014) It is originally from the Capability Maturity Model (CMM) that defined by the Software Engineering Institute (SEI). CMM defines the capability maturity can be divided into five levels (Paulk, Curtis, Chrissis, & Weber, 1993). Accompany with the CMM, Papazoglou used the Capability heat map to visualize the capability maturity level. These techniques could be also used in this research to present the assessment results.

2.3.2.3 Capability development plan

Capability map helps an organization to find the strategic capabilities and identify the missing capabilities. And the capability assessment helps an organization to estimate the degree of the performance of these capabilities. In order to support strategy implementation, capabilities of an organization that is related to the chosen strategy, should exist and meet the expected performances.

However, in many cases, capabilities are needed to be improved and transformed to enable the delivery of the chosen strategy (Business Architecture Guide, 2014). Therefore, to make the capability development plan is important.

The Open Group stated that a capability would take time to deliver and normally involved many projects delivering numerous increments (The Open Group, 2011). At any certain point, the performance of a capability can be represented as a capability increment. Therefore, the capability development plan is about making several projects to improve the capability from one capability increment to another capability increment.

In order to create different projects to improve the capability performance, an organization could use the Capability Systems Life Cycle (CSLC) as a reference, which was defined by the capability development group in Australia. This group believed the CSLC is the basis for defence's strategy-led Capability Development process (Capability Development Group Australia, 2014). The CSLC involves five steps, which is shown on Figure 13:

Figure 13 : The Capability Systems Life Cycle (Capability Development Group Australia, 2014)

This figure presents that each capability development plan should start with the needs analysis. The needs phase is referred to the identification of the missing and the underperform capabilities of the organization. After the developing goals are found, the organization should allocate the required resources and create the developing projects then put them into execution.

But these projects probably cannot be executed at the same time. Therefore, Papazolgou proposed a capability roadmap that can be used to sequence these developing projects in order to achieve the desired capability increment.

Eventually, the CBP could help an organization to plan and improve the strategic capabilities. To have all the required capabilities to support, an organization could have a higher chance to implement the chosen strategy better.

2.3 Enterprise architecture framework and ArchiMate language

In this section, the concept of Enterprise Architecture (EA) will be discussed to provide a

background of how to use EA to support the execution of Capability-based planning (CBP). There are some papers and researches already described the usage of CBP to facilitate the organizational changing. The purpose of this section is to find out the framework and language that can be used for modeling the CBP.

2.3.1 CBP in Enterprise Architecture framework

EA framework like TOGAF already provides an overview of using CBP as a business planning technique that focuses on business outcomes. It introduces the concept of CBP from EA and IT perspective and claims it could be a powerful mechanism to ensure the strategic business planning. (The Open Group, 2011)

Enterprise Architecture (EA) is the complete, consistent and coherent set of methods, rules, models and tools which guides the (re) design, migration, implementation and governance of business processes, organizational structures, information systems and the technical infrastructure of an organization according to a version(Iacob et al., 2012). To apply CBP in EA framework, The Open Group proposed two notions that could help an organization manages their capabilities, which are capability dimension and capability increments.

Capability dimensions are the sub-set of capability and capability can be managed by its capability dimensions. TOGAF describes the capability dimensions could help an organization to well explain and understand its capability. And the relationship between capability dimensions, capability increments and capability is shown on figure 14.

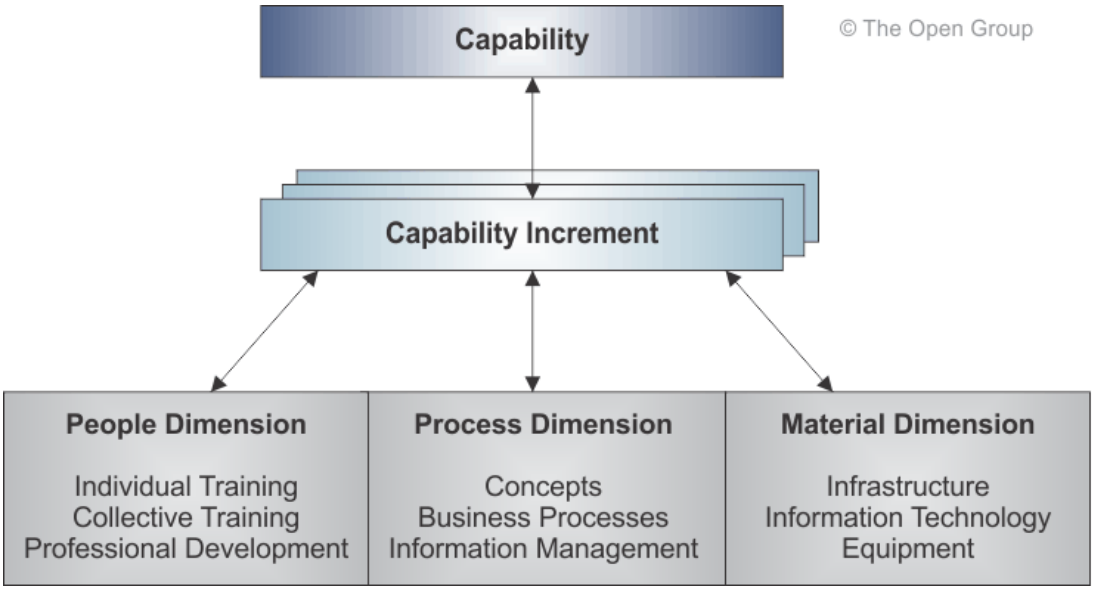


Figure 14 : Capability increments and dimensions (The Open Group, 2011)

Different studies have different categories for these capability dimensions. Typically, a capability could include Process, People and Assets (Greski, 2009) according to the definition of capability. Some of researches divide the capability dimensions in more details. For example, Grant defined the Assets could involve tangible asset (financial, physical) and intangible asset (technology, culture and reputation)(Grant, 2010). However, no matter which categories that an organization follows, capability is generated by the value that is contributed by its capability dimensions.

And another concept is **Capability Increments**, which is also shown on Figure 14. Since a capability will take time to deliver and it could involve projects to deliver. Therefore, in any

certain point of time, the capability can be presented as a capability increment. Combined with the concept of capability dimensions, the capability increments can be shown as "Radar", which is illustrated in Figure 15.

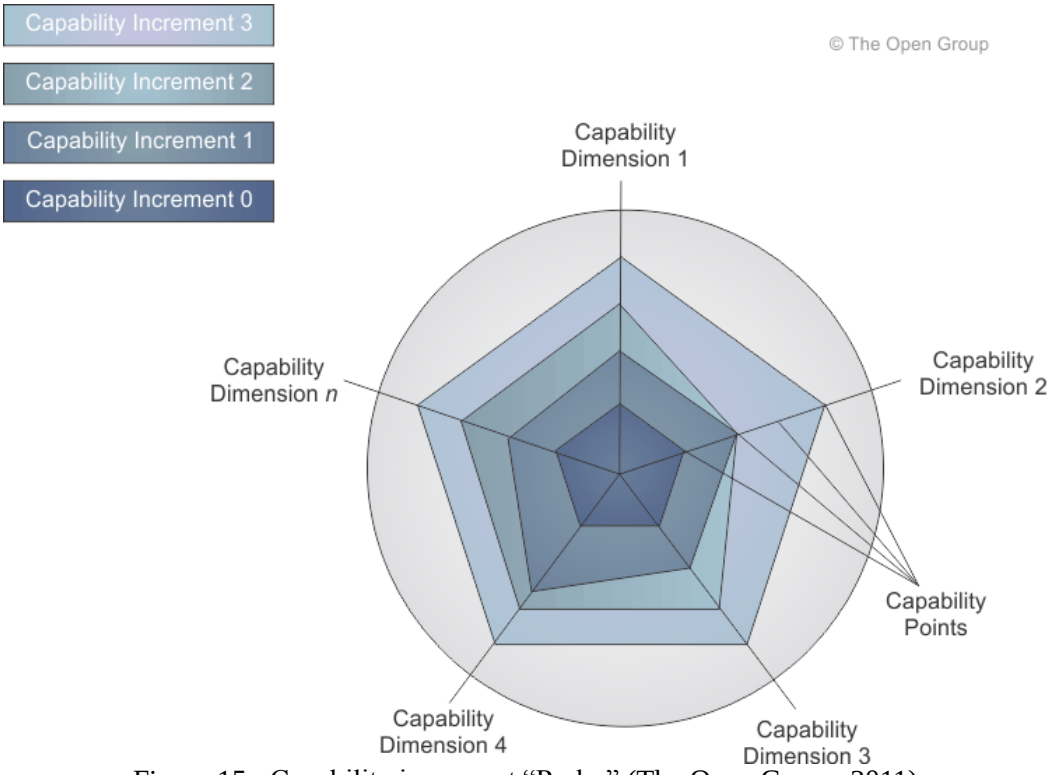


Figure 15 : Capability increment "Radar" (The Open Group, 2011)

Consequently, capability can be broken into several capability increments and is realized by its capability increments. Papazoglou said that the capability increments followed an organization's overall planning from the baseline architecture to the transition architectures and finally to the target architecture, which could be represented as a single plateau in ArchiMate. (Papazoglou, 2014)

Therefore, CBP can be used in the context of EA and should be able to model in EA language, which will be discussed in the next section.

2.3.2 ArchiMate language and metamodel

For building the EA model, the ArchiMate language has been introduced, which could provide a uniform representation for diagrams that describe EA. It offers an integrated architectural approach that describes and visualizes the different architecture domains and their underlying relations and dependencies. (The Open Group, 2013)

ArchiMate language consists the general concepts for modeling the operational aspects (structure, behavior and information) of the business, application and technology layers and the other two language extension, which includes the Motivation extension and Implementation and migration extension. (Iacob et al, 2012)

The ArchiMate core language contains the fundamental concept and relationship that can be used for the general EA modeling. It consists of three main types of elements and has been defined into three main layers. More specifically, the main elements of ArchiMate language

consists of active structure elements, behavior elements and passive structure elements while the main layers of ArhiMate language can be divided into the Business Layer, Application and Technology Layer. The aspects and layer structure the Architectural Framework allows for modeling EA from different viewpoints. According to the ArchiMate language and the Architectural Framework, Iacob et al have structured the complete description of the ArchiMate core language.

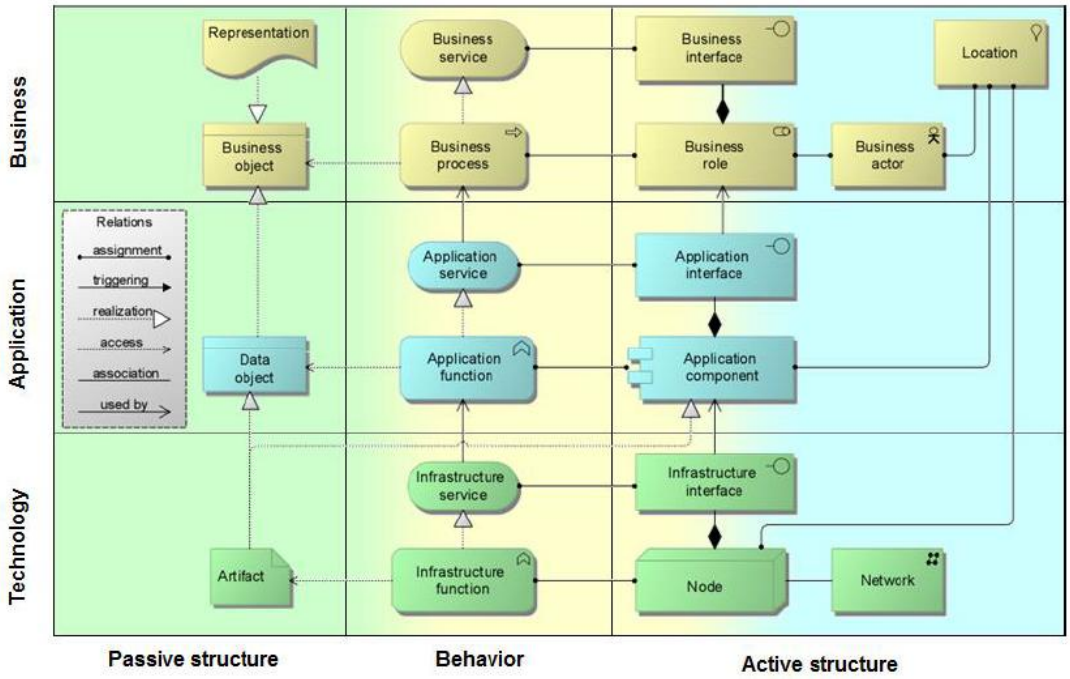


Figure 16 : ArchiMate core metamodel (Iacob et al., 2012)

The Motivation Extension is used to describe the motivation and/or intentions that underlie the design of EA. To address EA to its context, ArchiMate language involves seven main notations to structure the enterprise intentions. These concepts are defined in Figure 17, and the descriptions of these concepts are listed as follow.

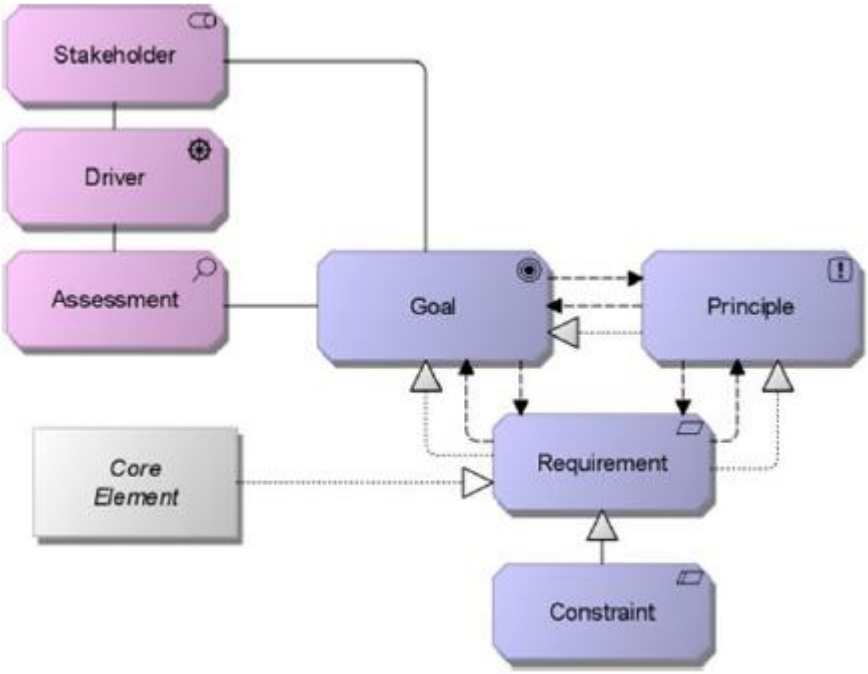


Figure 17 : Motivation extension metamodel (Iacob et al., 2012)

- Stakeholder: It is defined as the role of an individual, team or even an organization that is showing the interests or related to the architecture outcome.
- Driver: It is something from internal or external that can trigger the change of an organization.
- Assessment: It is used for describing the outcome of the analysis of the driver.
- Goal: It defines the result that the stakeholder would like to achieve.
- Requirement: It describes the needs of the architecture to achieve the specific goal.
- Constraint: It describes the restrictions on the way that the goal is realized.
- Principle: It defined as the normative in the given context on the way that the goal is achieved.

Except for these seven main concepts in the Motivation Extension, the core elements are representing the operational aspects in the EA model and it could realize the requirements in order to achieve the goal. It connects the ArchiMate core language with the part of Motivation Extension.

The Implementation and Migration extension provides the concept to support the modeling of the architecture change process and increase the insight into these changes as well as they managed in terms of portfolio and project. (Iacob et al, 2012) Figure 18 shows the metamodel of the Implementation and Migration extension, the additional concepts will be introduced as follow.

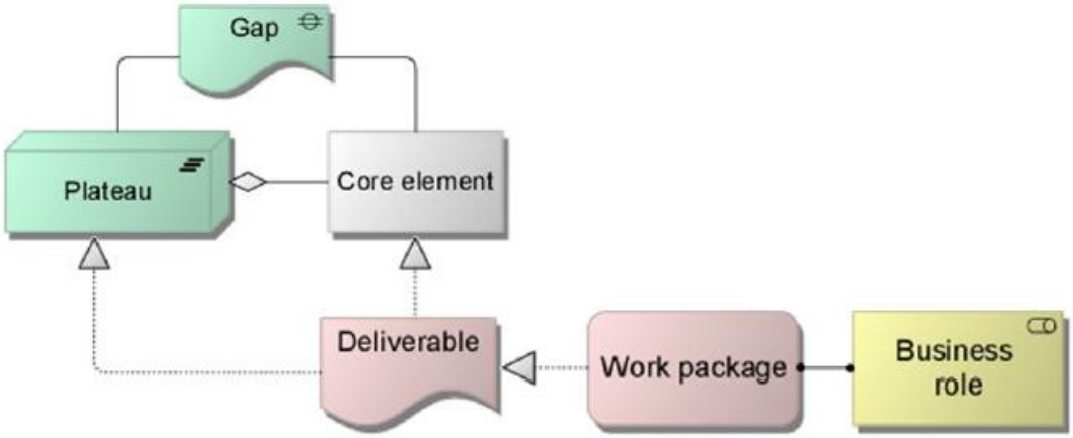


Figure 18 : Implementation and migration extension metamodel (Iacob et al., 2012)

- Work package: It is defined as a set of actions designed to accomplish a goal within a specific time.
- Deliverable: It is used for modeling the specific outcome of the work package.
- Plateau: It is defined as a relatively stable state of the architecture that exists during a limited period of time. From figure 2.16 we can find that the ArchiMate core elements could be aggregated to a plateau.
- Gap: It is used for modeling the difference between two plateaus.

To combine these concepts, Papazoglou claimed that the CBP can be modeled in ArchiMate language, which will be discussed in the next section.

2.3.3 Using ArchiMate language for CBP

The ArchiMate language is being used to describe the CBP method because it has already contained a set of strategic concepts and the notation to present the capability concept has been proposed. Furthermore, ArchiMate language is also one of the most well known EA modeling language in the world. Therefore, we would like to use ArchiMate language to validate the proposed CBP method in this study.

Figure 19 shows the Abstract syntax (metamodel fragment) for strategy and value-related concepts. It reveals the relations between the behavior element, capability, resource and the goal(Iacob et al., 2012). According to this metamodel fragment, Azevedo et al proposed to use the capability and resource concepts as the addition of ArchiMate language. (Azevedo et al., 2013)

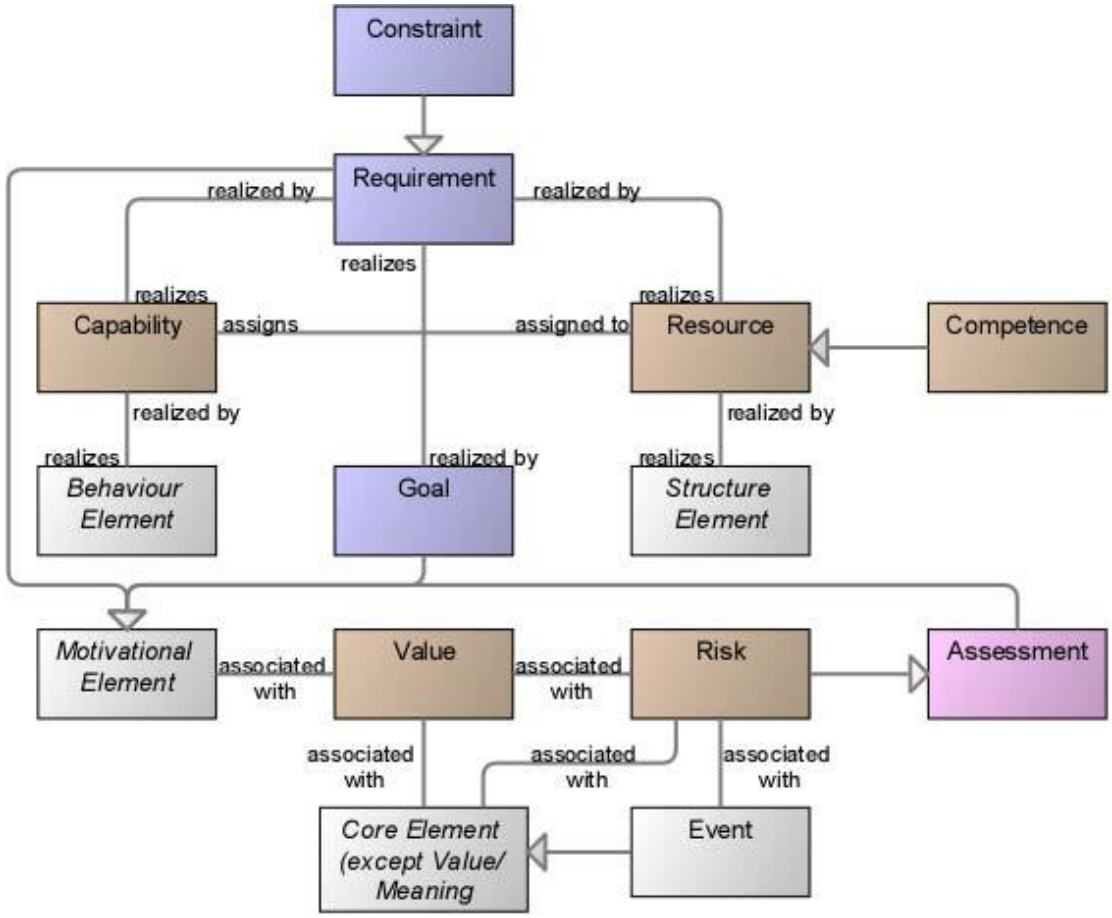


Figure 19 : Abstract syntax (metamodel fragment) for strategy and value-related concepts (Iacob et al., 2012)

Since Aldea et al. proposed to use the concept of Goal to represent the mission, vision, strategy and objective. (Aldea et al., 2014) Therefore, according to the metamodel that presented in Figure 19, she constructed the Capability-based planning extension metamodel in ArchiMate language, which is illustrated in Figure 20. Except for using the concepts from the ArchiMate core and the other two language extension, Aldea et al. also added the concept of capability, capability increment and metric in this metamodel, which could help the organization to model CBP by using ArchiMate language:

- **Capability**: As mentioned before, Capability is defined as the ability (of a static structure element, e.g., actor, application component, etc.) to employ resources to achieve some goals (Iacob et al., 2012) In Figure 19, Iacob et al. claimed that the capability could be realized by the behavior elements. In order to represent this relation in ArchiMate, Aldea proposed to use the ArchiMate core to describe the behavior element. And the core elements could be aggregated to the plateau to represent the architecture of the capability in certain time.
- **Capability increment:** In any certain point of time, the capability can be represented as a capability increment. (The Open Group, 2011) It is a version of capability, which could help the user to know the transition of the capability.
- **Metrics:** It is defined as the extent, quantity, amount or degree of something, as determined by measurement or calculation. (Aldea et al., 2014)

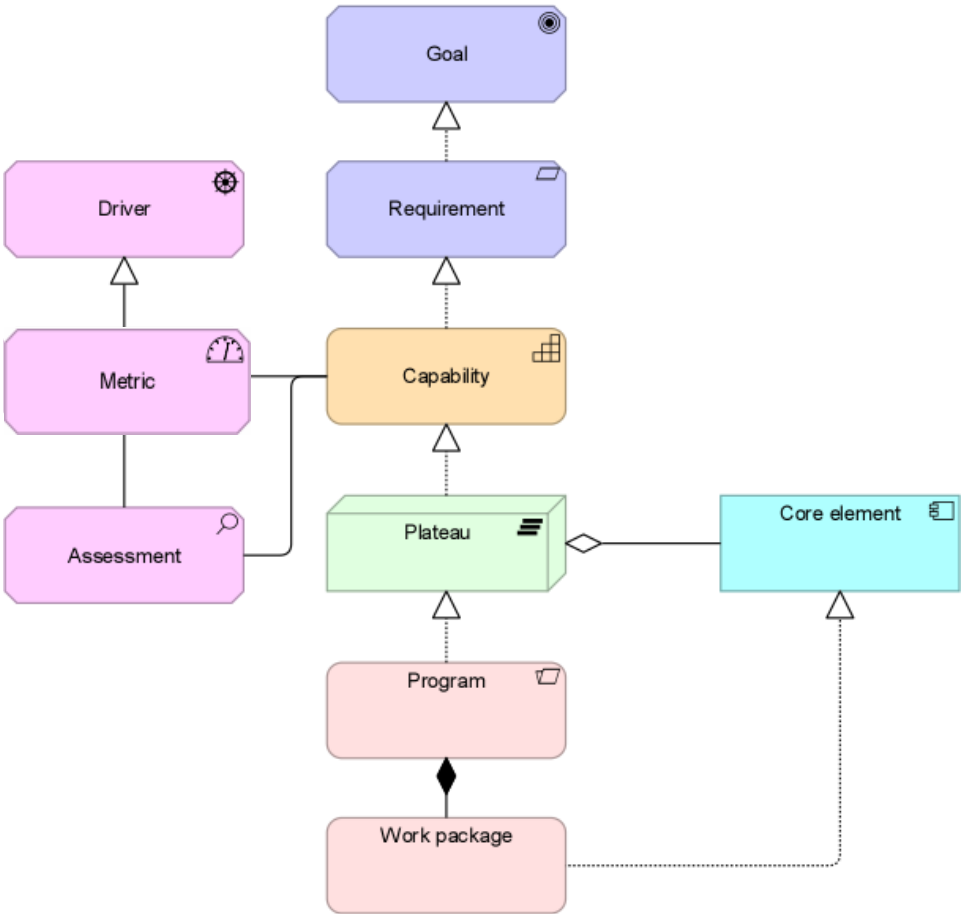


Figure 20 : Capability-based planning extension metamodel (Aldea et al., 2014)

According to the added concepts that proposed in the CBP extension metamodel, the CBP could be modeled by ArchiMate language, the resource, capability notation and the capability increment could be defined. And the possible relations between these concepts of the resource and capability extension aspect are shown on Figure 21. And the definitions of the relations that could exist between these concepts are presented in Table 2.

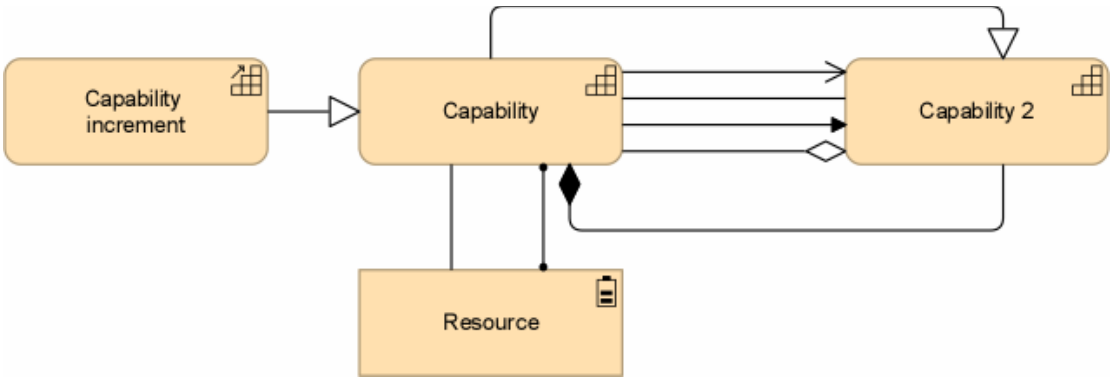
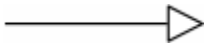


Figure 21 : Possible relations between the resource and capability extension

Table 2 : Possible relations in the resource and capability extension (The Open Group, 2013)

Relationships	Definition	Notation
Association	The relationship between objects without any other specific relationship.	
Used by	The use of services by	

	processes, functions, or interactions and the access to interfaces by roles, components, or collaborations.	
Assignment	Linking units of behavior with active elements that perform them, or roles with actors that fulfill them.	
Aggregation	Indicating that an object groups a number of other objects.	
Composition	An object is composed of one or more objects	
Triggering	It describes the temporal or causal relationships between processes, functions, interactions, and events.	
Specialization	An object is a specialization of another object.	

According to these added concepts and their relations, we could use the ArchiMate language to model the capability and link the capability to the existing ArchiMate concepts. Furthermore, to use different relationship notation to express the relations between different capabilities, which could help us to model the Capability Map concept that defined in the previous section.

Summary

This chapter presents the basic concepts and the key techniques that will be mostly discussed in this research. Since the goal of this research is to define a Capability-based planning (CBP) method to facilitate the strategy implementation, the literature review is divided into four sections, which include strategy implementation, relationship between strategy and capability, CBP and Enterprise Architecture. For each section, the definitions of the key concepts and the common techniques are discussed, which could provide the theoretical support or/and used by the method that will be created in this research.

3. Capability-based planning Method Design

The foundational question for strategic management is how an organization can achieve and sustain its competitive advantage. To answer this question, Teece et al. referred the competitive advantage as "dynamic capabilities". With the dynamic capabilities approach, the question can be refined as how an organization can develop its capabilities to adapt and capitalize on rapid changing environment. (Teece, Pisano & Shuen, 1997)

The term "capabilities" in "dynamic capabilities" emphasizes the key role of strategic management in appropriate skills, resources, and functional competences toward changing environment. (Teece & Pisano, 1994) Therefore, planning, developing and providing the suitable capabilities are important for an organization to formulate and implement its strategy. The organization can apply the Capability-based planning (CBP), which focuses on the planning, engineering, and delivery of strategic business capabilities to the enterprise (The Open Group, 2011), to support the strategic management process and help the organization to link its capabilities with its strategies.

3.1 Capability-based Planning Method

In the document 'Guide to Capability-Based Planning', CBP has been defined as the method for identifying the levels of capability needed to achieve the strategy. With the scenarios, CBP explicitly connects capability goals to strategic requirements. Based on the goals, the defense department can do the holistic assessment of the defense capability and hence the development of robust force options within the available budget to meet the range of contingencies expected by government. (TTCP, 2004)

Comparing with the definition from the defense perspective, The Open Group defines CBP is focusing on the planning, engineering and delivery of strategic business capabilities to the enterprise. It is business-driven and business-led and combines with the requisite efforts of all lines of business to achieve the desired capability.(The Open Group, 2011) From the Enterprise Architecture perspective, capabilities are directly derived from the corporate strategic plan and used for satisfying the enterprise goals, objectives, and strategies. However, a capability could be in different performance/maturity level in certain time, which requires time to deliver it to the enterprise. It requires the CBP should also involve the tool for identifying the level of capability and then the organization can make the plan for improving the capability.

In conclusion, similar to the definition from the TTCP, the CBP method that defined by The Open Group is also including the concept of linking capabilities with the strategic requirements, assessing the level of capability and making the plan to deliver the capability. Therefore, Aldea stated the CBP as the methodology was focused on planning the improvement (over time) of a series of capability that will help achieve specific business outcomes. And based on the descriptions above, Aldea defined the CBP into three major phases, which involves Map, Access and Plan. (Aldea, 2014) And the method is shown on Figure 10 in chapter 2.3.2.

This method reveals that in CBP, Map, Plan and Assess can affect each other. Although the relationships between all the phases in this method are iterative, the method still follows a

certain sequence. To make it more specific, the CBP method can be defined as several steps that are related to Map, Assess and Plan respectively.

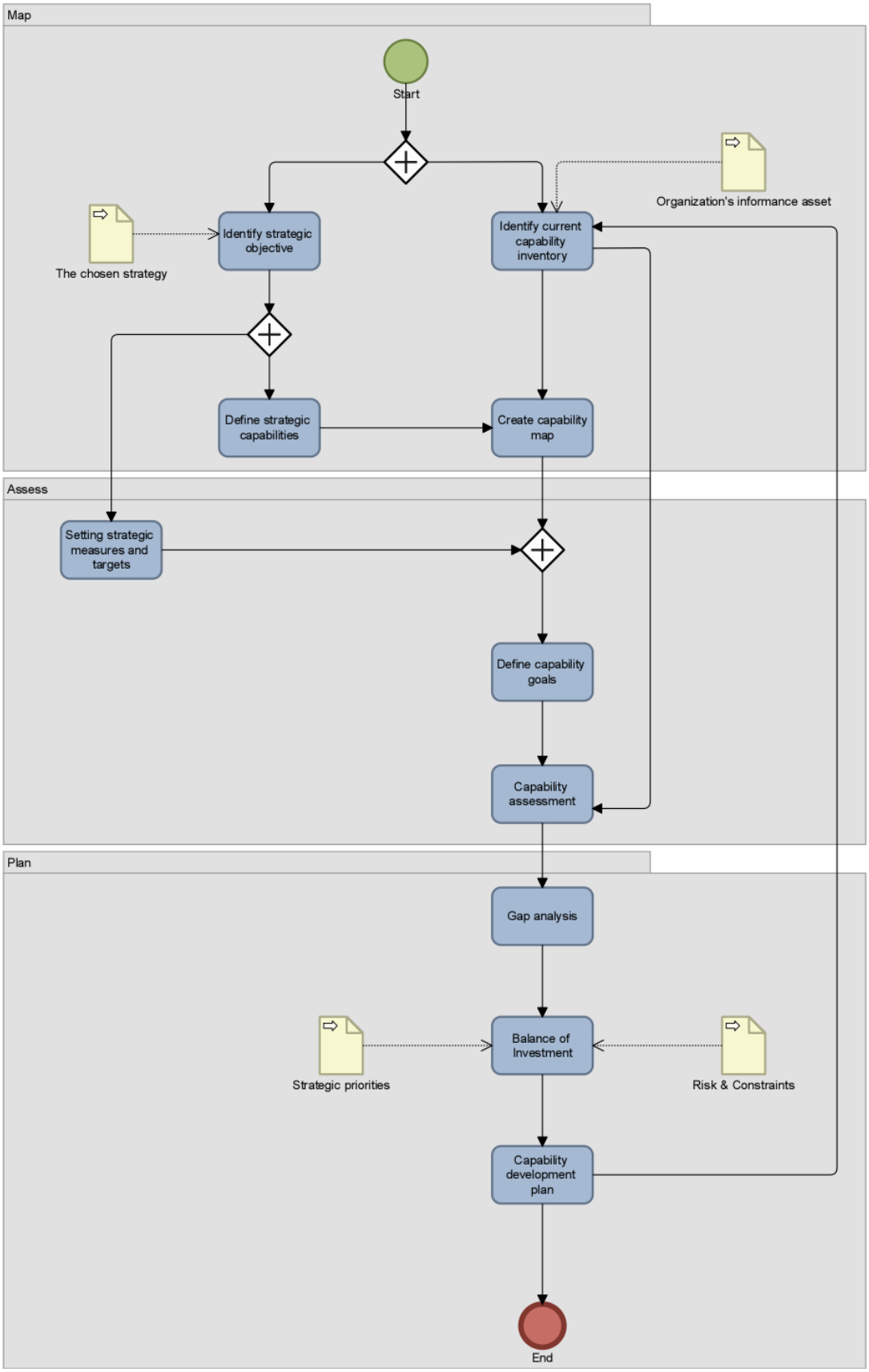


Figure 22 : General steps of Capability-based planning

Figure 22 shows the general steps of CBP. It uses the Business Process Modeling Notation (BPMN) to represent the major steps and the data input of the CBP. Since capability is derived from the strategy and CBP is used for helping the organization to implement the strategy. Map will be always the first phase of CBP, which helps the organization to identify, describe and relate the capabilities of the organization and link these capabilities to the specific strategic objectives. After the organization has identified the strategic capabilities and mapped them with baseline capabilities, the relevant metrics/KPIs should be identified in the Assess phase. In the Assess phase, the organization will identify both the target performance and the baseline performance of the related capabilities. Then it goes to the final phase, which is Plan. To make a capability development plan, it requires the organization to know the gaps between their current capabilities and target capabilities and plan the increments over time and allocate the resources. The results of the Plan phase will be the capability increments and capability roadmap that can give a direction for the organization to improve its capabilities. And the capability development plan will be linked to the baseline capabilities that the organization defined in the Map phase. The CBP process is iterative, and the capability development plan is contributing to the improvement of the current capability. However, for each time the organization executes the CBP, it finishes with the capability development plan.

Start with the next section, which will discuss the CBP process in details. The CBP involves three major phases, which are Map, Assess and Plan. Phase A is Map, which used for determining the target capability map and the baseline capability map. To find out what are the required capabilities for implementing the chosen strategy successfully. And then the organization can find out the missing capability based on these two capability maps.

The Phase B is Assess. This study will more focus on this phase. The purpose of assessing the capability is to find out the desired performance and the current performance of the strategic capabilities, which could help the organization to define the gap of the under performance capabilities and develop the project to improve them. In Phase B, this study would like to describe the tools and concepts that could be used for the capability assessment in details, which involves Enterprise Architecture (EA), Capability heat map, Capability dimensions, Capability assessment framework and the Indicator specification table. Furthermore, in this section, the performance level criteria that will be used for validating the capability is defined.

The Phase C is Plan. To execute the Plan phase is based on the result of Assess phase, and the final outcomes of the Plan phase will contribute to the development of the current capabilities. The purpose of making the capability development plan is to give the organization a direction to improve the under performance capabilities, which are required for the strategy implementation.

3.2 Phase A: Map

Enterprises require specific capabilities in order to be able to implement strategies efficiently and achieve a specific outcome.(Wißotzki, 2014) Therefore, this study focuses on using Capability-Based Planning (CBP) to improve the strategy implementation of an organization. Figure 23 shows the key elements of the strategy implementation includes the strategic objectives and the metrics of these objectives.

Figure 23 : Excerpt from Strategic planning processes (Aldea et al., 2014)

The CBP that defined in this study should support the organization to link the strategy and capability tightly. According the literature review, Rashidirad et al. used the basic concept of the Task-Technology Fit model to align the strategy and capability together.(Rashidirad, Soltani&Syed, 2013) Therefore, in order to translate strategy into implementation via CBP, the first step of CBP is to analyze the characteristic of both strategy and the organization's capabilities. And then, the organization can map these capabilities with specific strategic objectives. And the general activities of the Mapping phase are shown on figure 3.4.

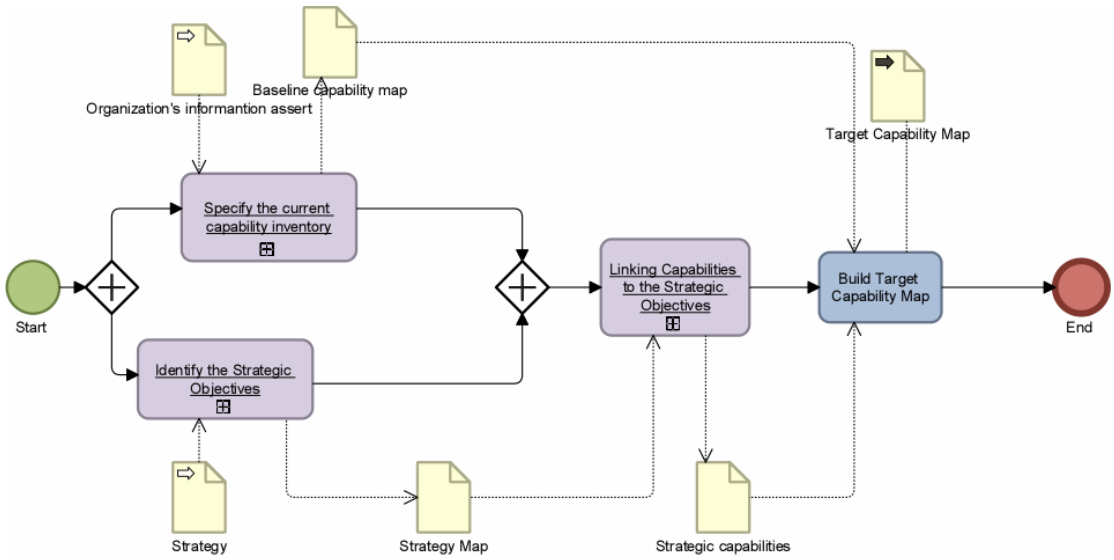


Figure 24 : Mapping activities

The notation in Figure 24 follows the Business Process Model and Notation (BPMN) language. Map is considered as a separate process of the CBP, and the sub-processes and tasks that showed on Figure 24 are the major activities of the Mapping process. The input data of each task or sub-process are represented as the empty arrow data file, while the output data are represented as the data file. Under certain conditions, the output data can be the input data of the other task or sub-process.

The general idea of the Mapping phase is to find the capabilities that will contribute to the chosen strategy of the organization. The planning of the capability improvement should be based on the Capability Map that related to the chosen strategy. Therefore, the initiate steps of the Mapping phase not just determining the baseline Capability map of the organization, but also finding the strategic objectives and the requirements of the chosen strategy. Then, the manager can determine the strategic capabilities based on the strategic objectives and requirements. To link the current capabilities to the strategic objectives will be happened after the manager determined the baseline capability map and the strategic capabilities. The current capabilities in the baseline Capability map will be linked to the strategic capabilities. After that, the manager can create the target Capability map and identify what are the missing capabilities.

The Table 3 below shows general attributes of the Mapping phase, which involves the input, output and the techniques that will be used in this phase.

Table 3 ： The Characteristics of Phase Map

Phase A: Map	
Goal	To help the organization to identify the required capabilities for the chosen strategy, and find out the missing capabilities.
Activities	● A1: Specify the current capability inventory ● A2: Identify the strategic objectives ● A3: Linking current capabilities to the strategic objectives ● A4: Creating the target capability map and finding out the missing capabilities
Input	● The chosen strategy ● The information asset of the organization
Output	● Strategy Map ● Baseline Capability Map ● Target Capability Map
Techniques	● Strategy Map ● Capability Map

3.2.1 Step A1: Identify the current Capability Inventory:

Iacob et al. have defined Capability as the ability (of a static structure element, e.g., actor, application component, etc.) to employ resources to achieve some goals (Iacob et al., 2012). Basically, any ability of an organization could be defined as the capability. However, there are some principles that the manager needs to follow to define the capability, which includes:

1. Using a common language to define the capability: First, the capabilities are nouns, not verbs. Second, the capabilities should be defined in business terms, not technical. Then, the capabilities should be stable, not volatile. All the stakeholders can easily understand the meaning of the capability in terms of their business.
2. Capabilities define what a business does, not how it does it: To differentiate the meaning of capability and the business process or value stream is important. A business capability could involve a set of processes, people and physical assets, but not equal to them. (Greski, 2009)
3. Capabilities can be decomposed: It is typical to consider the capabilities could be decomposed from level 1 to level 3. The decomposition of capabilities is particularly useful for making the Capability map. It is crucial to keep the same detail level of the capabilities in the same level.(Aldea, Iacob, Hillegersberg, Quartel, & Franken, 2014)
4. Capabilities should not be redundant. A specific capability only shows once and only once for a business. In the same level, different capabilities cannot overlap.
5. Capabilities map to, but not equal to the line of business (LOB), business, business process or value stream (Ulrich & Rosen, 2011): Therefore, a capability can be decomposed to a sub-capability, but it cannot become a process, task or activity.

The manager can create the baseline capability map of the organization by following these principles. It requires an adequate investigation of an organization's business. The steps of creating the baseline capability map are shown on Figure 25.

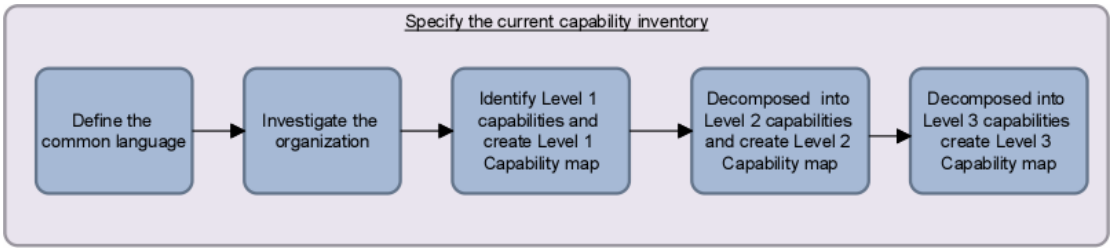


Figure 25 : Steps of creating the baseline Capability map

For the first step, the manager needs to define the common language to name the capabilities. Second, there should be an adequate investigation of the organization's business to help the manager to have a better understanding of what the capabilities that the organization has. Third, the manager needs to identify the Level 1 capabilities and construct them into a Level 1 Capability map.

Ulrich and Rosen suggested "if there are examples, templates, or consultancy-supplied capability maps that your organization can obtain in advance of starting a mapping effort, these should be incorporated into the analysis process."(Ulrich & Rosen, 2011). Therefore, there are some common capability categories that the manager can follow:

- Customer or equivalent external stakeholder Management
- Product or service management
- Account, policy, contract, or similar management
- Additional external stakeholder relations management
- Investments, marketing, and other strategic management
- Industry-specific categories, such as claims, routing, or money management
- Support capabilities, including accounting, HR, IT, and legal management

Figure 12 that listed in chapter 2.3.2.1 is the Sample Level 1 Capability map. More specifically, Ulrich and Rosen also proposed a layering structure within the Capability map. Each layer represents a set of capabilities as they relate to the viability of the business and the bottom line. (Ulrich & Rosen, 2011)

After the Level 1 capabilities have been defined, the manager should seek more information about the specific capabilities. By using Level 1 Capability map as the baseline, leveraging information asset views and ensuring the LOBs are represented in an appropriate level, the level 1 capabilities can be decomposed into level 2 capabilities. And the manager can use the level 2 capabilities to construct the level 2 Capability map. To decompose the level 2 capabilities into level 3 capabilities is similar to the previous step. After finalizing all the capabilities from Level 1 to 3, the manager can construct the whole Capability map. And the example three level capability decomposition is shown on Figure 26, which is the example from HR management.

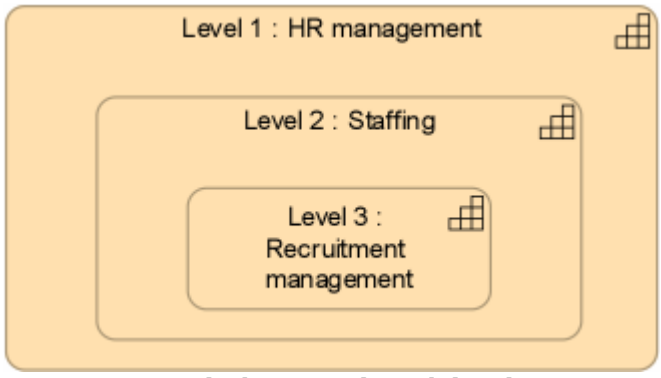


Figure 26 : Example three-Level capability decomposition

3.2.2 Step A2: Identify the strategic objectives

The goal of step A1.1 is to identify the strategic objectives of the chosen strategy, which will be realized by creating the Strategy Map. Therefore, the process of step A1.1 can be seemed as the process of creating the Strategy Map, which shows on Figure 27.

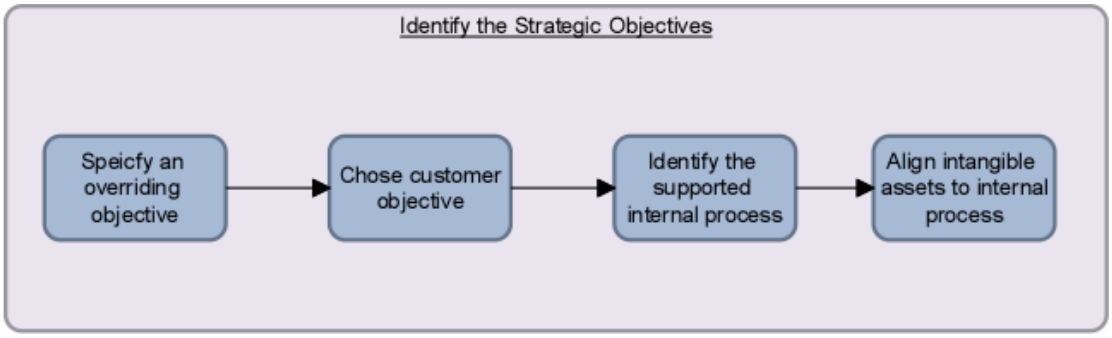


Figure 27 : Sub-process of identifying the strategic objectives

A strategy map is a one-page representation of the cause-and-effect linkages among the objectives for both the outcomes and drivers of strategy.(Kaplan & Norton, 2004)Basically, the process of creating the Strategy Map follows the top-down sequence. Kaplan and Norton defined a six step process to use Strategy Map and Balanced Scorecard together. For only creating the Strategy Map, which will relate to four of these six steps:

1. Specify an overriding objective: First, the manager needs to specify an overriding objective of the chosen strategy. This step is critical. The objective should represent the stakeholder/shareholder value gap. For profit-making organization, the overriding must be economic (Armitage & Scholey, 2006), in another word, the overriding objective of the organization can be also considered as the financial objective.
2. Reconcile the value proposition: To clarify the market segments and customer value proposition and link the customer objectives to the financial growth goals.
3. Identify the key strategic themes: Strategy Map is often divided into several strategic themes, which are vertical slices across the four perspectives of the Strategy Map that describing how the strategy create value. Therefore, the manager needs to identify the critical internal processes which will have the impact on the customer value proposition.
4. Identify and align the intangible assets: Define the human, information and organization capital required to support the internal processes. Setting the objectives of the intangible asset improvement.

Figure 4 that shown in chapter 2.1.3.1 shows a Sample Strategy Map. The strategic objectives of the chosen strategy can be mapped into four perspectives, which are financial perspective, customer perspective, internal perspective and learning & growth perspective. While constructing the Strategy Map, the cause and effect relationship also clear, the objectives from the lower level perspective are the foundation of the objectives from a higher level perspective. For example, for the financial perspective, the organization would like to grow the revenue, which requires the organization to provide the highly innovative product to achieve the objective in the customer perspective. Furthermore, to create these products, the organization should accelerate development teams work (internal perspective), which requires the organization to acquire, enhance and retain skilled people (learning and growth perspective).

Each strategic objective has its requirements. Based on the requirements, the strategic capabilities can be defined.

3.2.3 Step A3: Linking the capabilities to the strategic objectives.

Aldea et al. mentioned that the activities of Capability-based planning can start in the later phases of strategy planning, after the strategic objectives, KPIs, targets and initiatives have been determined. (Aldea et al., 2014)Capabilities should contribute the strategic value, therefore, after identified the baseline Capability map and the Strategy map, the manager should link the capabilities to the specific strategic objectives.

The activity of linking the capabilities to the strategic objectives can be divided into four steps:

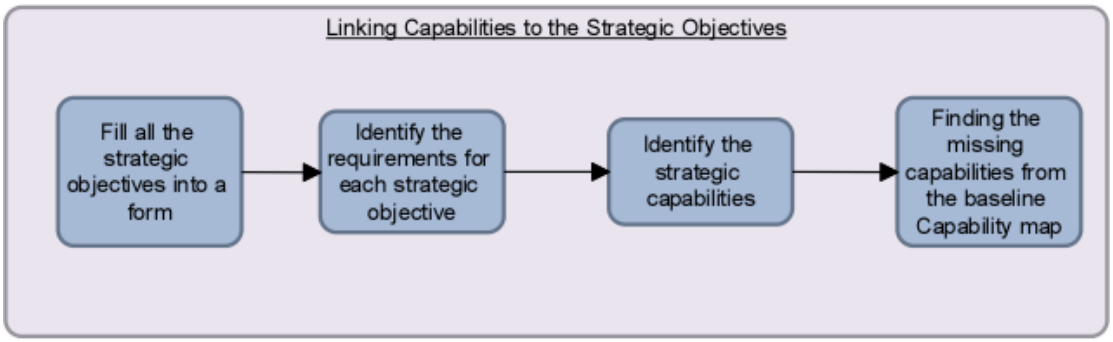


Figure 28 : Sub-process of linking capabilities to the strategic objectives

First, the strategic objectives of the Strategy Map should be filled in a form and link with the specific strategic outcome, which can help stakeholders easy to read and structure the requirements of each objective.

Second, the manager can identify the requirements for each strategic objective. To see what kind of capabilities are required to fulfill this strategic objective. Then, the manager can use the baseline Capability map as a reference to find and identify the strategic capabilities. Be aware, not all the strategic capabilities can be found on the baseline Capability map and not all the capabilities on the baseline Capability map are required for this chosen strategy. Finally, after identifying the strategic capabilities, the manager will know what are the missing capabilities of the baseline Capability map.

In addition, from the Strategy Map point of view, the strategic objectives from different perspectives have the cause-and-effect relationships: the objectives in the lower level perspective support the objectives in the higher level perspective. Furthermore, various capabilities of an organization have different level of strategic impact.(Bakhtiyari, Mohammd, Barros, & Alistair, 2012) A business capability is the fundamental abstraction used to describe what a business does. Overall, capabilities can provide the capacity to achieve a desired outcome. They can be described through a capability map, which is a hierarchical description of what the business does.(Ulrich & Rosen, 2011)

Furthermore, in order to describe the relationship between the strategic objectives and capabilities, Kudryavtsev et al. created a metamodel to describe how to link different capabilities to different perspective of the Strategy Map. (Kudryavtsev, Grigoriev, & Bobrikov, 2014) They applied the decomposition concept to capabilities and received the “Capability type” as a result of specification and the “Capability component” as a result of breaking “Component” down into parts. Comparing with the decomposition structure that defined by Ulrich and Rosen, they defined the decomposition of the capability has the “primary—management—enabling” classification and the different type/component capability can be linked to different predefined goal groups (perspective). (Kudryavtsev, Grigoriev, & Bobrikov, 2014)

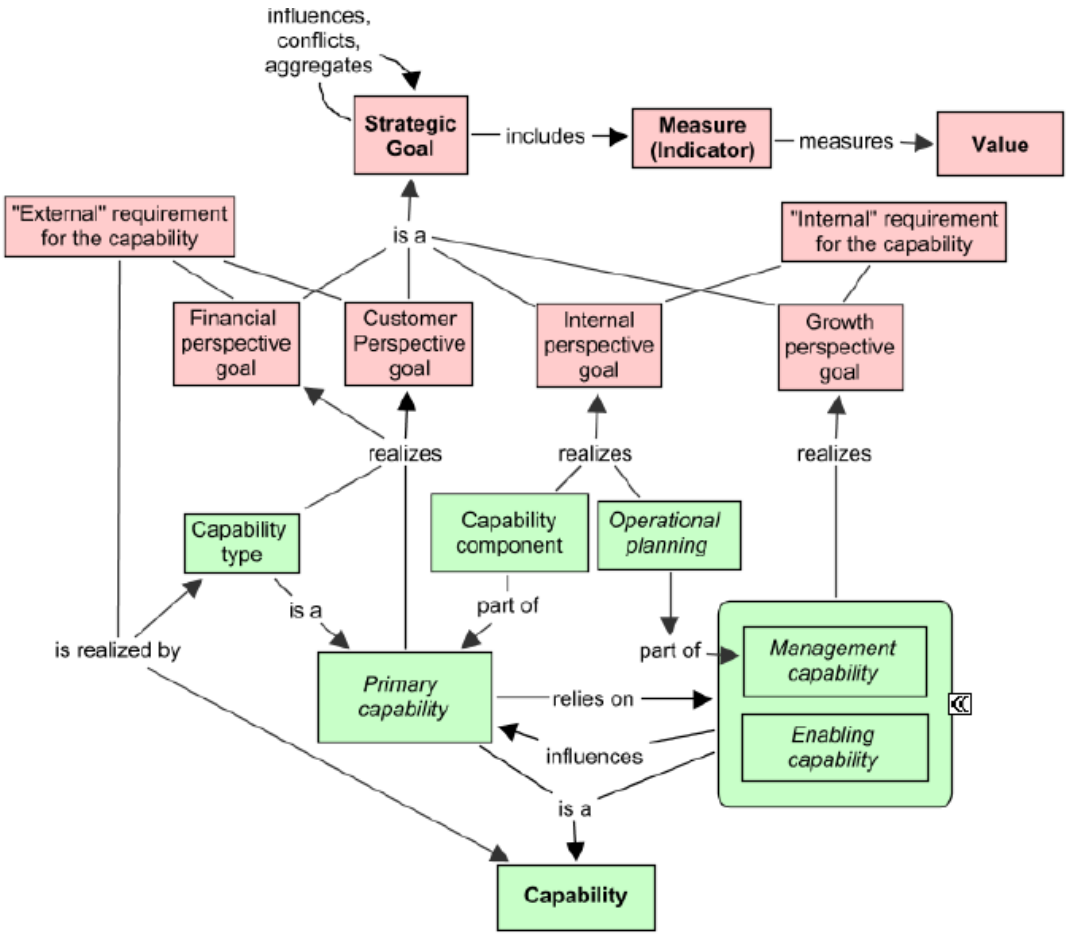


Figure 29: Meta-model for linking capabilities with strategic goals and measures (Kudryavtsev, Grigoriev, & Bobrikov,2014)

Therefore, the different level capabilities could be linked to different level strategic objectives. The low level capabilities are more detail comparing with the high level capabilities, which could be linked to the strategic objectives from the foundation perspective. In the opposite way, the high level capabilities are more abstractive, which relate to the overall objective. Table 4 shows the template of linking the capabilities to the strategic objectives:

Table 4 : Linking capabilities with strategy

Strategic theme		Objective	Requirement Description	Strategic Capability
Financial Perspective	**Explanation:** The Strategic themes are vertical slices across the four perspectives of the Strategy Map that describing how the strategy creates value. This part can be filled based on the Strategy Map.	**Explanation:** The Strategic objectives relate to the specific strategic theme and belong to different perspectives. Based on the Strategy Map, the cause and effect relationship among the strategic objectives should be clear. This part can be filled based on the Strategy Map.	**Explanation:** To describe what will be required to fulfill the specific strategic objective. The requirement description can help the manager to identify the strategic capabilities.	Level 1 and/or Level 2 Capabilities
Customer Perspective				
Internal Perspective				Level 3 Capabilities
Learning and Growth perspective				

After filling this form and identifying what are the strategic capabilities for this chosen strategy, the manager can find out the missing capabilities by comparing the baseline Capability map and the strategic capabilities. For example, Table 5 shows the example of linking the level 3 capabilities with the specific strategic objective in learning and growth perspective. This table illustrates the requirements of "acquire, enhance and retain skilled people" could be keeping the high performance employee and hiring new high skilled people and using training project to improve the employees' skill. After identifying these requirements, the manager can know that the related capabilities might be compensation and benefit, employee relationship, training, employee performance assessment and recruitment management. And they are the Level 3 decompositions of HR management.

Table 5 : Example linking capabilities to specific strategic objective

Strategic theme		Objective	Requirement Description	Strategic Capability
Learning and Growth perspective	**Motivated skilled and stable workforce**	Acquire, enhance and retain skilled people	Keep the high performance employee and hire new high skilled people. Using training project to improve the employees' skill.	Performance assessment
				Recruitment management
				Training

3.2.4 Step A4: Building the Target capability map

The final step of Map is building the Target capability map. The Target capability map includes all the capabilities that will be contributed the strategic value to the chosen strategy. It is constructed strategic capabilities that defined in the previous step and it will use the baseline

capability map as a reference.

Since the strategic capabilities are already defined, the manager only needs to put these capabilities in the right position. The language and the structure of the Target capability map should keep the consistence with the baseline capability map. For example, Ulrich and Rosen order the capability map according to the three categories of capabilities: strategic, value-add and support, which shows on Figure 12. If the Baseline capability map follows this structure, then the Target capability map should also divide into strategic, value-add and support.

After the Target capability map has been built, the manager will find that not all the capabilities of the Target capability map can be found on the Baseline capability map. Therefore, the manager should use another color, like white, to highlight the missing capabilities. For example, Figure 30 shows the sample Target capability map that related to the objective that the organization should acquire, enhance and retain skilled people. It involves all the level 3 capabilities are required and highlights the missing capabilities. From this figure, the stakeholders can recognize that the organization does not have the capability of handling the employee relationship.

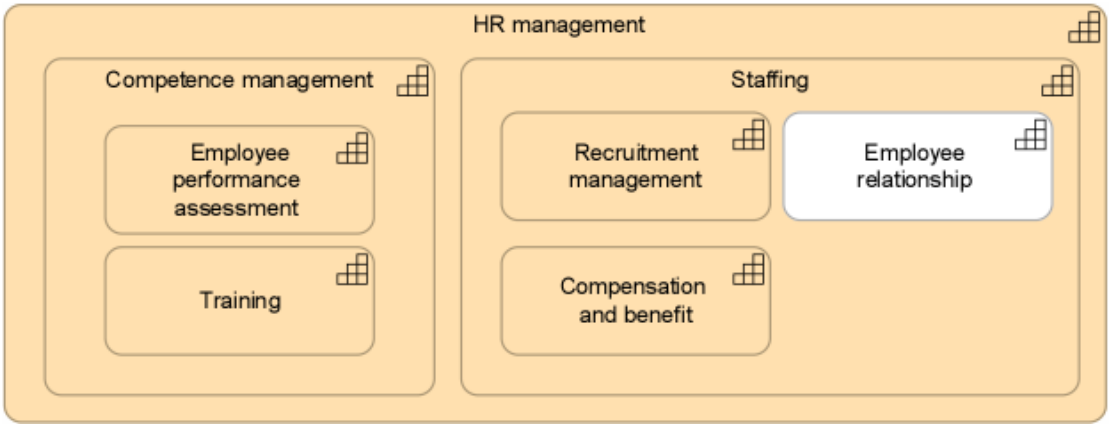


Figure 30 : Example Target capability map

3.3 Phase B: Assess

In the next phase of this method, it focuses on analyzing the performance of the capabilities. It is intended to assess the organization's capacity to fulfill those strategic capabilities that identified in the previous phase. Therefore, it is important to have the capabilities that are measurable for CBP.(Aldea et al., 2014)

In phase A, the question of "To execute the chosen strategy, what capabilities are required?" has been answered. The Target capabilities map categories the required capabilities into several blocks and highlight the missing capabilities of the organization. However, the desired performances of these strategic capabilities are still not known yet. It is necessary to look for the performance level of these selected capabilities, which includes the desired performance and the current performance.

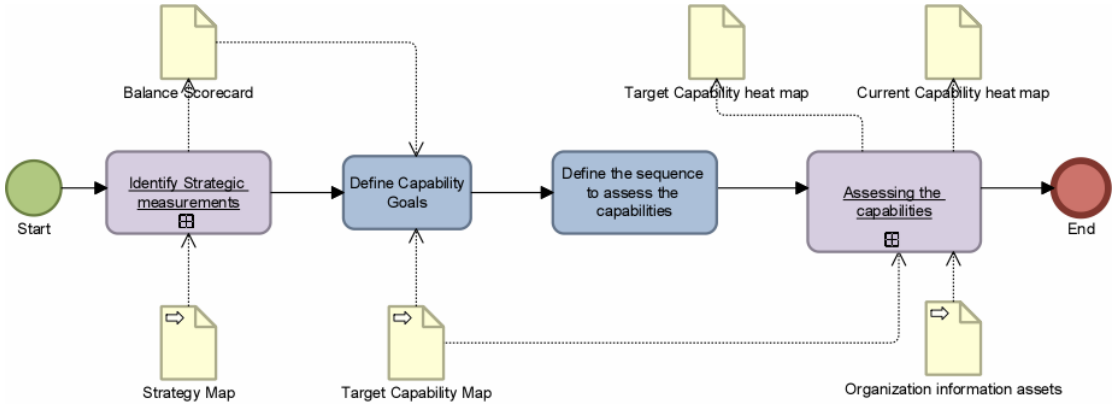


Figure 31: Assessing activities

Figure 31 shows the major activities in the assessing phase. The notations in this figure are also following the BPMN notation.

The general idea of this phase is finding the desired performance level and the current performance level of the strategic capabilities that represented in the Target capability map. The pre-conditions for assessing the capabilities are: first, grouping the required capabilities into specific objective; second, the relationships among these capabilities are clear.

As mentioned before, an organization requires specific capabilities to implement its strategy in an effective way and get the desired results. To align the capabilities to the chosen strategy, CBP can start in the later phases of strategic planning, after the strategic objectives, KPI, targets and initiatives have been determined. (Aldea et al., 2014)Kaplan and Norton claimed that before selecting the measures for the chosen strategy, the manager needed to describe what the organization attempted to achieve with this strategy. Therefore, the Strategy map of the strategic objectives is required to build first and only afterwards select measures for each objective. Since the Strategy map with the strategic objectives already defined in Phase A, the Balanced Scorecard (BSC) can provide a framework for organizing strategic objectives into the four BSC perspectives. Thus, the initiate step of the assessing phase is to structure the BSC with the defined measures for each strategic objective. Depending on the setting measures and targets, the capability goals can be more specific. TTCP stated that goal setting provided the means for setting the desired level of capability needed to achieve the stated objectives. (TTCP, 2004)According to the setting goal, the manager can start to assess the strategic capabilities. To find out what will be the desired performance of these capabilities to achieve the specific strategic objective. Besides, there is one objective of CBP is to plan the improvement of the capabilities. Thus, after the target capabilities have been set, the manager should assess the current performance the organization's capabilities.

The Table 6 below shows general attributes of the Assessing phase, which involves the input, output and the techniques that will be used in this phase.

Table 6 : The Charaterics of Phase Assess

Phase B: Assess	
Goal	To help the organization to identify the desired performance and the current performance of the strategic capabilities that listed on the Target capability map.
Activities	● B1: Identify the strategic measurements ● B2: Define the capability goals ● B3: Define the sequence to assess the capabilities ● B4: Assessing the capabilities
Input	● Strategy Map

	● Target capability map ● The information asset of the organization
Output	● Capability heat map
Techniques	● Balanced Scorecard ● *i** Strategic Dependency model ● Capability assessment framework ● Indicator specification table ● Capability heat map ● Enterprise Architecture ● Business validation

3.3.1 Step B1: Develop a set of measures for assessing these strategic objectives

Kaplan and Norton proposed the Balanced Scorecard (BSC) as a method for managing the implementation of a strategy. It involves four perspectives are used to provide a broad view of the organization's strategy, which includes financial perspective, customer perspective, internal perspective and learning & growth perspective. (Kaplan & Norton, 1992) It is a reference framework of the performance management. The strategic objectives that cooperated with measures in the BSC can be used for assessing the performance of the chosen strategy.

Ulrich and Rosen stated, "a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome. " (Ulrich & Rosen, 2011) The capabilities should deliver the measurable value for the specific goal. And the BSC approach offered the ability for strategic objectives and measures to be married to each other, enabling organizations to better understand how the measures they were setting as targets related to and supported the organization's objectives. (Business Architecture Guide, 2014) Therefore, in order to identify what value that the capabilities should contribute to the strategic objectives, the manager could define the measures for the chosen strategy, which leads to the BSC.

According to the reasons above, to develop a set of measures for assessing the strategic objective involves the following steps that showed in Figure 323.

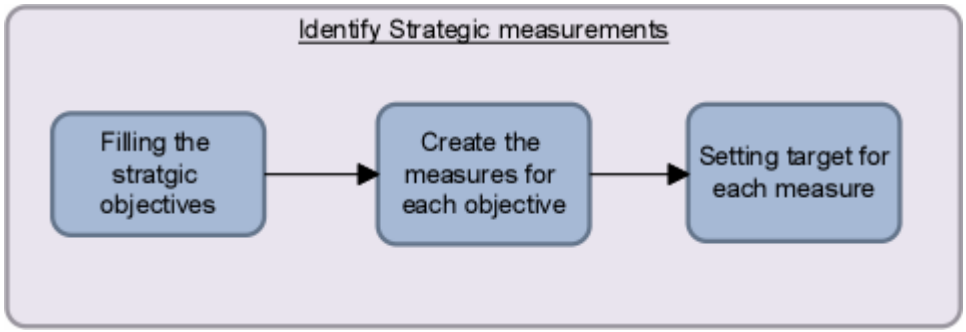


Figure 32: Sub-process of Assess: create the BSC

First, the pre-condition for creating the measures is that the organization should identify what they want to achieve with the chosen strategy, which means they need to identify the strategic objectives. In the mapping phase, the Strategy Map with the strategic objectives already identified, and they are constructed into the four BSC perspectives. Therefore, the managers only need to fill these objectives into the scorecard to complete the first step. In the second step, the manager should create the measures for each strategic objective that listed on the

scorecard. While the organization sets the strategic objectives, they describe what they want to accomplish. It turns out that the selection of measures is much easier. For example, once the customer objective is "Give the customers convenient access to the right products", based on the business analysis of the organization, the measurement could be the number of targeted customers using the online channel for transactions. (Kaplan, 2010) Kaplan and Norton observed that several organizations achieving performance breakthroughs within two to three years. (Kaplan & Norton, 2001)Therefore, to set the target for each measure can be limited in three years. Figure 33 represents the sample of the BSC.

Figure 33: Balanced Scorecard (Kaplan & Norton, 2007)

To set the right measures and targets, the managers should have a good understanding of the relationship between the desired outcomes and the related business processes. It requires the managers to gather sufficient information asset of the organization and its business. Therefore, the measures should be chosen in a way that gains the active endorsement of the senior managers of the organization, reflecting both their privileged access to strategic information, and the importance of their endorsement and support of the strategic communications that may flow from the Balanced Scorecard once designed. (Kaplan & Norton, 1992) Furthermore, the measures can be also determined in a management team by using brainstorm. The team needs to discuss whether the measures set up are SMART (Specific, Measurable, Achievable, Relevant and Timely). After identifying the measures, the managers should define baseline levels of performance for these measures, and then they can reconcile them with existing and desired organizational competencies and goals. And these scorecards can be aligned in a hierarchical way, with the strategic objectives that defined in the previous step. Therefore, the BSC can be structured like Table 7.

Table 7： BSC template

	Strategic theme	Objective	Measure	Target
Financial Perspective	**Explanation:** The Strategic themes are vertical slices across the four perspectives of the Strategy Map that describing how the strategy creates value. This part can be filled based on the Strategy Map.	**Explanation:** The Strategic objectives relate to a specific strategic theme and belong to different perspectives. Based on the Strategy Map, the cause and effect relationship among the strategic objectives should be clear. This part can be filled based on the Strategy Map.	**Explanation:** The measures are derived directly from the strategic objectives. They are used for tracking the achievement of the specific strategic objective.	**Explanation:** Targets are associated with measures to be used for tracking the achievement of the specific strategic objective. Target represents the target value of the specific measure in a certain time.
Customer Perspective				
Internal Perspective				
Learn and Growth perspective				

For example, to assess whether the organization has achieved the objective of acquiring, enhancing and retaining skilled people or not, the manager can define the measures as the following table:

Table 8 : Example BSC

	Strategic theme	Objective	Measure	Target
Learn and Growth perspective	Motivated skilled and stable workforce	Acquire, enhance and retain skilled people	Key staff retention	80%
			Recruitment drive	Ongoing
			Annual bonus pool	+20%

3.3.2 Step B2: Define Capability goals

CBP provides a method for identifying the levels of capability needed to achieve the strategy and explicitly connects capability goals to strategic requirements. Therefore, setting goals for the capabilities is setting the desired level of capability needed to achieve the stated objectives, which provides a general target for the holistic assessment of these capabilities. (TTCP, 2004) Accordingly, in order to assess the desired and the current performance level of the capabilities, the manager should determine the capability goals first, which derived from the strategic objectives, measures and targets.

As mentioned in the Mapping phase, the Strategy Map provided a hierarchical structure for mapping the strategic objectives. The financial objectives serve as the overall objective of the chosen strategy. Besides, capabilities are also hierarchical, they can be modeled as parent-child relationship, to allow the stakeholders to understand the capabilities in multiple level. (Greski, 2009)Therefore, the capabilities that linked to the financial objectives could be the high-level capabilities, which are more general and abstract. In contrast, the low level capabilities (ex. Level 3 capabilities) could be linked to the foundation strategic objectives

from the internal perspective or learning & growth perspective, which are more detail and can be decomposed as the business behavior directly. Thus, compared with the low level capabilities, the goals of the high level capabilities are more difficult to quantify and measure. The process of determining the goals of the capabilities should be bottom-up.

For example, one metric for measuring the objective of acquiring, enhancing and retaining skilled people is the recruitment drive. The target for it is the organization should keep hiring the high quality people. This measure relates to the capability of recruitment management. Depending on this specific measure and its target, the manager can define the capability goal is that the successes recruitment should support the hiring job of the organization is keep going, which can be measured by the number of positions they fill and the time it takes to fill these positions. The sample of the capability goal can be represented in Table 9:

Table 9 : Example capability goal

Recruitment management		
Related strategic objective	**Measure**	**Target**
Acquiring, enhancing and retaining skilled people	Recruitment drive	Ongoing, keep hiring high quality people
Capability goal		
The successes recruitment should support the hiring job of the organization is keep going, which can be measured by the number of positions they fill and the time it takes to fill these positions.		

3.3.3 Step B3: Define the sequence to assess the level 3 capabilities

After the capability goals have been defined, we would like to know which capabilities should be assessed and which capability should be assessed first. Capabilities could not exist alone, which could depend to each other. Danesh and Yu used *i** Strategic Dependency (SD) model to illustrate the dependency relationship among the capabilities. They used the Product Management as an example.(Danesh & Yu, 2014) From Figure 35 we could find that the lower level capabilities are part of the specific higher level capability. Therefore, the performance of the high level capabilities could be determined by its sub-capabilities. Furthermore, we find that even the same level capabilities can depend on each other. Danesh and Yu said that capabilities complement one another by fulfilling goals, satisfying softgoals, providing resources, or performing tasks.(Danesh & Yu, 2015)

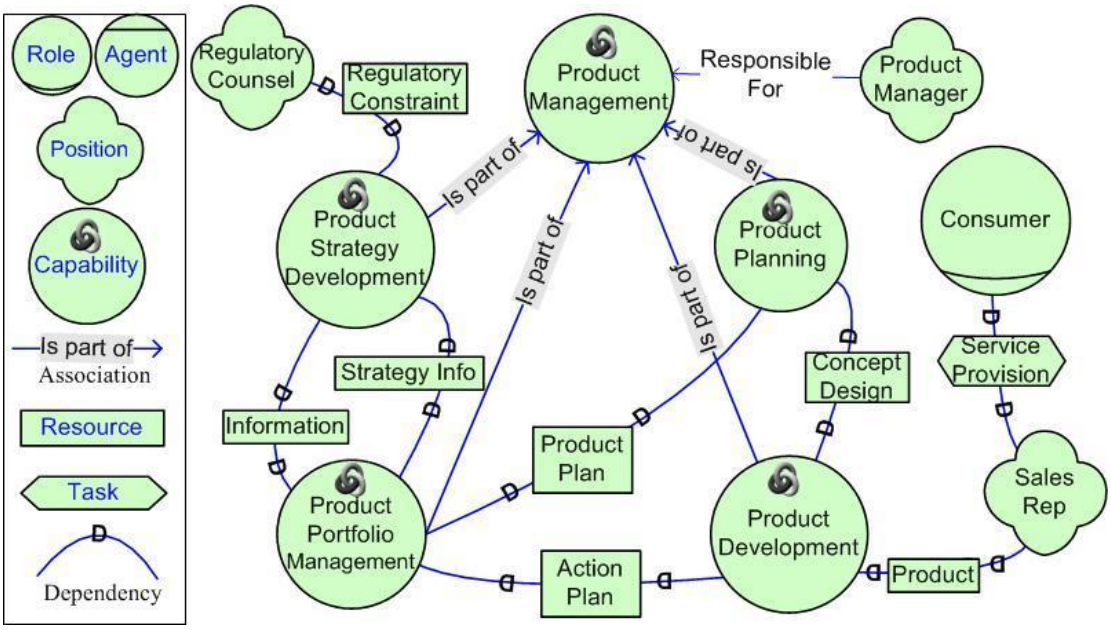


Figure 34 : Strategic Dependency Model - The Product Management Capability (Danesh & Yu, 2014)

There are some capabilities reacting directly on the strategic goal, while the others are acting more as the supported capabilities. Therefore, we could assess the capabilities that are directly reacting on the strategy. If these capabilities are underperform, we can go for the further investigation.

The dependency relationships between different capabilities can be illustrated by ArchiMate language. Figure 35 is the example to use ArchiMate to present the dependency relationships between the capabilities. As shown in this figure, the recruitment management presents the ability of the organization to hire the skilled employee, it could help the organization to assign the project manager, which could be seemed as the human resource that assign to the project planning. Therefore, the recruitment management is used-by the project planning, which can be seemed as the support capability while the project planning is more relating to the strategic goal.

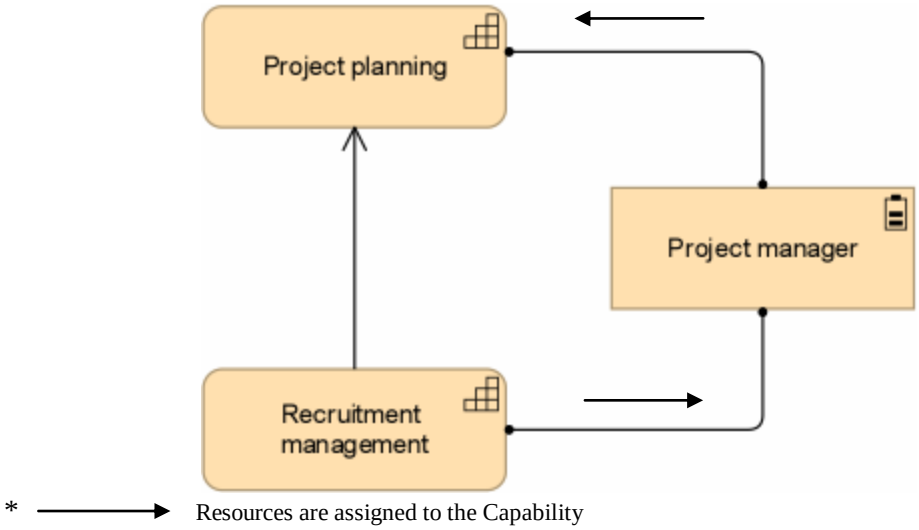


Figure 35: Example capability dependency relationships

When the Recruitment management has been defined as the supported capability and the

project planning is more strategic related, the organization should assess the project planning first. If the project planning is underdeveloped, the organization could have further investigation. On the other hand, if the project planning achieves the desired performance, it means the supported capabilities are providing the desired value to it and they might also achieve their target.

3.3.4 Step B4: Assessing the capabilities

As mentioned in the previous section, the high-level capabilities are too general to assess. Therefore, the assessment of capabilities should follow the bottom-up sequence. More specific, the performance level of the parent capability is determined by its child capabilities.

Therefore, depending on the capability goals and the analysis of the organization's information assert, the manager could create the several metrics to define the performance of the capability. Since even the level 3 capabilities somehow are too general to assess, the capability should be measured by its detail business.

Figure 36 shows the sub-processes of assessing the capabilities. Since assessing the performance of the capabilities is a main part of phase B, this step B3 will separate into different sections to discuss:

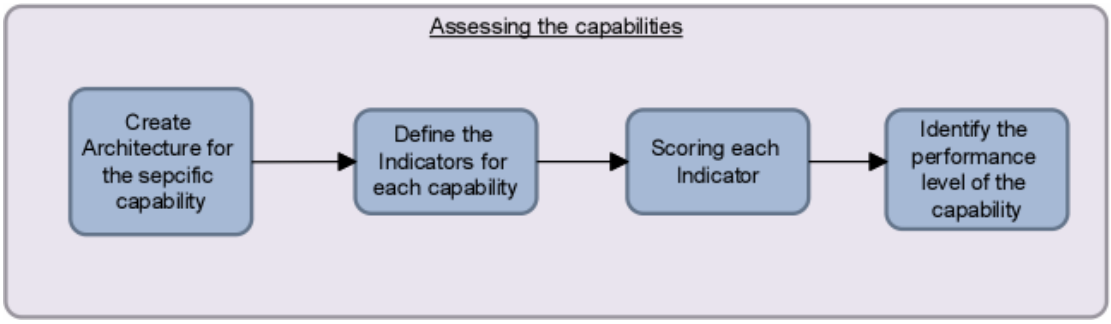


Figure 36: Sub-process of assessing the capabilities

3.3.4.1 Create architecture for the selected level-3 capability:

There are two stages performance level of the capability are needed to be assessed. In order to better describe the assessment process, this paper will show how to find the desired level of the select capability and use the recruitment management as an example.

The first step in assessing the target capabilities (Level 3) is to construct the target architecture for the selected capabilities.

Capabilities are the building blocks of the enterprise, and the business capabilities are a combination of business process, people, technology and assets that aligned with strategic objectives (Malan, Bredemeyer, Krishnan & Lafrenz, 2006) Moreover, if the level 3 capabilities are the lowest level capabilities, it can be expressed directly by the behavior, which could be decomposed into business process, functions and/or services, and the realization of a capability occurs from the bottom up, with the contribution of organizational assets and behavior.(Papazoglou, 2014) Since the Enterprise Architecture (EA) could provide a long-term view of a company's process, systems, and technologies so that individual projects can build capabilities. (Ross, Weill & Robertson, 2006) Therefore, together with these elements, the manager can use the EA to represent a capability.

Aldea et al. defined the CBP extension metamodel (Figure 20 in chapter 2.3.3) to show how the capability and metric concepts can be related to ArchiMate.

In Figure 20 that shown in chapter 2.3.3, the metamodel shows that the capability can be realized by the plateau. A Plateau is defined as a relatively stable state of the architecture that exists during a limited period of time. (The Open Group, 2013) Papazoglou said that the plateau could be assigned to the concept of capability increment. At any certain point in time there is an architecture that realizes a version of a given capability, which could be also the target architecture that represented a fully developed capability.(Papazoglou, 2014)

Another figure, which is Figure 16, shows the ArchiMate core elements that could be aggregated to a plateau then to realize a capability. A capability can be a way in which enterprise combines resources, competences, information, processes and their environments to provide value to stakeholders and achieve the target architecture.(Aldea et al., 2014) The AchiMate core elements compose the behavior elements, application, device and business role concepts are associated with the concept of the capability. Therefore, by using EA to represent a capability could help the manager to align the business behavior, application and device as a specific indicator to the capability. For example, the target architecture of the recruitment management can be represented as Figure 37. From this figure, the manager can have a better understanding of the business process and the supported technology and the device that could be used for realizing the desired performance of the capability. The Recruitment management increment 2 represents the target version architecture of this capability. This increment is realized by the target plateau.

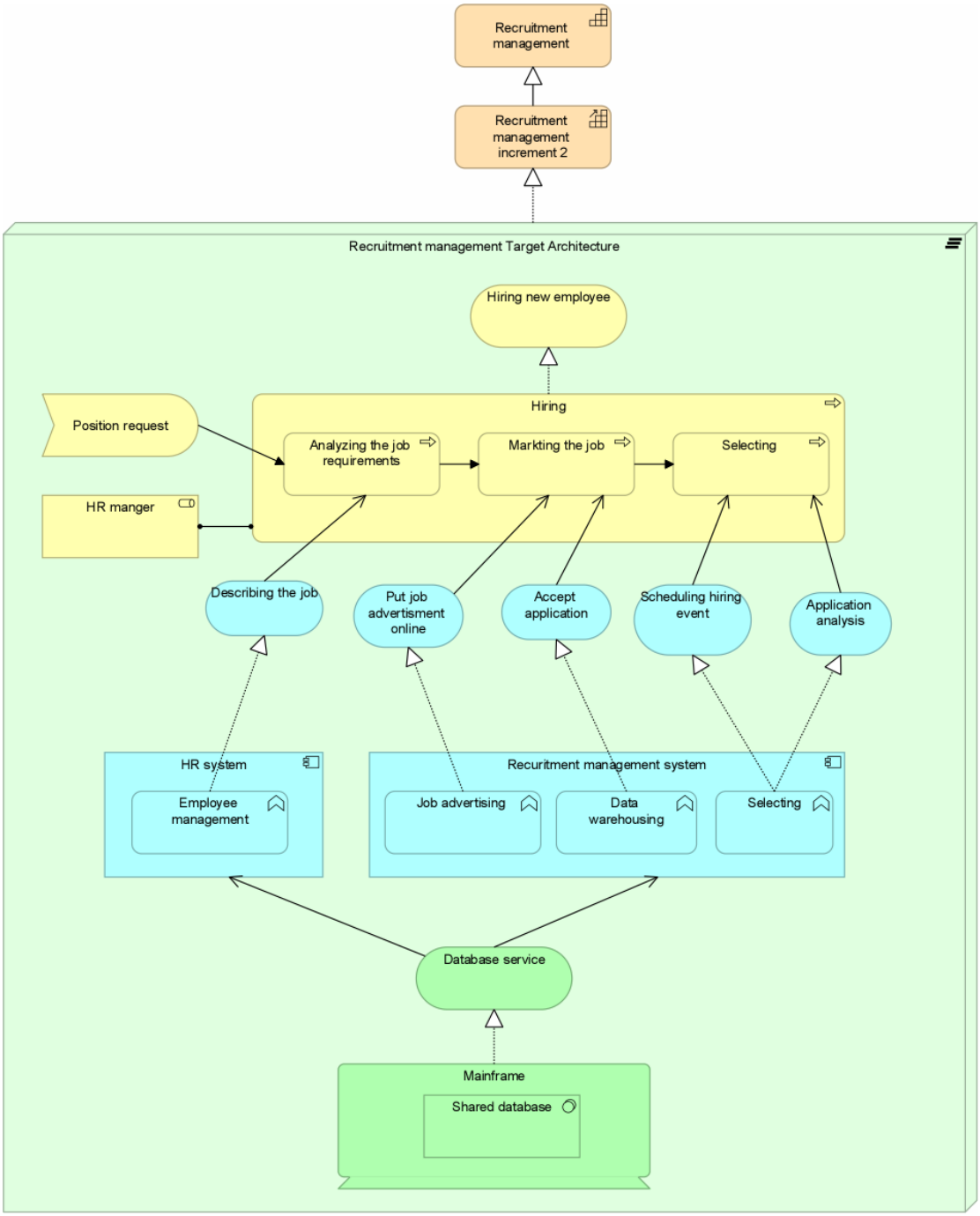


Figure 37 : Example target architecture of the recruitment management

In this step, the manager creates the target architecture to represent the fully developed version of this capability, which could fulfill the requirements to achieve the capability goal.

3.3.4.2 Define the indicators for the capability:

The next step of assessing the target capabilities is to define the specific indicators for each capability. These indicators are derived from the capability goal, and should be aligned to the general capability dimensions.

The Open Group defined the capability could be realized by the capability increments, which

could be separated into several dimensions. Every organization has a different but similar set of dimensions. (TheOpenGroup, 2012) However, according to the concept that defined by Icaob et al., the capability is the ability of an organization to employ resources to achieve some goal.(Iacob et al., 2012) Therefore, in general, the capability can be decomposed into the three major dimensions that represented in Figure 14 in chapter 2.3.2, which includes people, process and material.

Azevedo et al. said that the capability is realized by the behavior elements and the resources assigned to capability. (Azevedo et al., 2013) Behavior element that related to the capability can be decomposed like Figure 38, which shows the process is part of the capability and the services that delivered value to the capability are depending on the process. Therefore, the behavior element of the capability can be assessed by the business process.

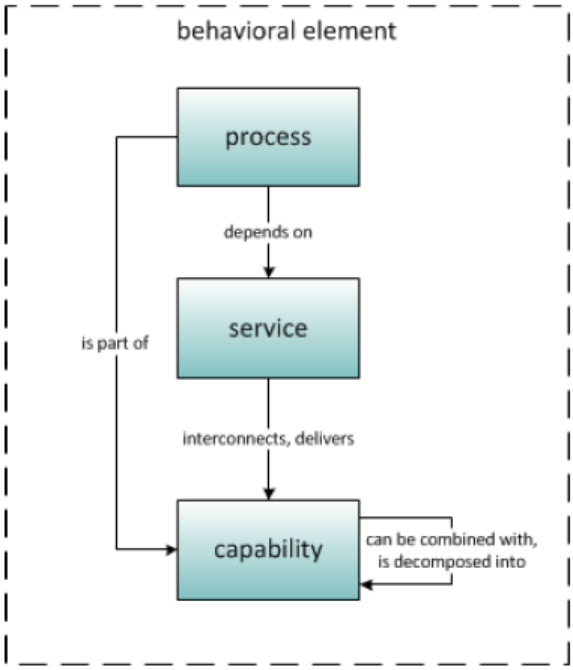


Figure 38 : Decomposition of the behavioral elements (Papazoglou, 2014)

From the resource-based view, there are multiple types of key resources that the firm can use to achieve its capability, which involves human resources, organizational resources, financial resources and the physical resources. (Barney, 1991) The material is one part of the resource but cannot represent the whole resource concept. Therefore, Grant defined the resources can be assigned to capability can be defined like Figure 39.

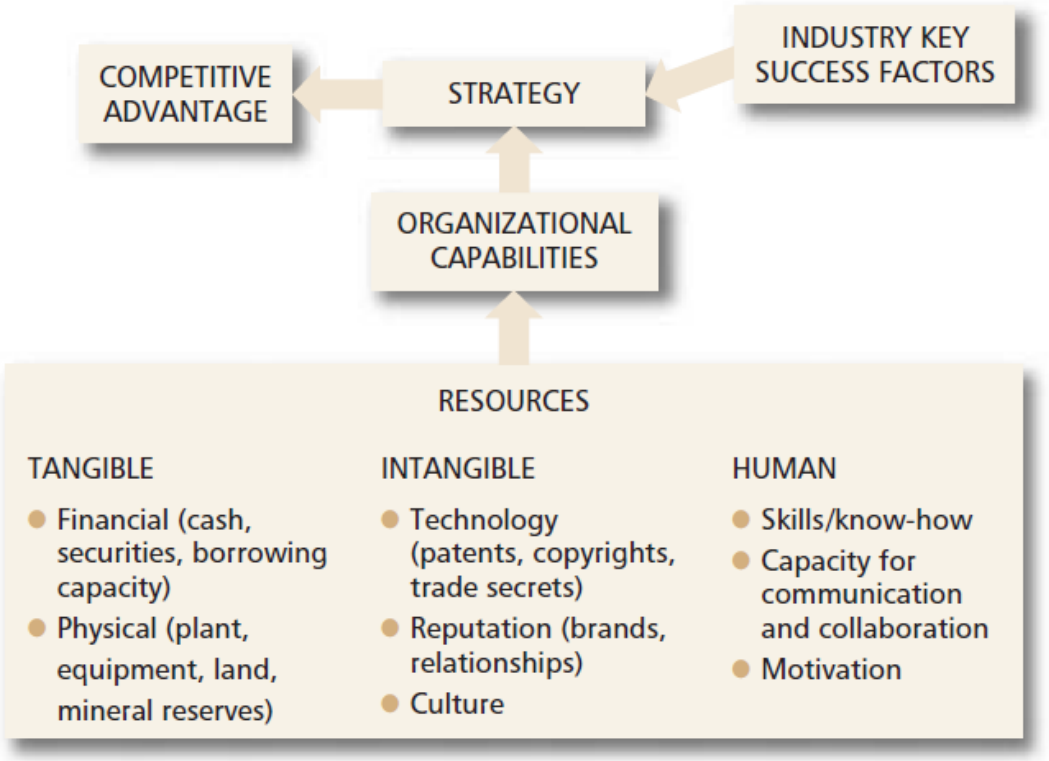


Figure 39 : The links among resources, capabilities, and competitive advantage (Grant, 2010)

Since there are some capabilities are barely interacting with the external environment, the value that contributed by reputation is hard to find. Barney has defined the organizational resources could combine Reputation and culture, which is more suitable for our case. Therefore, the manager can assess the maturity level of the capability through assessing the following dimensions:

Process: The process for the capability in an organization is the business process. A business process is defined as a behavior element that groups the behavior based on ordering of activities. It is intended to produce a defined set of products or business services. (TheOpenGroup, 2013)

Financial: The financial resource as a tangible asset could include the cash, securities and borrowing capacity etc. It is valued in the firm's financial statement and provides the ability for the organization to support the business implementation.

Physical: The Physical resource is tangible, and it could involve the plant, equipment, land, mineral reserves, etc. Most of the capabilities will be relied on certain physical resource.

Technology: Grant defined the technology resource could involve patents, copyright and trade secrets, and it is intangible and could be seemed as the intellectual property of the organization. For any certain organization, the intellectual property is the key source that provides market value. In this study, to identify how the technology resource contributes to the capability will also involve the application as one kind of technology resource of an organization.

Organizational: It includes a firm's formal reporting structure, its formal and informal planning, controlling, and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment (Barney, 1991) This

could include Reputation and Culture resource that defined by Grant. The reputation resource for an organization could be the relationship with the public, customers, even for its competitors. And the brands and other trademarks are also valuable as the reputation resource. The reputation resource is intangible and sometimes it is even more valuable than the tangible resource. For example, the potential candidates are more willing to find a job in a good reputed organization, and it can make the process of recruitment management easier.

For the culture resource, Grant claimed that the culture as a resource was hard to define. It relates to an organization's values, traditions, and social norms. When culture to be treated as one kind of intangible resource, it can be defined as the organizational context as it affects internal collaboration of all the employees. It can be reflected by the managerial skill and the way the organization conducts their business.

Human: Human resource can be also seemed as the intangible asset of an organization. It is the expertise and effort that offered by the employees. To understand how the human resource contributes to the organization requires identifying the set of skills, content knowledge, attitudes, and values associated with the employees.

However, there is one problem of evaluating the resource. The same resource could be used by multiple capabilities. Therefore, Grant mentioned that the primary goal of resource analysis is not to value a company's assets, but to understand their potential for creating competitive advantage, which is contributed by their capabilities. (Grant, 2010) For example, while evaluating the tangible resource of the capability, there are two questions:

1. What opportunities exist for economizing on their use?
2. What are the possibilities for employing existing assets more profitably?

Similar to the analysis of the tangible resource, irrespective of intangible or human resources, the manager needs to assess the value of the resource contribution to capability. It is important to be noted that the manager should not analyze the resource itself, since the resource can be shared.

Therefore, the manager can have a better understanding of the structure and business elements of the capability after he/she create the target architecture to represent the capability. After that, the manager can identify the specific indicators to evaluate the capability, which should be aligned to the structure that shows on Figure 40.

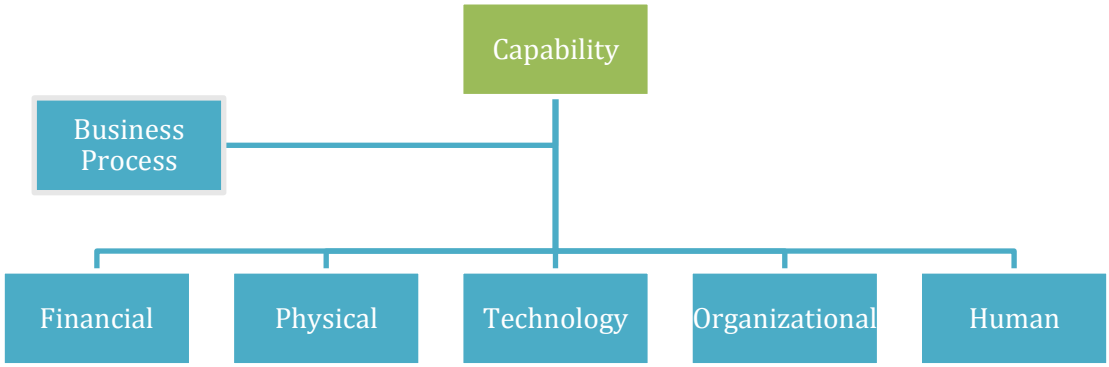


Figure 40 : Capability dimensions

For example, for supporting the recruitment management, the organization should have a set of functional application to handler the related business process. Therefore, the organization has a set of functional applications, which includes website, recruitment management system, could be one indicator for assessing the performance of recruitment management. And this

indicator is related to the technology dimension.

3.3.4.3 Determine the performance level for each indicator:

The purpose of this step is to determine the target performance level for each indicator. The target performance levels are derived from the capability goal, which is required to achieve the strategic objective.

The capability can be divided into seven dimensions and each dimension has their own scoring principles. Since these indicators are aligned to different capability dimensions. To determine their performance level, the manager should follow different rules. In this study, the Indicator specification table will be used for assessing the value of the indicator, in order to find the performance level of the specific capability dimension.

A. Indicator Specification Table

Capabilities are engineered/generated taking into consideration various dimensions. (TheOpenGroup, 2012) In the previous section, this study defined that the capability dimensions could involve: Process, Finance, Physical, Technology, Reputation, Culture and Human. In order to evaluate the Capability maturity level more precisely, it is necessary to define a set of indicators to assess the performance of the capability. And these indicators should be derived from the capability goal, and could be aligned to the general capability dimensions.

To assess these specific indicators, an indicator specification table is defined. This indicator specification table should act as a tool that the organization can use to precisely describe an indicator and represent and construct the relevant measurement data. The final outcome of the table defines the indicator performance level of a specific capability dimension. It represents how well this capability performs in a specific dimension. To combine all the performance level from the entire capability dimensions, the manager can create a capability increment spider chart to represent the capability's performance in a certain point.

B. Basic components of the table

The overall performance level of a capability is depending on the performance level of its entire capability dimensions. Therefore, this study uses the indicator specification table that contains all the required attributes to define and explain the value of the indicator, and related this value to the performance level of the specific capability dimension.

To define the indicator specification table, this study uses EAM KPI Catalog (Matthes, Monahov, Schneider, & Schulz, 2012) as a reference and combine the Key Performance Indicator (KPI) assessment measurement criteria that defined by The State of Victoria (The State of Victoria, 2010).

Table 10: Sample Indicator Specification Table

Indicator	**The title of the indicator**
Capability dimension	To which capability dimension that the indicator evaluate
Indicator specification	Explaining the indicator in details. For example, the goal of the indicator.
Measure	Specify the measuring unit or/and formula.

Target value	The ideal value of the indicator
Worst value	The worst outcomes of the indicator could contribute
Tolerance value	The worst outcomes that the indicator can have
Current value	The actual value of the indicator
Method	The ways that the owner of this indicator to gather the related information and measure the indicator.
Owner	The one who is responsible for this indicator.
Performance level	Which represents the performance level of this capability dimension

Indicator: The Software Engineering Institute (SEI) defines an indicator as a representation of measurement data that provides insight into software development processes and/or software process improvement activities. (Goethert & Siviy, 2004) The concept of the indicator for software development can be also adopted in assessing the capability dimension, which represents a specific measurement for identifying the degree of the progress.

The indicator is used for evaluating the performance level of the capability dimension, which represent the quantifiable or measurable outcomes and the real business value of the specific capability dimension of the capability.

Indicator specification: To identify the indicator as a benefit, what the goal it has and how it can contribute the value to the capability. Especially, how it affect the implementation of the business process of the capability. It could affect the business behavior of the capability or the resources that are used to support the capability.

Measures: The measures that defined in this table should be capable to measure the required information and to identify the value of the indicator.

Ward et al. stated that the benefits of a business case could involve: financial benefit, quantifiable benefits, measurable benefits and observable benefit. (Ward, Daniel, & Peppard, 2008) This category of benefit is shown below, which can be adopted in assessing the indicator's value.

		Type of Business Change		
		Do New Things	Do Things Better	Stop Doing Things
High ↑ Degree of Expli-citness ↓ Low	Financial Benefits	Financial value can be calculated by applying a cost/price or other valid financial formula to a quantifiable benefit.		
	Quantifiable Benefits	There is sufficient evidence to forecast how much improvement/benefit should result from the changes.		
	Measurable Benefits	Although this aspect of performance is currently measured, or an appropriate measure could be implemented, it is not possible to estimate how much performance will improve when changes are implemented.		
	Observable Benefits	By using agreed criteria, specific individuals or groups will use their experience or judgment to decide the extent the benefit will be realized.		

Figure 41 : Classifying Benefits by Their Degree of Explicitness (Ward et al., 2008)

Not all the indicator can be measured by a formula and transfer the value into a specific

number. Based on Figure 41, the most explicitness benefit is the financial benefit, which means the financial value is the most explicitness benchmark to evaluate the performance level of the capability dimension. Therefore, when the owner selects the way to measure the indicator, he/she can follow the top-down sequence from this figure to make the result more reliable.

The indicator involves certain metric to evaluate the performance of the specific capability dimension. The common metrics that could be used for evaluating the indicator includes: reducing cost, quality, efficiency, time etc.

Value: The value provides an evidence for the owner to determine the performance lever of the capability dimension. It involves the **target value**, **worst value**, **tolerance value** and the **current value**.

The **target value** is the ideal value of this indicator, which is corresponding to the performance level 5 of this capability dimension.

The **worst value** is the worst result of this indicator. However, 0 represent that there are no resource and process to support this capability dimension. Therefore, the worst value is corresponding to the performance level 1.

Both **target value** and the **worst value** of the indicator provide a benchmark for the indicator owner to evaluate the performance level of the specific capability dimension.

The **tolerance value** is more related to the decision criteria, it will not correspond to a certain performance level of the capability dimension. It represents that if the actual value of this indicator is lower than this, the low performance of this capability dimension will highly affect the whole the entire capability.

The **current value** is the actual value that the indicator performs. If the manager is assessing the target capability, the current value represents the desired/planned value of this indicator. The performance level of this capability dimension that related to this indicator is the desired performance level.

Method: It is the analysis method that the owner uses to assess the value of the indicator. It also includes the source that the owner gets the input data.

Owner: It is similar to the definition of actor in the capability assessment framework. It is the person or business unit who is responsible for the value of this capability dimension.

Performance Level: The performance level is represented as a score. The scoring standards for each capability dimension are different and it can be identified based on the value of its indicator. However, they all represent how well the capability dimensions perform and the value that they contribute to the entire capability. The details of how to leverage the performance level for each capability dimension are described in the next section. The range of the score is [0, 5], the meaning of the score can be simply represented as follows:

- 0: None
- 1: Initial
- 2: Under development
- 3: Defined
- 4: Managed
- 5: Optimizing

It is important to realize that the desired performance level of the capability dimension is not

necessary to reach the highest score. The required performance level of a specific capability dimension is good enough to support the capability achieves the desired capability performance level.

C. Performance assessment for each capability dimension

The reason for the manager to define the target value and the worst value of the specific indicator is to set up the benchmark for the manager to evaluate the performance level of the capability dimension. In this study, the capability can be divided into seven capability dimension. Each of the capability dimension represents different value that the process and resource that can contribute to the capability. Therefore, the way that the manager estimates the performance level for different capability dimension should based on their specific characteristics.

The US Department of Commerce (DoC) adopts the concept of CMM and creates the Architecture Capability Maturity Model (ACMM) to evaluate the key component of the IT architecture process. They proposed the two dimensions framework to align the maturity model and the characteristics of the EA together, which could be also suitable for this study. Therefore, this study would like to use the US DoC ACMM as a reference (DoC, 2003), to make the link of the performance level and the capability dimensions.

Table 11 shows the sample capability performance assessment framework, which includes:

- Performance level partition: the performance level of the capability can be scored from 0 to 5.
- Capability dimensions: it involves process, financial, physical, technology, reputation, culture and human.

Table 11 : Capability performance assessment framework

Capability dimensions	Level 0: No capability	Level 1: Initial	Level 2: Under development	Level 3: Defined	Level 4: Managed	Level 5: Optimizing
Process	Not established or does not exist.	Processes are ad hoc and chaos.	Basic processes are organized. The processes are standardized and repeatable. They are built based on the experience from the similar projects, which are not unique.	The processes are well defined and communicated to the owner and the related staffs while the business is running. The processes are defined based on specific requirements.	There are quantitative goals for the processes execution. The processes are part of the business culture. Quality metrics are associated with the processes. In this performance level, the organization can predict the trends of the processes.	The organization addresses the processes variation and the processes improvement as the most important topics. To improve the performance of the processes and achieve the quantitative objectives.
Financial	No financial support for executing the related business.	Limited budget to support the business process.	Enough budgets with a little governance for the spending to support the related business.	Enough budgets with good governance of the spending for the related business.	Sufficient budgets. All the spending is planned and guided by the business requirements. Furthermore, the spending is under control, which is based on the feedback received from the implementation.	Sufficient budget. All the spending is planned and guided by the business requirements and the feedback of the implementation. It supports the variation of the business process and allows the organization to make the improvement of the capability.
Physical	No required equipment is	Difficult to use or/and with a high	The organization has the basic equipment	Specific equipment and location for the	The organization understands all the	The physical resources are

	involved in business process.	repair rate of the equipment.	and plant to support the related business.	related business.	potential capacity of the equipment and uses them to create business value.	contributing to the efficiency of the related business.
Technology	No intellectual property and the required application are involved in business process.	Limited intellectual properties or/and application is not good enough to support the business.	The organization has the knowledge and/or application to support the related business.	Specific knowledge and/or application for the related business.	The knowledge and/or the applications of the organization are updated. They improve the business value of the organization.	The knowledge and/or applications are updated. They have been sufficiently used and they are contributing to the efficiency of the related business.
Organizational	None. No communication exists between different business units.	Limited communication with both internal and external business units and/or no standards for the business units to implement their tasks.	Documented standards and some sort of communication exist between the internal and external business units	The way of the internal collaboration becomes a specific organizational culture. And the communication with internal and external business units works well.	Standards become a business culture. The culture encourages the employees to work with each other. And the relationships with the internal and external environment contribute to the business value.	The formal or informal standards are update regularly in order to adjust the change of internal or external environment. And the relationships with the internal and external environment become a competitive advantage of the organization.
Human	No participants involved in the business process.	The operating units do not have adequate skill. And/Or no enough participants are involved in the business process.	The organization has adequate skilled and motivated people to support their business.	Adequate skilled and motivated people are specifically assigned to the specific task.	Experienced, motivated and high skilled employees are assigned to the related business. There is an	The experts and experienced, motivated employees are facilitating the improvement of the business

					efficiency training system to improve the knowledge and skill of the employee to adapt the change of the environment.	performance.

After the manager estimated the value of the indicator based on the specific metrics, the target value, worst value, tolerance value and the current value have been decided. Based on these values of the indicator, the manager could define the performance level of the specific capability dimension more preciously.

D. Create the spider chart to present the capability increment

Once the target performance levels of each capability dimension have been identified, the target capability increments for the capability can be plotted on a spider chart as pictured in Figure 42. From Figure 42 we can find out the expected performance levels of the recruitment management for each capability dimension are: Process (4), Human (4), Financial (3), Physical (2), Technology (4), and Organizational (4). In the beginning, only the target capability increments will be represented. The current performance of each capability dimension will be identified later.

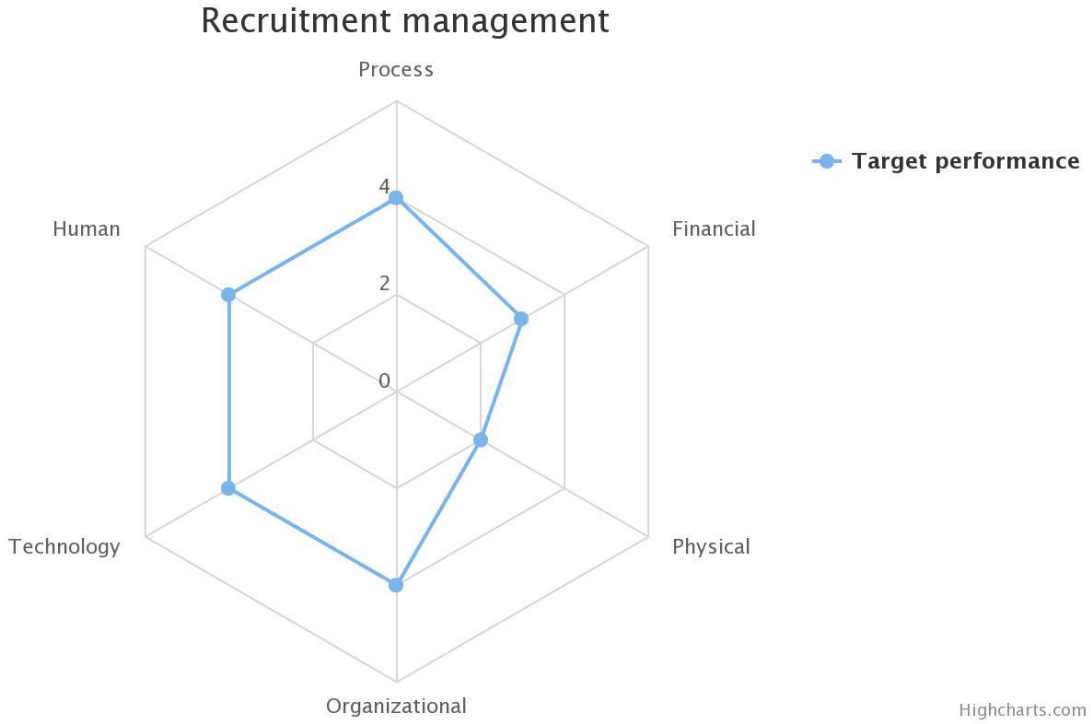


Figure 42 : Example target capability spider chart

The performance level of the spider chart presents the same meaning that defined before, it can be defined from level 0 to level 5, which is shown below. To determine the performance level is achieved by assessing each capability dimension against the specific indicators.

- 0: None
- 1: Initial
- 2: Under development
- 3: Defined
- 4: Managed
- 5: Optimizing

3.3.4.4 Identify the performance level of the capability:

In Capability-based planning, the Capabilities should be measurable. Therefore, it is necessary to define the metrics/indicators to measure the selected capabilities. (Aldea et al., 2014)

In order to answer the question "how to define metrics based on strategy to assess capabilities", this study proposes to use the Capability assessment framework to map the indicators with the capability dimensions to facilitate the process of capability measurement.

CBP is output oriented that should have a high-level objective that derived from the strategy. For each capability, they need support or facilitate the organization to achieve their strategic objectives to get the desired outcome of the chosen strategy. Therefore, each capability has its capability goal that is determined by the related strategic objective.

TTCP said that goal setting provides the means for setting the desired level of capability needed to achieve the stated objectives. (TTCP, 2004) It describes the desired competitive advantage that the capability should deliver to the strategy. However, even the level 3 capability is hard to be quantified and/or measured. Therefore, defining the indicator for each capability dimension can help the organization with assessing the current and desired performance of the capability in the detail level, which could facilitate the assessing progress.

A. Capability assessment framework

As mentioned in chapter 3.2.2, after setting the capability goal, the manager should start assessing the desired performance of selected capability. The manager should know that how well the performance level of the capability should reach in order to contribute the desired value to the organization.

Capabilities are hierarchical. They can be modeled as parents and child relationship. (Greski, 2009)Ulrich and Rosen suggested that the capability can be decomposed into three levels and the level 3 capability can be linked directly to the business process and the resource that it uses. (Ulrich & Rosen, 2011) Therefore, this study proposes a Capability assessment framework as a tool to assess the level 3 capability through assessing its each capability dimension, which can be related to the specific business process.

B. The basic components of the framework

In order to create the Capability assessment framework to support the level 3 capability assessment, the general capability dimension should be defined.

Iacob et al. have defined Capability as the ability (of a static structure element, e.g., actor, application component, etc.) to employ resources to achieve some goals (Iacob et al., 2012). And Azevedo et al. also proposed that the capability is realized by the behavior elements and the resources assigned to a capability. (Azevedo et al., 2013) Therefore, the capability could be divided into two major dimensions, which are behavior and resource.

Capabilities are engineered/generated taking into consideration various dimensions that straddle the corporate functional portfolios. (TheOpenGroup, 2012) As mentioned before, Grant defined that the resources can be aligned to the capability includes tangible asset

(financial, physical), intangible asset (technology, reputation, culture) and human, these resources are required to provide a capability. Furthermore, Rosen said that business processes described how the business performs, or implements, the given capability, and how capabilities connect to deliver a desired outcome. (Rosen, 2010) When the capability gets down to level 3, it can be mapped directly to the business process. Therefore, this study defines the capability dimensions include: Business process, financial, physical, technology, reputation, culture and human.

Combined with the capability dimensions, the Table 12 shows the Sample structure of the Capability assessment framework. This framework allows the organization to use the indicators to assess the performance of each capability dimension.

Table 12 : Sample Capability Assessment Framework

Capability title	**Level 3 capability's name**		
Description	The short description of what the capability does		
Capability Goal	The value that the capability deliver to the strategy		
Actor	The stakeholder that related to the capability, normally, it is the one who responsible for the execution of the capability.		
Capability dimension	Indicator	Attractiveness score	Performance level
Process	The specific indicators that can be used for measuring the performance level of the capability	To represent the importance level for each capability dimension	The performance level for each capability dimension
Financial			
Physical			
Technology			
Organizational			
Human			
Capability performance level	The capability performance level is using the capability maturity level as a reference. It shows the ability of the capability to achieve the desired outcomes of the organization.		

The explanation of the basic components of the Capability assessment framework shows below, to help the users have a better understanding of this framework:

Capability goal: The capability goal describes expecting contribution of the selected capability. It is derived from the objective, measures and target of the strategy. Therefore, the capability goal is the linkage between capability and strategy in the Assess phase of CBP.

Actor: The concept of the actor here is similar to the definition of the business action that is defined in ArchiMate core. An actor can be seemed as an organizational entity that is capable of performing capability. It could be business units, people and any other business entity that can perform the capability. (The Open Group, 2013)

Capability dimensions: The reasons for using these seven attribute as the capability dimension is already explained in the previous section. These capability dimensions include the business behavior and the necessary resources that are possible delivering the value to the capability.

Indicator: The Indicators are determined by the static attributes of the capability. The indicators should be fixed for the capability dimensions, which are used for evaluating the performance level of the specific capability dimension.

Attractiveness score: Not all the capability dimensions contribute the same value to the capability. Therefore, Grant proposed to appraise the strategic importance of resource and capability can use two dimension analyses. First, to assess the importance, second, to assess the relative strengths. (Grant, 2010)

In this study, we would like to use the attractiveness score to determine the importance level of each capability dimension. The attractiveness score is adopted from QSPM method (David, 1986), it can be used to represent the importance and the contribution of each capability dimension to the capability. The attractiveness score can be divided into five dimensions. To determine the score of the capability dimension is depending on the experience, knowledge of the decision-makers.

- 0: Not relevant
- 1: Not attractive (Not important)
- 2: Possibly attractive (Somehow important)
- 3: Probably attractive (Important)
- 4: Most attractive (Very important)

Indicator performance level: The concept of the indicator performance level is related to the capability maturity level, to define how well the behaviors, practices and processes of an organization can reliably and sustainably produce required outcomes. (CMMI Product team, 2006) And Succar et al. did the research about different maturity level that can be used for leveraging the capability or process can be divided into level 1 to level 5. Some of them have the level 0 to represent a non-exist or incomplete process. (Succar, Sher, & Williams, 2012)Therefore, the range of the indicator performance level that is used in this study will be also divided into 1 to 5, and use the 0 to represent the missing capability dimension.

- 0: None
- 1: Initial
- 2: Under development
- 3: Defined
- 4: Managed
- 5: Optimizing

To be noticed, the indicator performance level will not evaluate the value of the resource or process itself. It is used for assessing how well these resources and process support the actor to perform the capability.

Furthermore, there should be a **tolerance performance level** for each capability dimension. For example, to achieve the capability goal of the recruitment management, the desired performance level of its physical dimension is 2, which represents that the HR managers can use computers to perform their responsibilities. For this capability, both of the required performance level and the significant level of the physical dimension are low. However, if there is no computers can be used by the HR manager, the whole business process of the recruitment management will be ruined, which highly affect the capability maturity level.

Capability performance level: The capability performance level is used for evaluating the degree of the overall performance of the capability. Capability and capability dimensions are parent-and-child relationship. The desired capability performance level is depending on the indicator performance level of all the dimensions.

To combine the performance level of all the capability dimensions with their attractiveness score, the manager can calculate the overall performance level of the capability. The formulation is shown on Figure 43:

Capability performance level:

$$P = \sum_{i=1}^{N} P_i A_i \Big/ \sum_{i-1}^{N} A_i$$

*P: Capability Performance level
P_i: Performance level for each capability dimension
A_i: Attractiveness score for each capability dimension
N: The total number of capability dimensions

Figure 43 : Formulation for calculating the overall capability performance level

Similar to the performance level that used for the specific capability dimension, the overall capability performance level can be divided from 0 to 5. In order to assign the capability performance level into specific color that used in the capability heat map, each level has a certain range for the score.

The concept of the capability performance level is relevant to the capability maturity model (CMM), which because CMM address the problem of managing the change of process. It provides an assessment model for the organization to determine the level at which the organization currently stand. It indicates the organization's ability to execute in the area that they concern. (The Open Group, 2011) The original CMM aims at improving the existing software-development processes, but it can be also be applied to other process.

The CMMI Product Team address that the three critical dimensions are: people, procedures and methods, and tools and equipment, and the relationships among them are shown below:

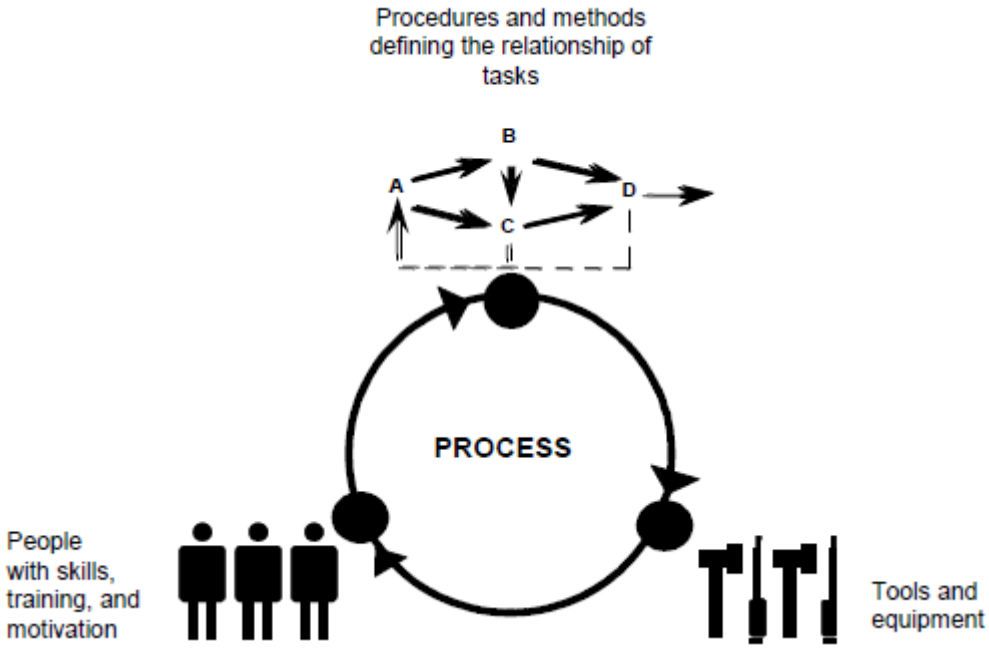


Figure 44 : The Three Critical Dimensions (The CMMI product team, 2006)

The CMM analyzes the maturity level based on the process because the processes allow you the way you do business. They allow you to address scalability and provide a way to incorporate knowledge of how to do things better. Processes allow you to leverage your resources and to examine business trends. (The CMMI Product Team, 2006)

Since capability reflects the structure of a business and abstract from processes, resources and people that are required to provide the capability. (Klinkmüller, Ludwig, Franczyk, & Kluge,

2010) The structure of the capability can be also aligned to Figure 45. Therefore, the meaning of capability performance level could be related to the definition of the maturity level.

Thus, the capability performance level can be represented as Table 13:

Table 13 : Framework of Capability performance level

Capability performance level	Score range	Representation on the Capability heat map	Definition
Level 0: None	[0, 0.5)		The performance level of the capability is too low to allow the organization to execute the capability.
Level 1: Initiate	[0.5, 1.5)		The processes of the capability are usually ad hoc and chaotic. (The CMMI product team, 2006) The organization usually does not provide a stable environment and sufficient resources to support the processes.
Level 2: Under development	[1.5, 2.5)		The processes are planned and executed in accordance with certain standards. It involves the skilled people and the required resources to produce controlled output. (The CMMI product team, 2006) In this level, the capability is repeatable and is not specific to the organization's needs.
Level 3: Defined	[2.5, 3.5)		The processes are well characterized and understood, and are described in standards, procedures, tools, and methods. (The CMMI product team, 2006) In this level. The process, resources of the capability are particular suiting for the organization's requirements and the related strategic objective.
Level 4: Managed	[3.5, 4.5)		The organization and projects establish quantitative objectives for quality and process performance and use them as criteria in managing processes. (The CMMI product team, 2006) Quantitative objectives are based on the needs of the customer, end users, organization, and process implementers. Quality and process performance is understood in statistical terms and is managed throughout the life of the processes. (The CMMI product team, 2006)
Level 5: Optimizing	[4.5, 5]		The organization continually improves its processes based on a quantitative understanding of the common causes of variation inherent in processes. (The CMMI product team, 2006) Which means

			the concept of life cycle is involved in the capability. Capability will be continually improved and change based on the feedback of the capability implementation result.

C. Create the capability heat map

In this step, the manager identifies the target capability performance level. It represents that the performance of this capability should be in this level then the organization could achieve the related strategic objective.

The capability maturity level could be depicted in the capability heat map. Ulrich and Rosen proposed the concept of "heat map". Certain Level 3 capabilities can be coded or marked as underperform (yellow) or in serious need of attention (red). Those capabilities performing as expected are shown as green, while those capabilities with no color designation have either not been evaluated or are not of interest. (Ulrich & Rosen, 2011) In this study, the capability performance has been divided into five levels. Therefore, this capability heat map should involve five different colors, which are: Initial (Red), Underperform (Orange), Defined (Yellow), Managed (Blue), Optimizing (Green). And just like the heat map that defined by Ulrich and Rosen, the manager can use no color or white to represent the missing capability. Figure 45 shows the sample level 3 target capability heat map that related to the objective that the organization should acquire, enhance and retain skilled people, which includes Employee performance assessment (Managed), Training (Defined), Recruitment management (Defined), Compensation and benefit (Managed), Employee relationship (Optimizing):

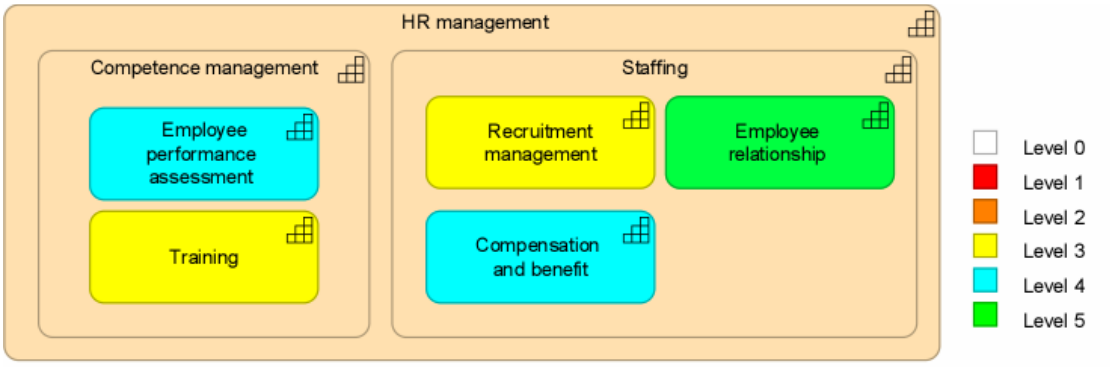


Figure 45 : Example Level 3 target capability heat map

3.3.4.5 Assessing the current capabilities

The process and techniques that used for assessing the current capabilities is the same as the assessment of the target capabilities, except for the input data. The desired performance of the capability is derived from the strategic objective, while the current performance of the capability is determined by the organization's current situation. Instead of using capability goal as the data input, the manager should gather sufficient relevant information to understand how good the current capability it is.

The first step is to create the baseline architecture. Using EA to represent a capability could help the manager to align the business behavior, application and device as a specific indicator to the capability. Furthermore, at any certain point in time there is an architecture that realizes

a version of a given capability (Papazoglou, 2014), which could be the baseline architecture that represents the current situation of the capability. For example, Figure46 shows the baseline architecture of the recruitment management.

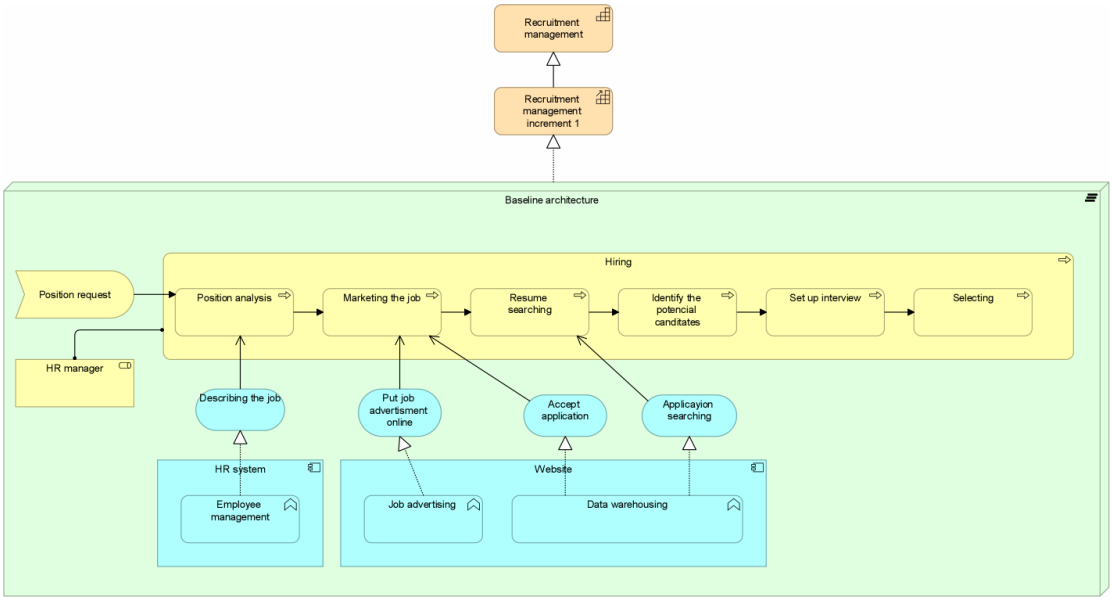


Figure 46: Example Baseline architecture of recruitment management

The second step is to define the indicators for each capability. These indicators are derived from the current situation of the organization and the baseline architecture that is created in the previous step. These indicators should be aligned to the general capability dimensions. In order to make this step easier, the manager can also use the indicators that defined for assessing the same target capability as a reference.

After all the indicators are defined, the manager should assess their performance level. In order to make the gap analysis more reliable, the scoring system should keep consistent with the previous step. The results of the performance level for each capability dimension can be shown in a spider chart. For example, Figure 47 is the representation of the current performance level for each capability dimension for the recruitment management.

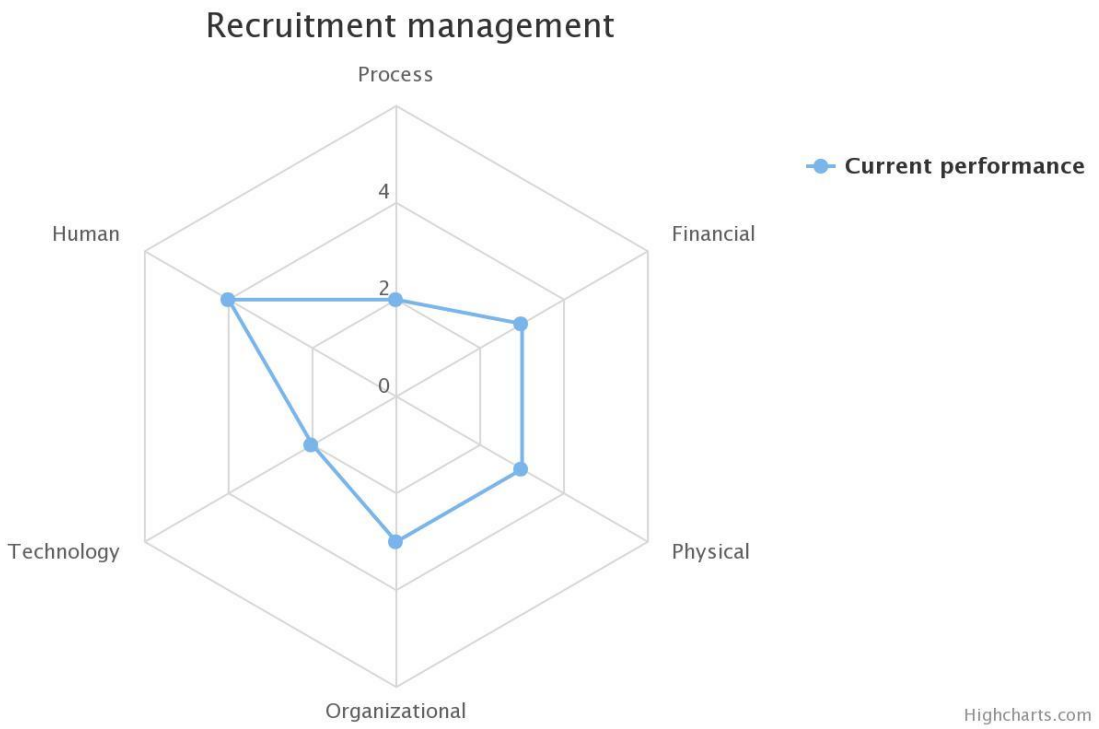


Figure 47: Example current capability spider chart

The final step is to define the current capability performance level. Since the baseline architecture is different from the target architecture, the significant level for each dimension of the current capability can be different from the target capability. For example, the target recruitment management is more relying on the functional applications, while the current situation is more relying on the well organized business process. Therefore, even though the specific performance level in the technology dimension of the recruitment management is different, the overall capability performance level could still be the same, which means the current capability of recruitment management already good enough to achieve the capability goal.

3.4 Phase C: Plan

The purpose of this phase is to plan the improvement of the capability. After assessing the current and desired performance of the strategic capabilities, the organization could have a clear picture of the underperform capabilities. In order to achieve their strategy, these underperform capabilities should be improved, which required time, budget and resource. Therefore, the manager should develop a capability development plan to make this improvement.

The capability development group in Australia defined the Capability Systems Life Cycle (CSLC), which they believed it is the basis for defence's strategy-led Capability Development process.(Capability Development Group Australia, 2014) The CSLC involves five steps, which is shown on Figure 13 in chapter 2.3.2.3:

Needs: The capability manager develops the user needs to address identified capability gaps. These gaps are defined according to the TTCP CBP process, which requires the data inputs like the strategic guidance, threat assessments, operational concepts, force structure and potential threats. With the consideration of the needs and capability gaps, the capability manager can develop a set of Defence Capability Plan (DCP).

Requirements: DCP projects are transformed to a possible capability options. The requirements can be the constraints, budget, risk and anything that can affect the decision-making. The capability manager should define the capability solution based on the consideration of these requirements.

Acquisition: The government approves the capability solution.

In-Service: The capability managers operate, support and manage the capability solution.

Disposal: Withdrawing the major systems and other material elements from the business process or redeploying them. **Acquisition**, **In-service** and **Disposal** are more related to the execution part of the capability development plan, which is not that related to this study.

For the non-defence capability development, Papazoglou proposed that the capability development and delivery involved three steps, which are: **Plan**, **Engineer** and **Deliver**. (Papazoglou, 2014)

Similar to the CSLC, the first step of capability development is to analyze the needs of the strategy and find out the capability gaps. The goal of plan section is to select the most urgent strategic business capabilities. Therefore, the main activities of plan section involves evaluate, prioritize and select. It is derived from the analysis of the strategic priorities, the capability gaps and the consideration of Balance of Investment (BOI).

The second section of the capability development is engineer. The goal of this section is to develop the selected strategic capabilities, which could include defining the capability increments, dimensions and the development timeline. This section focuses on planning the details for the execution of the capability development plan.

Following is the deliver section. The goal of this section is to monitor the coordination and alignment of the engineered/improved capabilities. The outcomes should be the successful improved capabilities.

In this study, the focus is on developing the capability development plan (CDP). Therefore, to

combine the needs and requirements section of CSLC and the Plan and Engineer steps that defined by Papazoglou, the general planning activities will be defined as Figure 48:

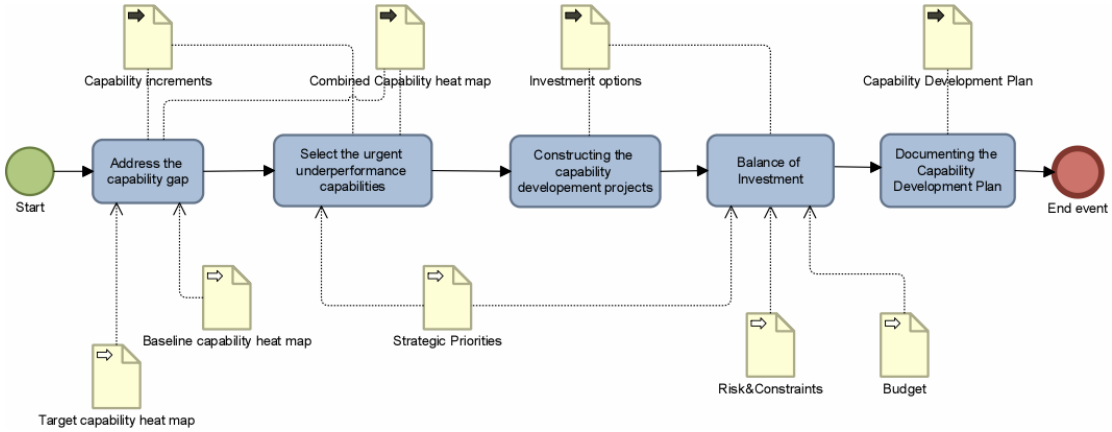


Figure 48: Planning activities

Figure 48 uses the BPMN notations to present the activities of the planning phase, which include five major tasks. The first three steps are creating the capability development projects, which can be related to the needs phase in CSLC. And the next two steps relevant to the requirements analysis of the capability development projects, which are depending on the organization's resource and budget. Table 14 below shows general attributes of the Planning phase, which involves the input, output and the techniques that will be used in this phase.

Table 14 : The Charaterics of Phase Plan

Phase C: Plan	
Goal	To plan the improvement for the underperform capabilities and create an affordable Capability Development Plan
Activities	● C1: Addressing the capability gaps ● C2: Select the urgent underperform capabilities ● C3: Creating the capability development project ● C4: Balance of Investment ● C5: Documenting the CDP
Input	● Strategy Map ● Target capability heat map ● Baseline capability heat map ● Target capabilities ● Baseline capabilities ● The information asset of the organization
Output	● Capability Development Plan
Techniques	● Balanced Scorecard ● Capability heat map ● Enterprise Architecture ● Business validation ● Risk management ● Cost and Benefit analysis

3.4.1 Step C1: Addressing the capability gaps

The first step of the planning phase is to identify the capability gaps and define the details of the implementation.

In the assessing phase, the manager acquires the capability heat map for both target capabilities and the current capabilities. This study uses the capability heat map as a tool to make the capability performance level visible. Papazoglou proposed that using a combined capability heat map can help the stakeholders easy to understand the gap between the current capabilities and the target capability. For example, as shown in Figure 49 below, the level 3 capabilities that related to the strategic objective "acquire, enhance and retain skilled people" are shown in the combined capability heat map: on the left side are the current performance states of these capabilities while the right side are representing the desired performance states.

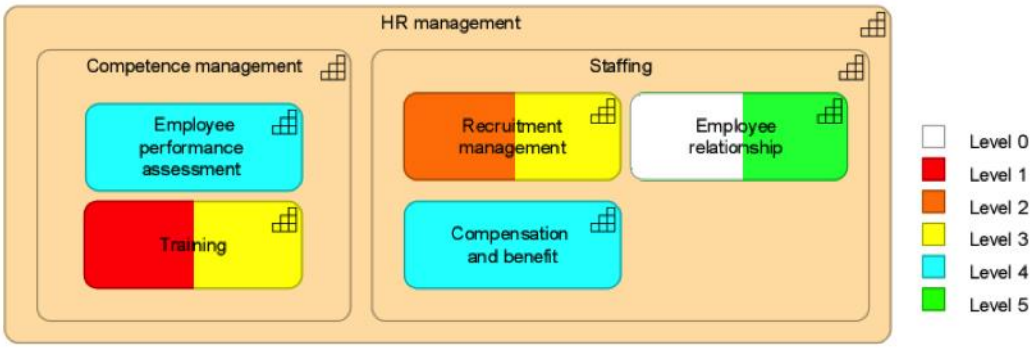


Figure 49 : Combined capability heat map

To sufficiently achieve the objective "acquire, enhance and retain skilled people", the related

level 3 capabilities should be in the performance level as shown on the right side. As mentioned before, different colors represent the different performance level, which are: Initial (Red), Underperform (Orange), Defined (Yellow), Managed (Blue), Optimizing (Green), missing capability (White). Therefore, from this figure the manager/stakeholders can easily find out the mismatch capabilities are in different colors. There is a chance that the performance level of the current capability even higher that the expected performance level, then the manager can ignore it. However, most of times the current performance level of the capabilities are lower than the desired performance level. For example, the recruitment management is currently at level 2 performance and the organization needs it improved to level 3. Therefore, the recruitment management required to develop. The same as the recruitment management, the performance level of training is required to improve from level 1 to level 3. Furthermore, the capability of Employee relationship is missing and it should be at the level 5 performance level, which is emergent.

After identifying underperform capability, the manager can plan the detail of the capability improvement. The improvement of the capability can be planned on the capability increments. And combined the capability increments that defined in the Assess phase with the capability dimensions, the manager can create a spider chart to show the development direction of the selected capability. Figure 50 is the capability increment spider chart of the recruitment management, which shows the current performance of the recruitment management in technology, process, reputation dimensions are underperform. Therefore, the manager knows, in order to improve the overall performance level of the recruitment management, the organization needs to improve the contributing value in these three capability dimensions.

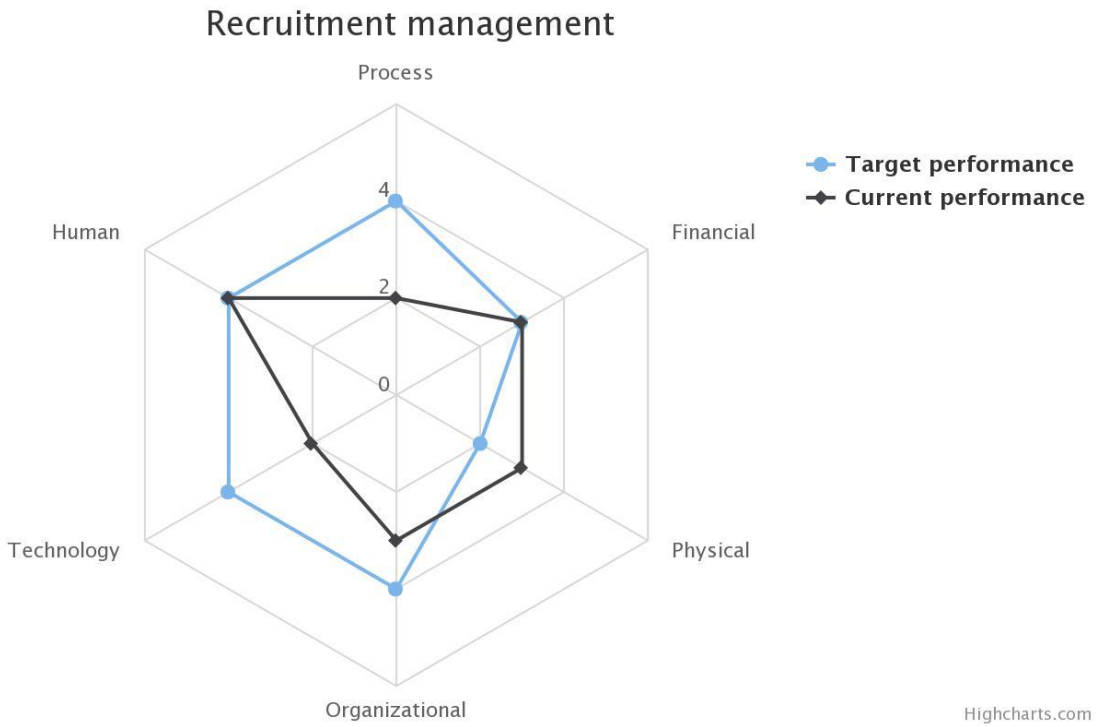


Figure 50: Example combined capability spider chart

3.4.2 Step C2: Selecting the urgent underperform capabilities

The second step of the planning phase is to develop the capability prioritize. As mentioned in the previous chapter, which capabilities are more important depending on what the organization wants to achieve. Therefore, before the manager makes the investment decision for the

capability development, he/she should put the strategic priorities into consideration. Since the Strategy Map defines the cause-and-effect relationships among the strategic objectives, the manager can recognize the strategic priorities by analyzing the Strategy Map.

For example, there is an objective that is "Accelerate development teams work" in the internal perspective of a Strategy Map, which only can be achieved if the organization accomplish the objective "Acquire, enhance and retain skilled people" in the learning and growth perspective of the same Strategy Map. Thus, the objective "Acquire, enhance and retain skilled people" has higher priority than "Accelerate development teams work".

In addition to the strategic prioritizes, Papazoglou mentioned there was another approach to select the underdeveloped capabilities, which was to create possible combinations of strategic business capabilities and select the one with the optimal trade-off. (Papazoglou, 2014)

With this approach, the manager could look for the combinations of Strategy Map and Capability Map first. For example, Figure 51 shows some of the capabilities that are required to realize the "Acquire, enhance and retain skilled people" and the "Accelerate development teams work" are related. Improving the performance of training and recruitment management can benefit for both objectives, which possibly shows more positive feedback than improving the other capabilities.

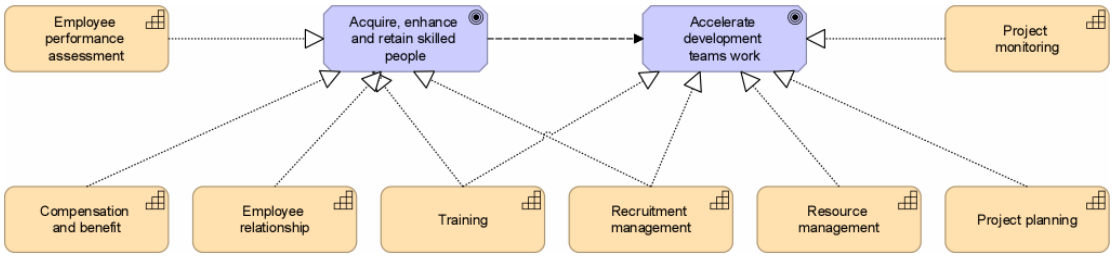


Figure 51: Example capabilities related to strategic objectives

Furthermore, the manager could look into more detail level of the capability, which is the capability dimension. Because it might be possible that one capability can perform better in combination with another one or more out of the other considered capabilities. (Papazoglou. 2014) As mentioned in the previous section, Danesh and Yu said that capabilities complement one another by fulfilling goals, satisfying softgoals, providing resources, or performing tasks.(Danesh & Yu, 2015) For example, one of the reasons that cause the low performance project planning is the poor skilled employee. Therefore, to improve the performance of training or recruitment management could be the one of the solutions to facilitate the project planning, which brings the optimal feedback.

However, there are some capabilities are performing worse than the tolerance level. For example, Figure 49 shows the performance level of training is level 1 while the desired level is level 3. And the employee relationship management is totally missing in the baseline capability map. Missing or having such a low performance capability could drag down the overall performance of the strategy. Therefore, to determine the urgent level of the underperform capabilities, the manager should not just consider about the value but also the importance of the capabilities.

In conclusion, there are four approaches to select the urgent underperform capabilities:

- Based on the strategic priorities.
- Based on the optimal trade-off.
- Based on the capability gaps.
- Business leaders' choice.

To choose which approaches to select the urgent underperform capabilities is based on the organization's culture and the experience of the business leader or the management team that are related to the capability development.

3.4.3 Step C3: Creating the capability development projects

In the previous section, the manager selects the capabilities that are required to develop. After the capabilities have been selected, the manager should develop a set of capability development projects.

The guide from BIZBOK mentioned, to realize a strategy, the organization should execute a set of strategic initiatives. In many cases, capabilities are required to direct and/or execute the strategic initiatives. Therefore, the strategy related capabilities are needed to be improved or transformed to enable delivery of a given strategy. However, a capability could be also carried out or improved by a strategic initiative. (Business Architecture Guide, 2014) For example, to "Acquire, enhance and retain skilled people", the related strategic initiatives involves building the benefits program to keep the key staff. Assuming the key staffs are high skilled engineers, who are belonged to the R&D department. To execute this benefit program could have the possibility to affect the performance of the product development, since this capability is highly depending on the human capacity.

Therefore, to construct the capability development project, the manager could look at the strategic initiatives first, to find out which could benefit for both strategy and capability development.

However, to be more specific, the capability development project should be planned in capability increments in the different capability dimensions. For example, Figure 50 shows the reasons that the recruitment management is under development is because of the low performance business process, technology and reputation. Therefore, the manager constructs a set of project to improve the contribution of these three capability dimensions.

However, the capability dimensions are associated with each other. Therefore, a capability should be represented as a whole architecture to help the manager to have a better idea about how to improve it. As mentioned before, a capability could be realized by the plateau of EA, which is aggregated by the ArchiMate core elements. Aldea et al. stated, by modeling all the elements of the architecture that realize a capability (increment) in a plateau, it could facilitate the process of identifying which parts of the architecture will be influenced by a change in a capability. (Aldea et al., 2014) Therefore, the plateau concept can be used to create the capability development project to implement the capability increment.

By using the recruitment management as an example, Figure 52 shows the example architecture elements that realize a capability increment.

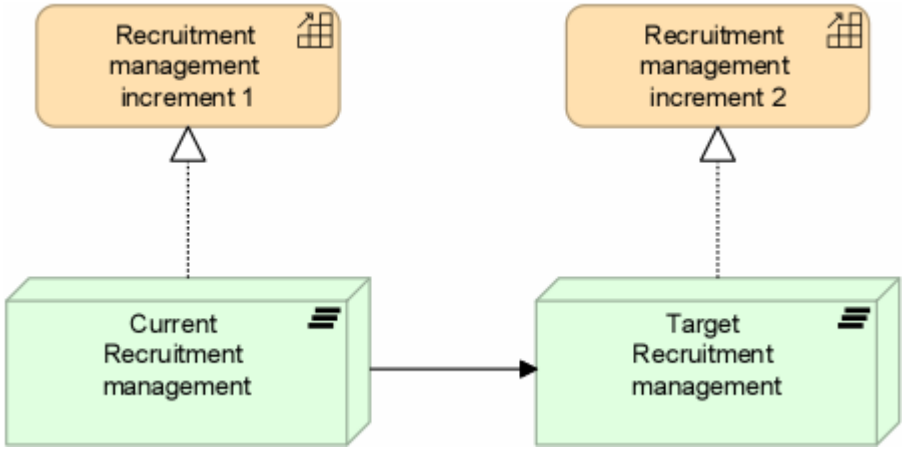


Figure 52: Example architecture elements that realize a capability increment

From the previous analysis of the recruitment management, the manager knew that the process, technology and reputation have low performance. From figure 50, the manager can realize that the inefficient process could be caused by the underdeveloped system. Therefore, in order to improve the performance level of the capability, the organization could think about to create a recruitment management system to support the hiring process. And the other possible capability development projects could be re-engineering the hiring process (improve the process) and advertising the company's name (reputation), which is shown on Figure 53.

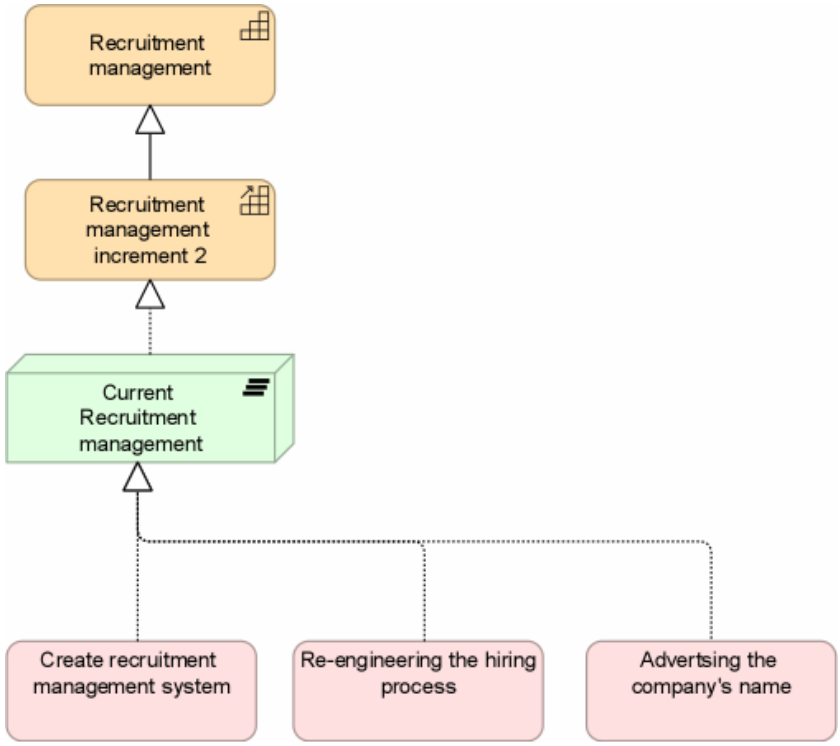


Figure 53: Example work packages and/or projects for the capability increments

However, not all the capability dimension can be modeled by EA, the contribution of reputation and financial are hardly represented in EA. For example, normally, the value that contributed by the financial resource, which could be represented by the budget that support the capability. If the performance level in the financial dimension is lack of development, it means the organization should put more financial support to this capability. However, financial resource, like cash or borrowing capacity are shared, to increase the budget for this capability can influence the other. Therefore, when the manager tries to arrange the resource

to improve the performance of one capability, he/she should look at the big picture.

3.4.4 Step C4: Balance of Investment

After the capability development projects have been defined, the manager should do the investigation of Balance of Investment (BOI). Planning the resource, budget and analyzing the risk of these projects, which relating to the project portfolio management.

BOI involves evaluating the requirements of the cost, resource demand, applicable time frames and any other possible constraints for developing a set of capabilities.

TTCP proposed that BOI can either use an analytical framework or a "facilitated committee process". Since in the previous process, the capability prioritizes and capability development projects already finalized. Within this process, the manager should allocate the limited budget and resource to propose the affordable capability development plan.

TTCP suggested using the process because they thought that the tools and techniques cannot combine all the information required for BOI. However, the manager can use a set of tool to support the decision making, for example, like business case, IE scorecard, ROI calculation, risk management etc. Furthermore, the committee process is depending on the experience and knowledge. To combine the skill, process and the supporting tool helps facilitating the discussion and developing the most suitable solutions. For example, in the previous step, the manager thought that create a recruitment management system can improve the overall performance of the capability. However, building a new system can be time consuming and increase the workload of employees in the IT department, which influence the other capability. Therefore, the manager can consider another capability development project, which could be outsourcing the system or re-engineering the business process.

To do the BOI, the manager should also need to consider about the time frame. The resource and budget somehow cannot be arranged in the same time, but it does not mean that the capability development project is not realistic. The development time frame can be represented by the capability roadmap. The arrangement of the capability developing timeline are depending on the capability prioritizes and the available resources (financial, human, technology etc.). For example, to plan the capability development projects that are shown in Figure 53, the manager mapped these projects with the capability increment like Figure 54. To be notified, the roadmap can include different capability increments, which shows, in order to achieve a strategy, how the capability development roadmap should look like.

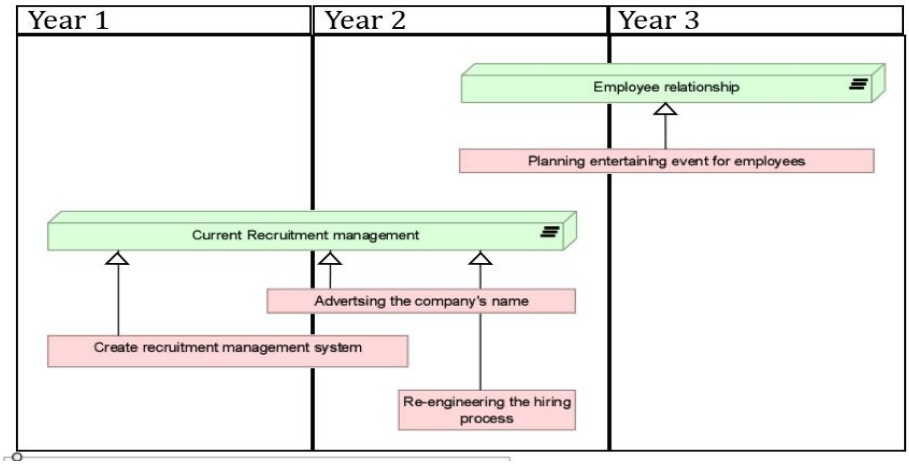


Figure 54: Example roadmap with projects linked to the capability they improve

3.4.5 Step C5: Documenting the Capability development plan

The final step of the planning phase is to documentation the capability development projects into an affordable Capability development plan (CDP). To implement the CDP helps the organization to achieve the capability goals, which are required to achieve the strategic objectives. Eventually, the performance of the strategy can be improved.

On the other hand, because of the constraints and risk, the affordable CDP cannot fulfill the requirements to implement the strategy. Which means the strategy needs to be refined.

To construct a CDP to meet the purpose of the Plan phase, there are some basic components are required, which are represented in Table 15 below:

Table 15: Example of basic component of Capability development plan

Capability	The name of the related capability
Capability goal	The desired goal of the capability
Capability gap	To describe the capability gap, which dimensions of the capability are underdeveloped.
Development project	Describe the projects that are planned to improve the capability performance
Estimate resource	The estimate resources that the project will use, for example, equipments and the human resource.
Estimate spend	The estimated budget
% of total budget	% of the total budget that used for capability improvement.
Benefit	The direct benefit to develop this project.
Impact of doing nothing	If done nothing, How the business will looks like, especially for the strategy implementation.
Developing timeline	The starting time and how long the project will last. Especially, when the company can get the benefit.

Summary

This chapter describes the main concept of Capability-based planning (CBP) method, especially how to apply the CBP into strategy implementation.

The CBP can be divided into three major phases, which involves Map, Assess and Plan. Each of them includes several steps. This chapter describes these steps in details. To show how the organization can use the CBP mehod to improve its capabilities, in order to achieve the desired goal of its strategy.

Furthermore, this chapter develops the capability assessment tool, which can be used for assessing the performance level of the capability more precisely.

4. ArchiPharma case study

The purpose of this chapter is to use the ArchiPharma case to demonstrate how to use the suggested method for Capability-based planning (CBP) to facilitate the strategy implementation. The ArchiPharma case is representing a real, but anonymized, pharmaceutical organization. It is the example that created by BIZZdesign to illustrate the use of ArchiMate to facilitate change of ArchiPharma. It includes the goal of the organization and related strategy. In this thesis, we try to use the CBP to close the gap between the strategy development and implementation, to help ArchiPharma identifying the required capabilities based on the strategy and improving the underperform capabilities. With the help of CBP, ArchiPharma could have a higher possibility to have a better performance of their strategies.

4.1 Introduction to the ArchiPharma

ArchiPharma is a large international pharmaceutical organization that has many geographically spread locations, which includes New York, London and Amsterdam office. The organization is the result of many mergers and take-overs. They are aware of the necessity to continuously change and improve to reach their end goal of becoming the leading provider of pharmaceutical services in the world. To realize this ambitious goal they switch their strategy from a complete focus on product leadership to a focus on operational excellence with product leadership still present in the background.

Figure 55 illustrates the vision, mission and the strategies of ArchiPharma. In order to achieve their vision, and to become the leading provider of pharmaceutical services in the world, ArchiPharma should offer the most innovative pharmaceutical services with a quick and reliable solution. According to the mission statement, ArchiPhama formulates two strategies, which are realizing the product leadership and excelling in operation. Based on the description, ArchiPhama should move their strategy to a focus on operational excellence (even thought the product leadership still present in the background). Therefore, this case study use the operational excellence as an example to describe how the suggested method for CBP can help ArchiPhama facilitating the strategy implementation.

Figure 55: Vision, Mission and Strategy of ArchiPharma

Current situation:
ArchiPharma are facing several problems from both external and internal:

- External:
  - Growing numbers of the competitive pharmaceutical organizations, and they also want to become the industry leader.
  - The (governmental) regulations change regularly.
- Internal:
  - A large legacy application landscape, which is resulted by simply patched the landscapes together when many mergers and take-overs happened.
  - Heterogeneous business process, products and even database.

From a further investigation of ArchiPharma, we find out that these problems are partly caused by the legacy application landscape. First, to comply with the changing regulations, the business process of ArchiPharma has to be agile. Since Archiphama has the legacy application landscape and their business is highly depending on the information system, which make it difficult for the organization to change their business process to apply to the changing environment. Second, to have a consistent business process, products and database, it also requires Archiphama to solve the problem of the large legacy application landscape. For example, the same services or/and products that provided by different business units could have different quality or follow different standards, which could be the consequence that different business units have their own system to execute the business process. Therefore, the consequence of the heterogeneous business process, products and database could influence the relationship between ArchiPharma and their customers, which is conflicting with the goal of having a professional and coherent image towards customers. It causes ArchiPharma to lose the advantages to become the industry leader.

Therefore, to face these challenges and achieve the operational excellence, ArchiPharma plans to have a Centralized Information System. The main strategic goal of the operational excellence is to centralize the Information Systems.

4.2 Strategy analysis

In order to excel in operations, ArchiPharma has formulated as main strategic goal to centralize its Information Systems, which can be seemed as the IT strategy of ArchiPharma. The IT strategy is the enabler for realizing the Business strategy, which is the Operational excellence. Therefore, the current analysis of this strategy is shown on Figure 56.

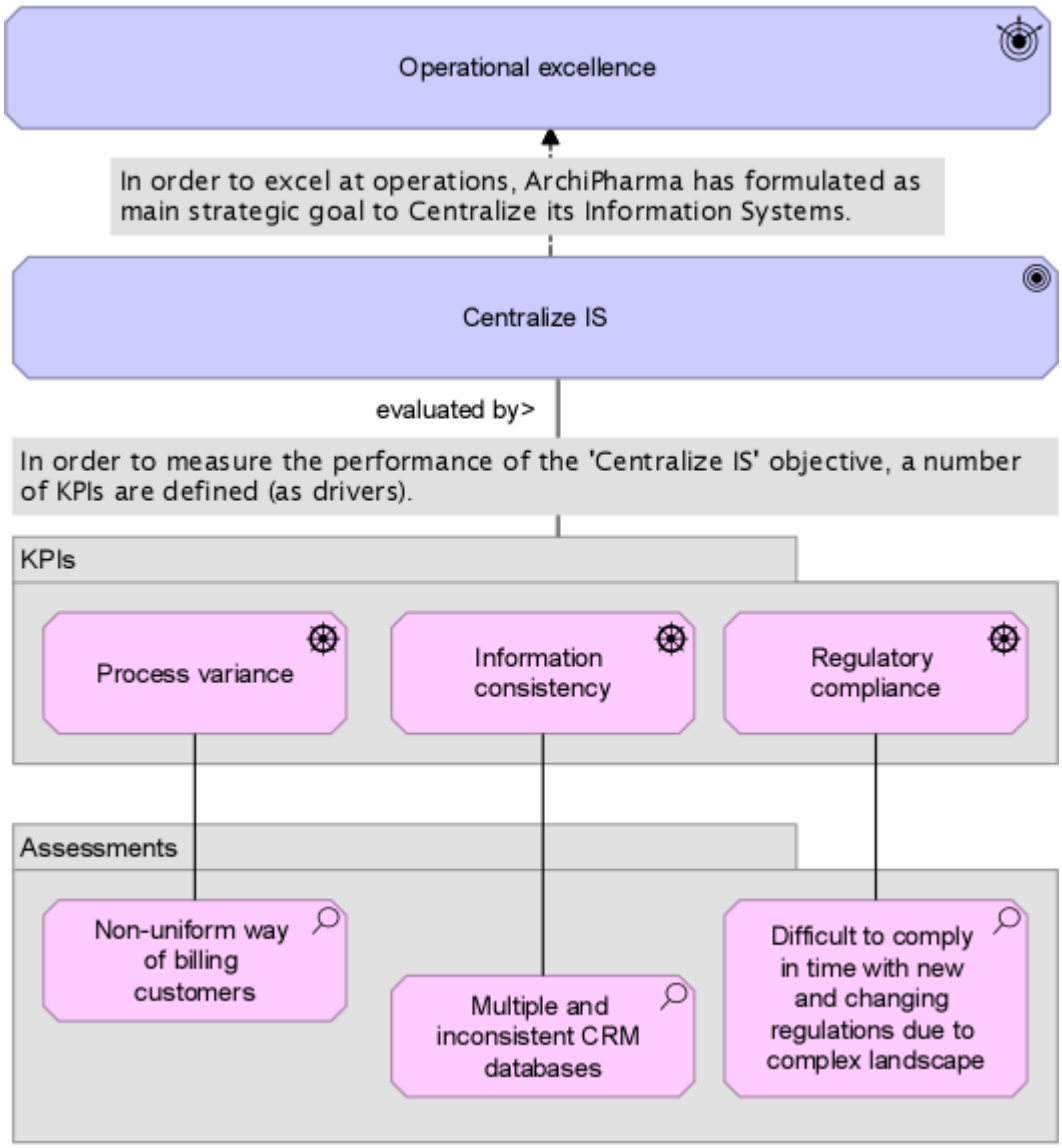


Figure 56: Strategy analysis: Operational excellence

According to the case description, the consequences of these problems of ArchiPharma are directly influencing the interactions with customers when running daily business process. The KPIs to evaluate this strategic goal are:

1. Process variance
2. Information consistency
3. Regulatory compliance

From these indicators, we could find the focus of this case is that: First, there is not-uniform way of billing customers: The processes are executed slightly different by each business unit. Therefore, when the larger and international customers interact with more than one business unit, they could get heterogeneous bills. Second, one client might appear with slightly different data in different in different CRM databases managed by different units, which could cause the differences in addresses, names etc. The components of the bills that the customers received might be different and also the time of sending, payment due data might differ per business unit. Third, with the complex landscape of the applications, it is difficult for the ArchiPharma to comply in time with the changing regulations.

With all the concerns of the main focused problem of this case and the requirements of

executing the suggested method for CBP, we try to create the Strategy Map and Balanced Scorecard (BSC) for this specific strategy. We assume that most of the organizations could have their existing Strategy Map and BSC. Therefore, the data on the Strategy Map and BSC can be seemed as the data input of the suggested method of CBP.

Since the strategic goal of the operational excellence is related to IT. Therefore, we would like to use Kaplan and Norton's IT Organization Strategy Maps (Kaplan&Norton, 2006) as a reference to build the Strategy Map for ArchiPharma, which is shown below:

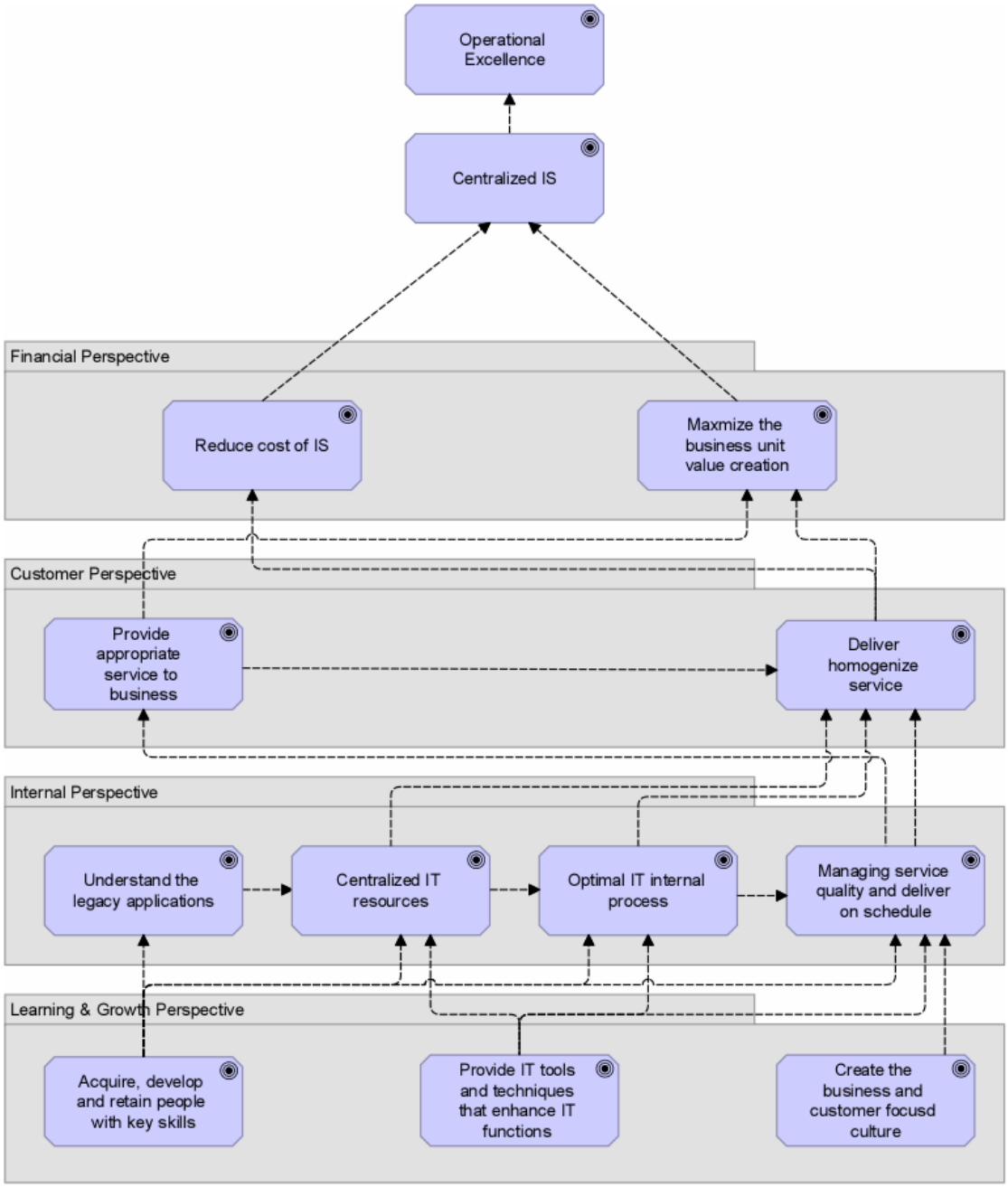


Figure 57: Strategy Map for operational excellence

According to these strategic objectives that defined in the Strategy Map and the context of the case, we could create the BSC with the specific measures and the targets, which is demonstrated in Table 16:

Table 16: Balanced Scorecard for Operational excellence

	Objectives	Measures	Targets (year 3)
Financial Perspective	Reduce cost of IS	The cost reduction of the maintenance fee for the Information Systems.	30%
	Maximize the business unit value creation	Revenue growth per business unit of the service	20%
Customer Perspective	Deliver homogenize service	Increased customer satisfaction rate.	+20%
	Provide appropriate service to business	Time saving	-40%
Internal Perspective	Managing service quality and deliver on schedule	Services consistency	90%
	Optimized IT internal process	Process variance	20%
	Centralized IT resources	Information sharing rate	80%
	Understand the legacy applications	Legacy applications decreasing rate	-50%
Learning & Growth Perspective	Acquire, develop and retain people with key skills	Key staff rate	60%
	Provide IT tools and techniques that enhance IT functions	Developed a standard platform and shared databases	Available for all business units
	Create the business and customer focused culture	Developed Standard Operation Procedure (SOP) based on the customer's needed	SOP reflects the customers' needs

The Strategy Map and BSC will be used as the data input of the suggested method for CBP. In the next section, we will use the Strategy Map directly and skip the process of identifying the strategic objectives.

4.3 Map

After analyzing the information asset of the organization, the high level capability map can be defined. Figure 58 is the Level 2 Capability Map of ArchiPharma, which divides the capabilities into three layers that are related to different business functions.

Figure 58: ArchiPharma Level 2 Capability Map

As mentioned in Chapter 3.2.1, it is typical to consider the capabilities could be decomposed from level 1 to level 3, and the level 3 capabilities can be linked directly to the business process and resource, which can be assessed more easily. Therefore, we will decompose the Level 2 Capability Map into the Level 3 Capability Map based on the organization's information assets. Figure 59 is part of the Level 3 Strategic Capability Map for ArchiPharma. After defining all level 3 capabilities, the capabilities can be linked to the strategic objectives.

Figure 59: Part of the Level 3 Strategic Capability Map for ArchiPharma

In section 4.2, the ArchiPharma Strategy Map accompanied with the strategic objectives have already been defined. Based on the strategic analysis, we already know that to excel in the operations, ArchiPharma formulated the main strategic goal to centralize its Information Systems. In general, according to the investigation of the problems and the goals that ArchiPharma faced, its strategy related to Customer management and Governance, Risk and Compliance management. However, there should be more capabilities being used during the strategy implementation. Therefore, we would like to map the capabilities to all the strategic objectives in order to translate the strategy into implementation, which is shown in Table 17:

Table 17: Linking capabilities with strategy for ArchiPharma

	Objectives	Requirements	Capabilities
Financial Perspective	Reduce cost of IS	The size of the application landscape should be decreased. Which requires ArchiPharma have a centralized IS.	Asset management
			Customer management
	Maximize the business unit value creation	Keeping the loyal customers and attracting the new customers. To comply with the changing regulations in time, eliminate the risk of providing incompatible service to the customer.	Governance, Risk and Compliance management
Customer Perspective	Deliver homogenize service	All the business units have a uniform way of billing customers and the information of the	Customer billing and collection management
			Customer data

		customer should always keep consistent.	management
	Provide appropriate service to business	There should be sufficient and high quality technology support for providing the service to business. To comply with the changing regulations in time, in order to provide the service in time.	Asset portfolio management
			Regulatory compliance management
Internal Perspective	Managing service quality and deliver on schedule	The billing service should deliver on time and follow standard procedure.	Regulatory analysis and prediction
			Customer billing process management
			Customer billing data collection
	Optimized IT internal process	Different business units can use the same application to handle the same business service.	Application portfolio management
	Centralized IT resources	Different business units can retrieve the same data from the CRM system. Data of the customer should consistent.	Infrastructure portfolio management
			Customer data organizing
	Understand the legacy applications	Analyzing the function, value etc. of all the applications that the organization use.	Application portfolio management
Learning & Growth Perspective	Acquire, develop and retain people with key skills	Keep the high performance employee and hire new high skilled people. Using training project to improve the employees' skill.	Recruitment management
			Training
			Compensation and Benefit management
	Provide IT tools and techniques that enhance IT functions	The business units from different location require having the same applications support. The required data should be always the same.	Application portfolio management
			Infrastructure portfolio management
	Create the business and customer focused culture	The organization should have a good understanding and focus on customers' needs.	Customer data analysis
			Organizational regulatory setting

After the required capabilities have been defined, we can structure the Target capability map and find the missing capability. The missing capabilities will be marked in white color, which represents the meaning as empty. The Target capability map that related to the operational excellence strategy is illustrated as Figure 60.

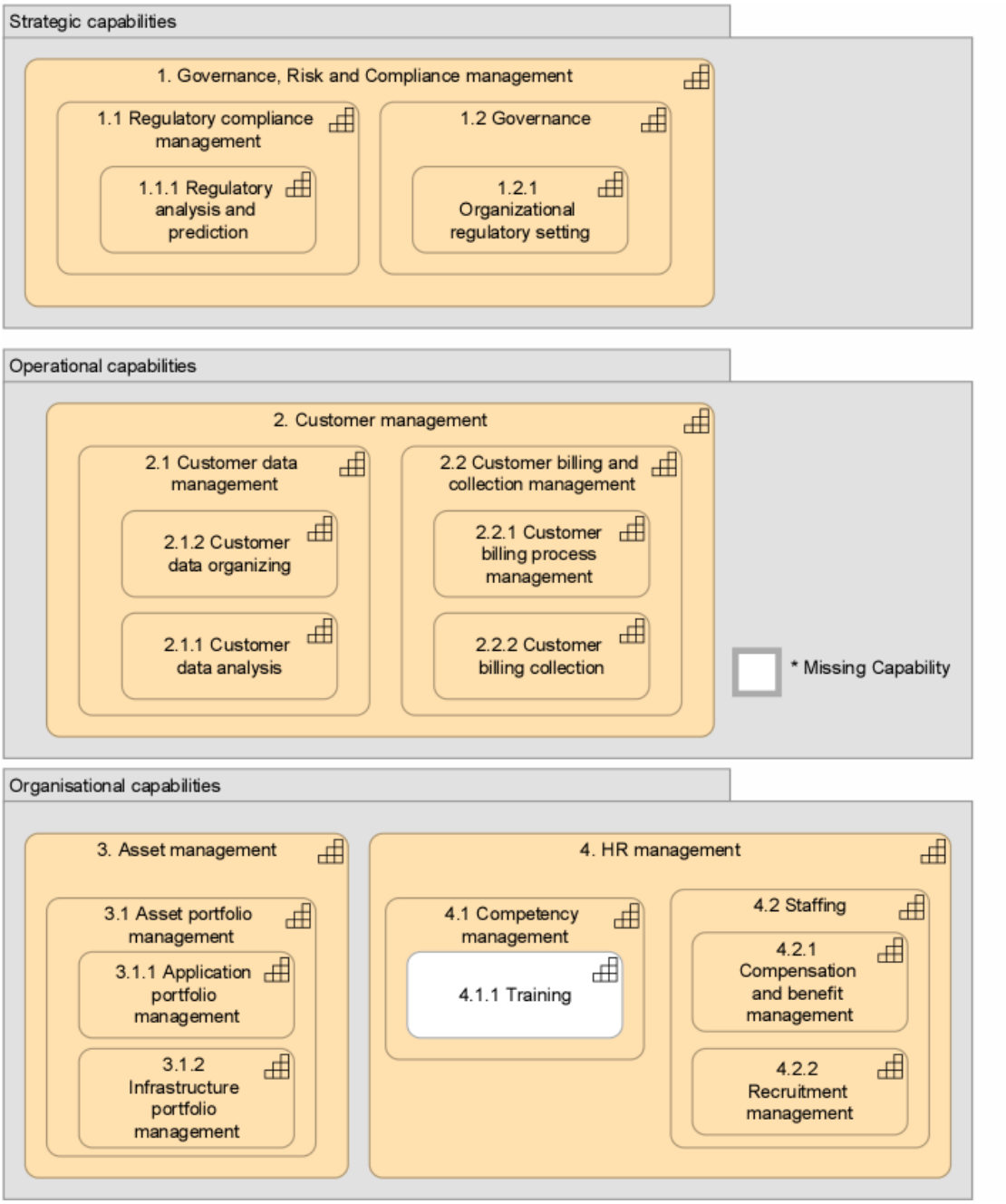


Figure 60: Operational excellence Target Capability Map

From this figure, we find out that the training capability is in white color, which probably means that the ArchiPharma is outsourcing the training to another company or just simply missing this capability. Except for training, ArchiPharma has all the required capabilities for the strategy implementation. However, we do not know how the performances of these capabilities are. The underperform capabilities could also influence the final performance of the strategy implementation as the missing capabilities does. Therefore, after we define the Target Capability Map for ArchiPharma, we need to find the desired performance level and the current performance level of these required capabilities.

4.4 Assess

As what we discuss before, the organization requires specific capabilities to translate their strategic intent into action. After we identified the Target Capability Map for ArchiPharma to realize their operation excellence strategy, we should continue to identify the quality of these required capabilities. In this section, we will define the desired performance of these required capabilities first. After that, we will define the current performance of these capabilities based on the current situation of ArchiPharma.

4.4.1 Define capability goals:

Since we have the BSC as data input, the first step of Assess is to define the capability goals. Besides, the children capabilities are part of their parent capability. Therefore, the performance of the parent capability is determined by its children capabilities. In this case study, we would like to set up the goals for the level 3 capabilities, we assume that if the level 3 capabilities achieve their goals, their parent capabilities can also reach their target.

According to the description of the case and the BSC, we create Table 18 to collect the goals of the level 3 capabilities in ArchiPharma, which are directly functioning on the strategic objectives from the internal perspective and learning and growth perspective:

Table 18: Level 3 capabilities goals for ArchiPharma

1.1.1 Regulatory analysis and prediction		
Related strategic objective	**Measure**	**Target**
Managing service quality and deliver on schedule	Services consistency	90%
Capability Goals		
ArchiPharma can adjust their business on time, according to the regulatory analysis report on time and make business plan based on the regulatory forecasting report. Furthermore, ArchiPharma can provide appropriate service in time.		

1.2.1 Organizational regulatory setting		
Related strategic objective	**Measure**	**Target**
Create the business and customer focused culture	Developed Standard Operation Procedure (SOP) based on the customer's needed	SOP reflects the customers' needs
Capability Goals		
ArchiPharma can adjust their regulatory to ensure the operation procedure can reflect the customers' need.		

2.1.1 Customer data analysis		
Related strategic objective	**Measure**	**Target**
Create the business and customer focused culture	Developed Standard Operation Procedure (SOP) based on the customer's needed	SOP reflects the customers' needs
Capability Goals		
Fully understand what the customer wants and categorize the customers' requirements.		

2.1.2 Customer data organizing		
Related strategic objective	**Measure**	**Target**
Centralized IT resources	Information sharing rate	80%
Capability Goals		
The customer data should be unique and well organized and all the business units can retrieve the same data.		

2.2.1 Customer billing process management		
Related strategic objective	**Measure**	**Target**
Managing service quality and deliver on schedule	Services consistency	90%
Capability Goals		
The business units from different location have the same standard business process of billing customers. And the service time should be controlled in ±3 days difference in different business units.		

2.2.2 Customer billing collection		
Related strategic objective	**Measure**	**Target**
Managing service quality and deliver on schedule	Services consistency	90%
Capability Goals		
The components of the customer's bills should keep consistent.		

3.1.1 Application portfolio management		
Related strategic objective	**Measure**	**Target**
Optimized IT internal process	Process variance	20%
Understand the legacy applications	Legacy applications decreasing rate	50%
Provide IT tools and techniques that enhance IT functions	Developed a standard platform and shared databases	Available for all business units
Capability Goals		
Eliminate the redundancy application and narrow down the application landscape. **Ensure different application should have minimized overlap function and provide a standard platform for ArchiPharma business units to handle their services.**		

3.1.2 Infrastructure portfolio management t		
Related strategic objective	**Measure**	**Target**
Centralized IT resources	Information sharing rate	80%
Provide IT tools and techniques that enhance IT functions	Developed a standard platform and shared databases	Available for all business units
Capability Goals		
Provide the stable and powerful server to support the shared database, in order to provide the service to all the running applications		

4.1.1 Training		
Related strategic objective	**Measure**	**Target**
Acquire, develop and retain people with	Key staff rate	60%

key skills		
Capability Goals		
Providing training courses to improve employee skill.		

4.2.1 Compensation and Benefit management		
Related strategic objective	Measure	Target
Acquire, develop and retain people with key skills	Key staff rate	60%
Capability Goals		
Improve the bonus of the key staff.		

4.2.2 Recruitment management		
Related strategic objective	Measure	Target
Acquire, develop and retain people with key skills	Key staff rate	60%
Capability Goals		
Keep hiring skilled people		

4.4.2 Make sequence to assess the capabilities:

Even the same level capabilities could have dependency relationship. According to the strategic analysis, we know that the customer management and the Governance, Risk and Compliance management are directly influencing the operational excellence. Therefore, we could use the *i** Strategy Dependency (SD) model as a reference to describe the relationships among these required capabilities.

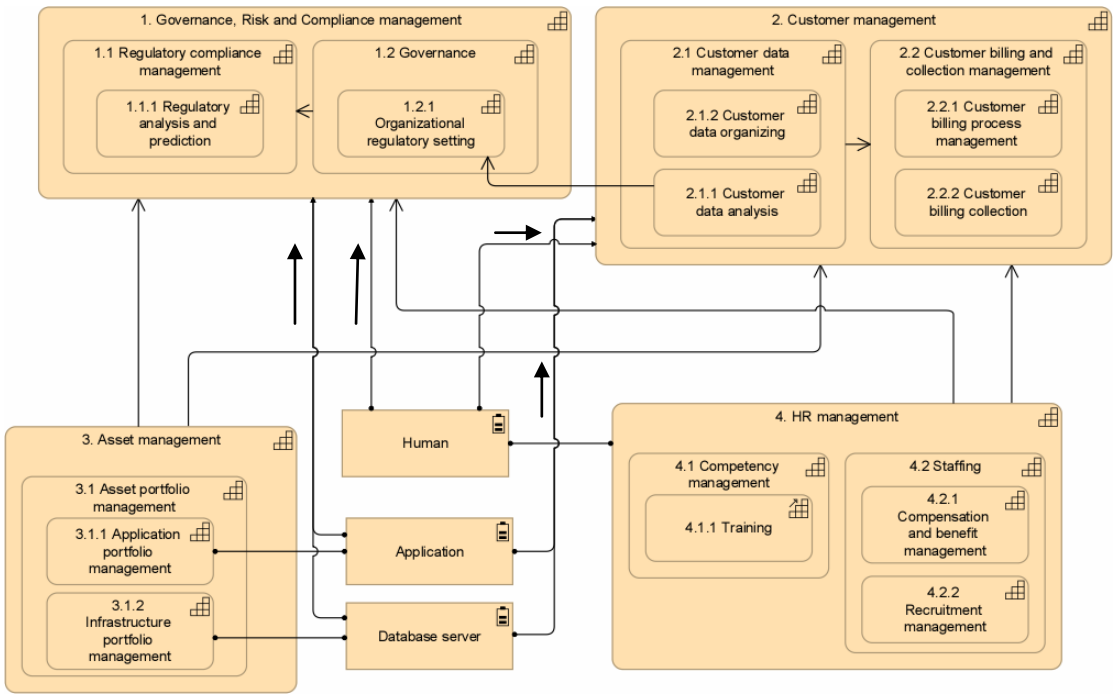


Figure 61: Relationships among the strategic capabilities

As mentioned before, there is one focus of this case, which is there is not-uniform way of billing customers: The processes are executed slightly different by each business unit. When the larger and international customers interact with more than one business unit, they could get heterogeneous bills. Therefore, we would like to analysis the capabilities of Customer billing process management first, which related to this problem of ArchiPharma directly.

4.4.3 Assessing the desired performance level of the capabilities

In order to determine the desired performance level of these required capabilities, we will follow the sub-process of Assess that defined in chapter 3.3.4, which is shown on Figure 36:

Create target architecture for the selected level-3 capability:
The first step of assessing the Customer billing process management is to create the target architecture to represent the process and resource of this capability. ArchiPharma have made part of the EA of Customer management. It is not sufficient enough to illustrate all the required business process and service. However, it could be used for describing the Customer billing process management, which is the child capability of the customer capability. Therefore, we would like to formulate the target architecture of Customer billing process management as Figure 62:

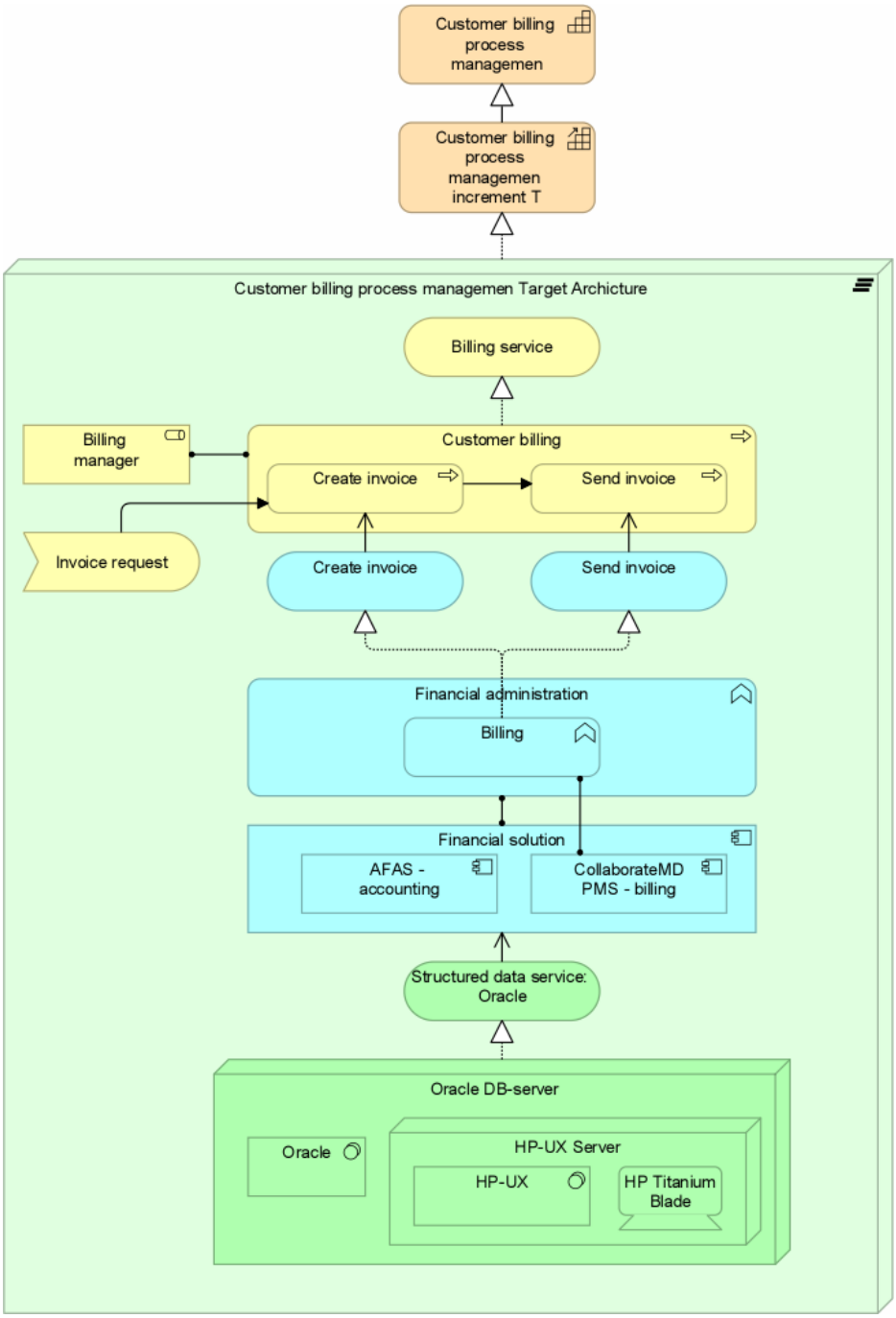


Figure 62: Target architecture of Customer billing process management

After the target architecture of Customer billing process management has been formulated, we should define the indicators to evaluate the performance of each capability dimension of this capability.

Define the indicators:

According to the context information of ArchiPharma, we knew the organization has separated location business that includes New York, London and Amsterdam office. In order to achieve the strategy, ArchiPharma should make sure that these offices have the same process to handle the billing customer service. Therefore, we set up the capability goal of Customer billing process management, which is aimed to ensure the business units from different location have the same standard business process of billing customers. And the service time should be controlled in ±3 days difference in different business units.

A customer billing is any kind of business event where a business collects money from a customer for goods or services provided. In order to achieve this capability goal, the integration of the billing process is critical. Therefore, we could define a set of indicators to find out the required performance level of each capability dimension of Customer billing process management, in order to determine the desired performance of this capability. Table 19 collects all the indicators that will be used for evaluating the performance level of each capability dimension, which is shown below:

Table 19: Indicators of Customer billing process management

Capability dimension	Indicator
Process	Sum of deviation of time (in days) against planned schedule of all billing processes
Financial	Sum of deviation in money of planned budget for managing the billing process
Physical	Sum of deviation in the planned equipments that will be used during the billing process
Technology	Available application provides the integrated billing service support for all the business unit
Organizational	Available formal documents for organizing the billing process
Human	Number of key staffs involves

Determine the performance level of each indicator:

To determine the performance level of each capability, the Indicator specification table will be used accompany with the Capability performance assessment framework for the capability dimensions that we defined in chapter 3.3.4, and the performance level will be divided into:

- 0: None
- 1: Initial
- 2: Under development
- 3: Defined
- 4: Managed
- 5: Optimizing

Table 20 shows the details of the process dimension evaluation. To evaluate other dimensions, we will still follow the structure of this table.

Table 20: Indicator specification table for Process dimension

Indicator	Sum of deviation of time (in days) against planned schedule of all billing processes
Capability dimension	Process
Indicator specification	To evaluate the consistency of the billing processes compare with the planned schedule from different business units in time.
Measure	Sum of deviation of time (in days): ● $\mathbf{T_p}$ for the planned spending time ● $\mathbf{T_i}$ for the real time used in different business units ● **N** for the total numbers of the business units that provide the billing service ● **σ** for the deviation of time of the real time spend against the planned schedule of all billing processes **Formula**: $\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(T_i - T_p)^2}$
Target value	σ ⩽1
Worst value	σ ⩾10
Tolerance value	σ =7
Current value	σ =3
Method	Review and report
Owner	Billing manager
Performance level	Level 4: Managed

After the performance level of all the capability dimensions have been defined, we could create the spider chart to illustrate how the desired situation of Customer billing process management should look like, which illustrated in Figure 63:

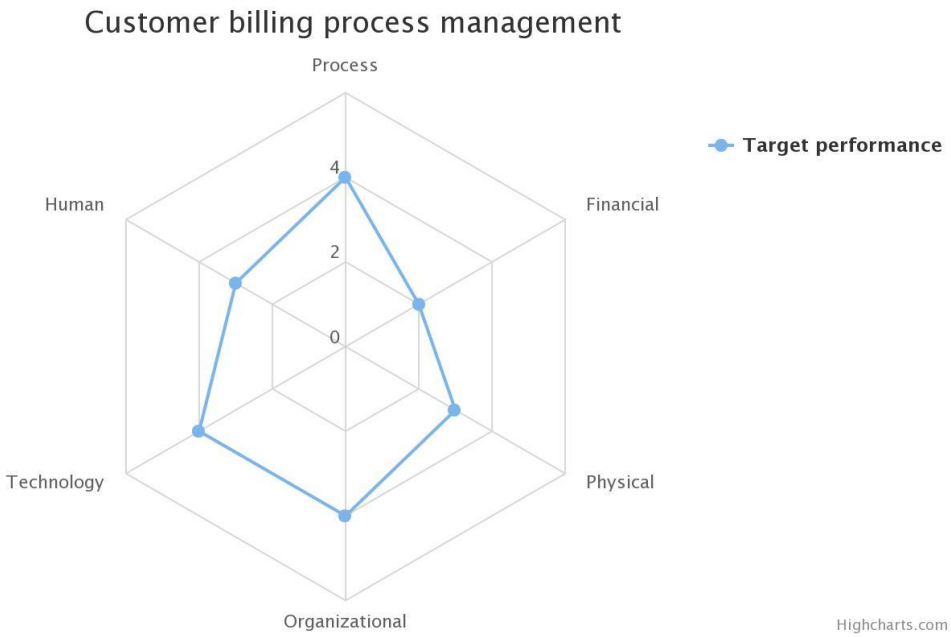


Figure 63: Target Capability Spider chart for Customer billing process management

The target capability increments for this capability have been plotted on a spider chart as pictured in figure 4.10. We could find that the performance levels for each capability dimension of Customer billing process management are Process (4), Financial (2), Physical (3), Organizational (4), Technology (4) and Human (3) respectively.

Identify the performance level of the capability:

To combine these performance levels we could determine the desired performance of the whole capability. However, not all the capability dimensions contribute the same value to the capability. Therefore, before calculating the overall performance level of the capability, the decision-maker should determine the attractiveness level with each capability dimensions, which according to the business analysis of this capability and the experience of the decision-maker. The attractiveness scores of each capability dimension will be divided into 5 levels, which are:

- 0: Not relevant
- 1: Not attractive (Not important)
- 2: Possibly attractive (Somehow important)
- 3: Probably attractive (Important)
- 4: Most attractive (Very important)

After that, we could fill the data into the Capability assessment framework and calculate the capability performance level of this specific capability. The relationships between the calculating result and the capability performance level are shown on the Table 21, which have been also described in details in Chapter 3:

Table 21: Simplified Capability performance level model

Capability performance level	Score range	Representation on the Capability heat map
Level 0: None	[0, 0.5)	
Level 1: Initiate	[0.5, 1.5)	
Level 2: Under development	[1.5, 2.5)	
Level 3: Defined	[2.5, 3.5)	
Level 4: Managed	[3.5, 4.5)	
Level 5: Optimizing	[4.5, 5]	

For example, Table 22 shows the details of the assessment for Customer billing process management. It combines the data of the attractiveness scores and the performance levels for its capability dimensions. The result of the Calculation is 3.625, according to Table 21, the capability performance level of Customer billing process management is level 4 Managed.

Table 22: Desired performance of Customer billing process management

Capability title	Customer billing process management		
Description	The ability to manage the process of billing customer		
Capability Goal	The business units from different location have the same standard business process of billing customers. And the service time should be controlled in ± 3 days difference in different business units		
Actor	Billing manager		
Capability dimension	Indicator	Attractiveness score	Performance level
Process	Sum of deviation of time (in days) against planned schedule of all billing processes	4	4
Financial	Sum of deviation in money of planned budget for managing the billing process	2	2
Physical	Sum of deviation in the planned equipments that will be used during the billing process	3	3
Technology	Available application provides the integrated billing service support for all the business unit	4	4
Organizational	Available formal documents for organizing the billing process	3	4
Human	Number of key staffs involves	2	3
Capability performance level	**Level 4: Managed** $P = \sum_{i=1}^{N} P_i A_i \Big/ \sum_{i-1}^{N} A_i = 3.5$		

***** **P** for Capability performance level
$\mathbf{P_i}$ for performance level of each capability dimension
$\mathbf{A_i}$ for attractiveness level of each capability dimension
N for total number of capability dimension

To determine the desired capability performance level of the other strategic capabilities follow the same process. Table 23 is the summary of the capability performance level of the strategic capabilities. In this table, we use the color to represent the performance level of each capability dimension and the number to represent the attractiveness score.

Table 23 : Summary of target capability performance level

Capability	Pr	F	Ph	T	O	H	Capability performance level
1.1.1 Regulatory analysis and prediction	4	2	1	2	4	4	Level 4
1.2.1 Organizational regulatory setting	3	2	1	2	4	4	Level 3
2.1.1 Customer data analyzing	3	2	3	3	3	4	Level 3
2.1.2 Customer data organizing	3	2	3	4	3	2	Level 3
2.2.1 Customer billing process management	4	2	3	4	3	2	Level 4
2.2.2 Customer billing data collection	3	2	2	3	3	3	Level 3
3.1.1 Application portfolio management	3	3	3	4	3	3	Level 4
3.1.2 Infrastructure portfolio management	2	3	4	3	3	3	Level 4
4.1.1 Training	2	3	1	2	3	4	Level 4
4.2.1 Compensation and Benefit management	2	3	1	1	3	2	Level 3
4.2.2 Recruitment management	3	2	1	2	3	3	Level 3
Interpretation	1. Pr: Process, F: Financial, Ph: Physical, T: Technology, O: Organizational, H: Human 2. Number represent the Attractiveness level 3. Different color represent different performance level Level 0 / Level 1 / Level 2 / Level 3 / Level 4 / Level 5						

After all the desired capability performance levels have been defined, we can construct the target capability heat map, which is illustrated in Figure 64.

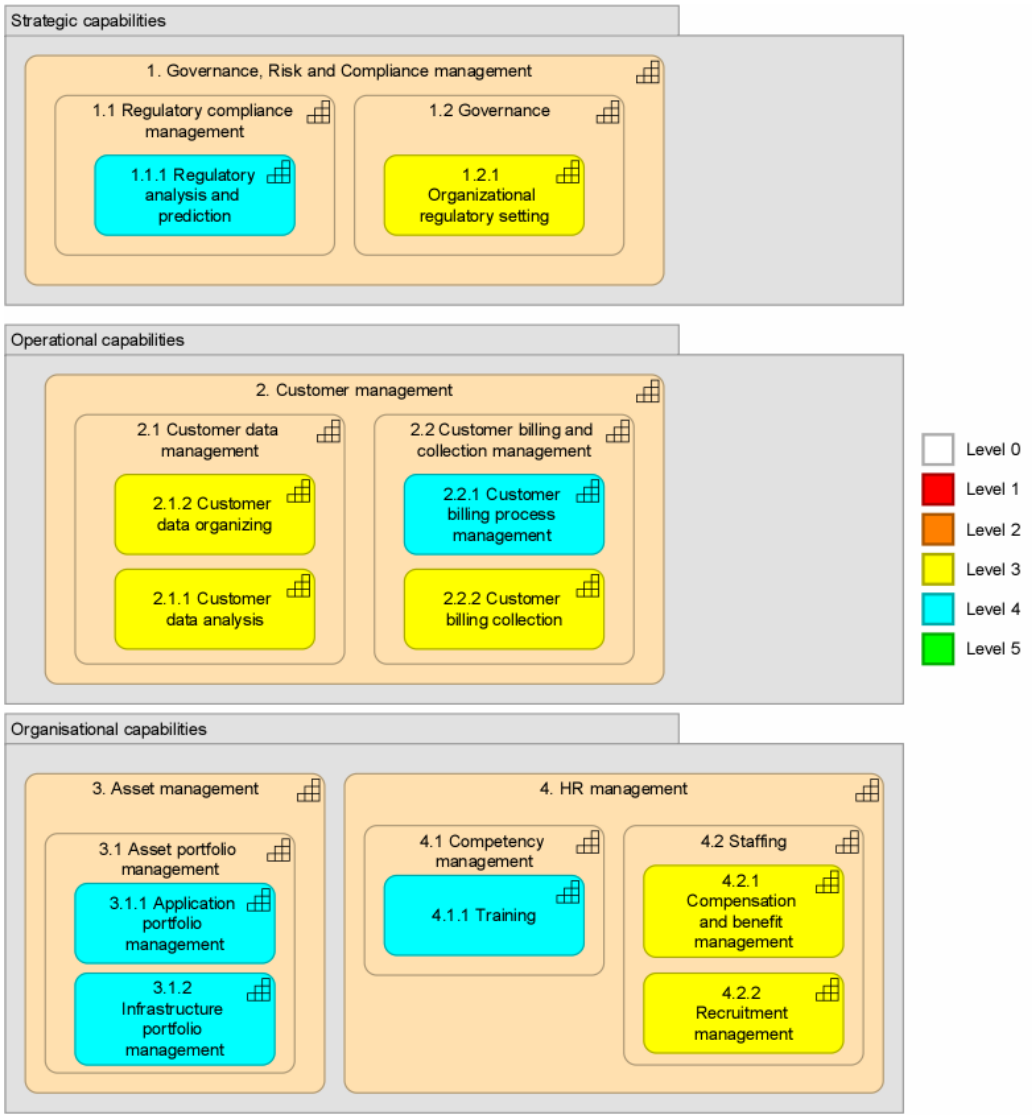


Figure 64: ArchiPharma Target Capability heat map

4.4.4 Assessing the current performance level of the capabilities

To assess the current performance level of the capabilities uses the same techniques and process as assessing the desired performance level of the capabilities. The major difference between these two assessments is the data input.

To use the Customer billing process management as an example, we already knew that the current problem of ArchiPharma is that there is not-uniform way of billing customers: The processes are executed slightly different by each business unit. According to the context of ArchiPharma, we could construct the Current architecture as shown on Figure 65:

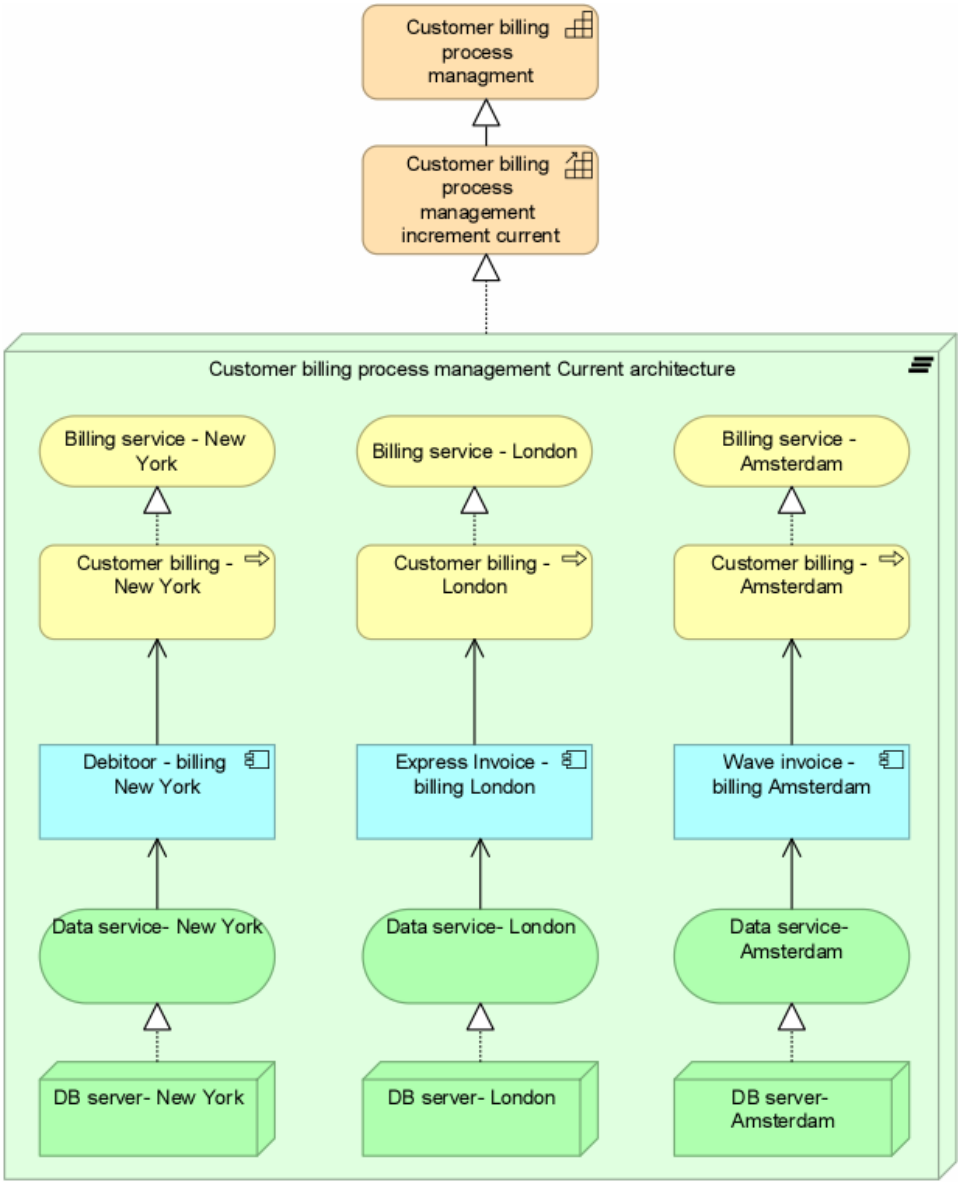


Figure 65: Customer billing process management Current architecture

From this architecture, we could find out that the different business units of ArchiPharma do not have harmonize billing process, which could be the result of the billing processes of different business units are handled by different applications. Furthermore, the customer data are stored in different database, which could cause the problem of heterogeneous data.

To evaluate the performance of this capability, we could also use the Indicators to assess the performance level of each capability dimension. To estimate the current performance level is based on the real situation of ArchiPharma. After we assess all the capability dimension of Customer billing process management, we could get the result that is shown in Figure 66, the spider chart that represents the current capability increment:

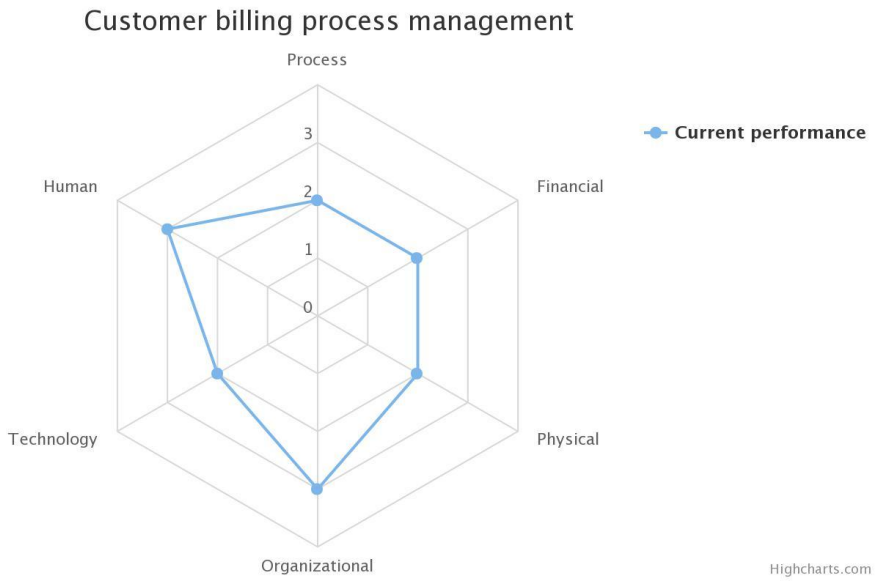


Figure 66: Current Capability Spider chart for Customer billing process management

According to the assessment results of these capability dimensions, we could fill in the capability assessment framework and calculate the overall performance of Customer billing process management, which described in Table 24.

Table 24: Current performance of Customer billing process management

Capability title	**Customer billing process management**		
Description	The ability to manage the process of billing customer		
Capability Goal	The business units from different location have the same standard business process of billing customers. And the service time should be controlled in ±3 days difference in different business units		
Actor	Billing manager		
Capability dimension	Indicator	Attractiveness score	Performance level
Process	Sum of deviation of time (in days) against planned schedule of all billing processes	4	2
Financial	Sum of deviation in money of planned budget for managing the billing process	2	2
Physical	Sum of deviation in the planned equipments that will be used during the billing process	3	2
Technology	Available application provides the integrated billing service support for all the business unit	3	2
Organizational	Available formal documents for organizing the billing process	3	3
Human	Number of key staffs involves	3	3
Capability performance level	**Level 2: Underperform** $P = \sum_{i=1}^{N} P_i A_i \Big/ \sum_{i-1}^{N} A_i = 2.33$		

It is important to notice that the attractiveness level required to define again, since the architectures of the current capability and the target capability are different. Therefore, the attractiveness level of each capability dimension might be changed.

Table 25 is the summary of the capability performance level of the strategic capabilities. In this table, we use the color to represent the performance level of each capability dimension and the number to represent the attractiveness score.

Table 25: Summary of current capability performance level

Capability	Pr	F	Ph	T	O	H	Capability performance level
1.1.1 Regulatory analysis and prediction	4	2	1	2	4	4	Level 3
1.2.1 Organizational regulatory setting	3	2	1	2	4	4	Level 3
2.1.1 Customer data analyzing	3	2	3	3	3	4	Level 3
2.1.2 Customer data organizing	3	2	3	4	3	2	Level 2
2.2.1 Customer billing process management	4	2	3	3	3	3	Level 2
2.2.2 Customer billing data collection	3	2	2	3	3	3	Level 2
3.1.1 Application portfolio management	3	2	3	4	3	3	Level 2
3.1.2 Infrastructure portfolio management	2	3	4	3	3	3	Level 3
4.1.1 Training							Missing capability
4.2.1 Compensation and Benefit management	2	3	1	1	3	2	Level 3
4.2.2 Recruitment management	3	2	1	2	3	3	Level 3
Interpretation	1. Pr: Process, F: Financial, Ph: Physical, T: Technology, O: Organizational, H: Human 2. Number represent the Attractiveness level 3. Different color represent different performance level Level 0 / Level 1 / Level 2 / Level 3 / Level 4 / Level 5						

To evaluate the other capabilities by following the same process that shown before, we could construe the current capability heat map, which is shown on Figure 67.

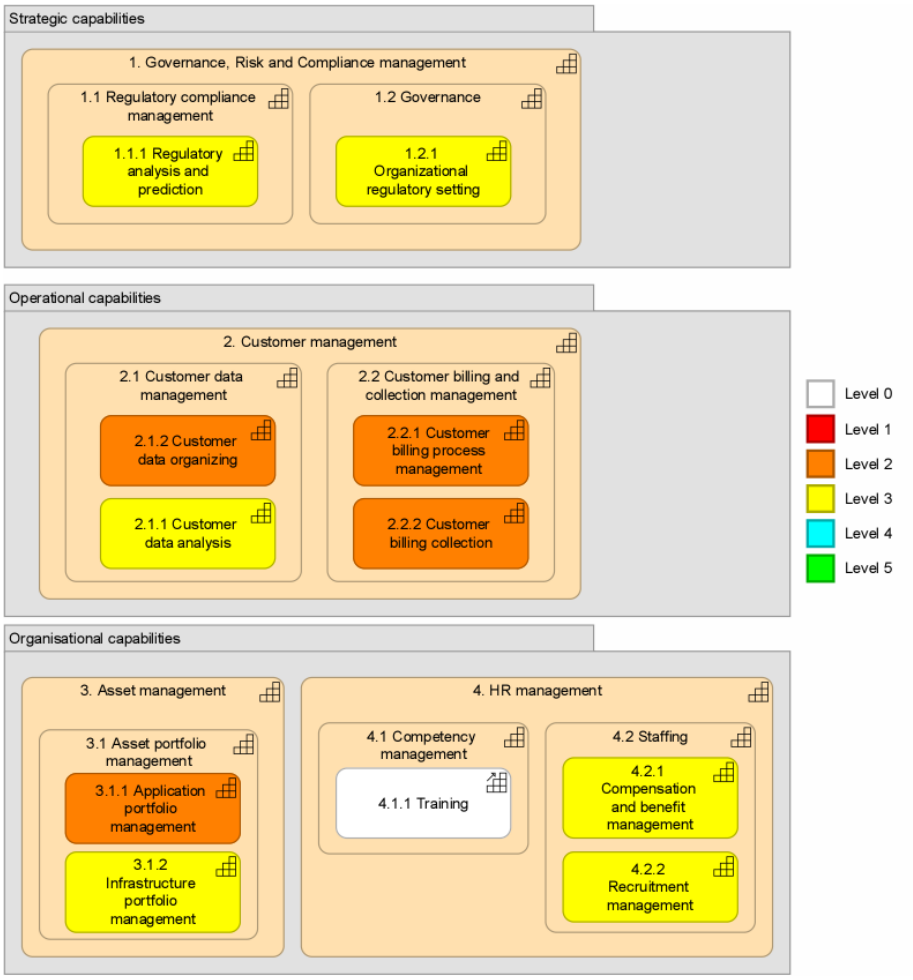


Figure 67 : ArchiPharma Current capability heat map

After we got the result of the target capability heat map and the current capability heat map, we could continue to the next phase, to make the capability development plan.

4.5 Plan

In order to achieve the strategic objectives, ArchiPharma should plan a set of capability development projects to improve their underperform capabilities. Eventually, the strategic capabilities of ArchiPharma could facilitate the strategy implementation.

Addressing the capability gaps:

The first step of Plan is to address the gap between target capabilities and current capabilities. Therefore, according to the heat maps that defined in the previous section, we could create the combined heat map to illustrate the difference of the performance level between target capabilities and current capabilities. Figure 68 is the combined capability heat map that pictures the capability gap of ArchiPharma to realize its strategic goal.

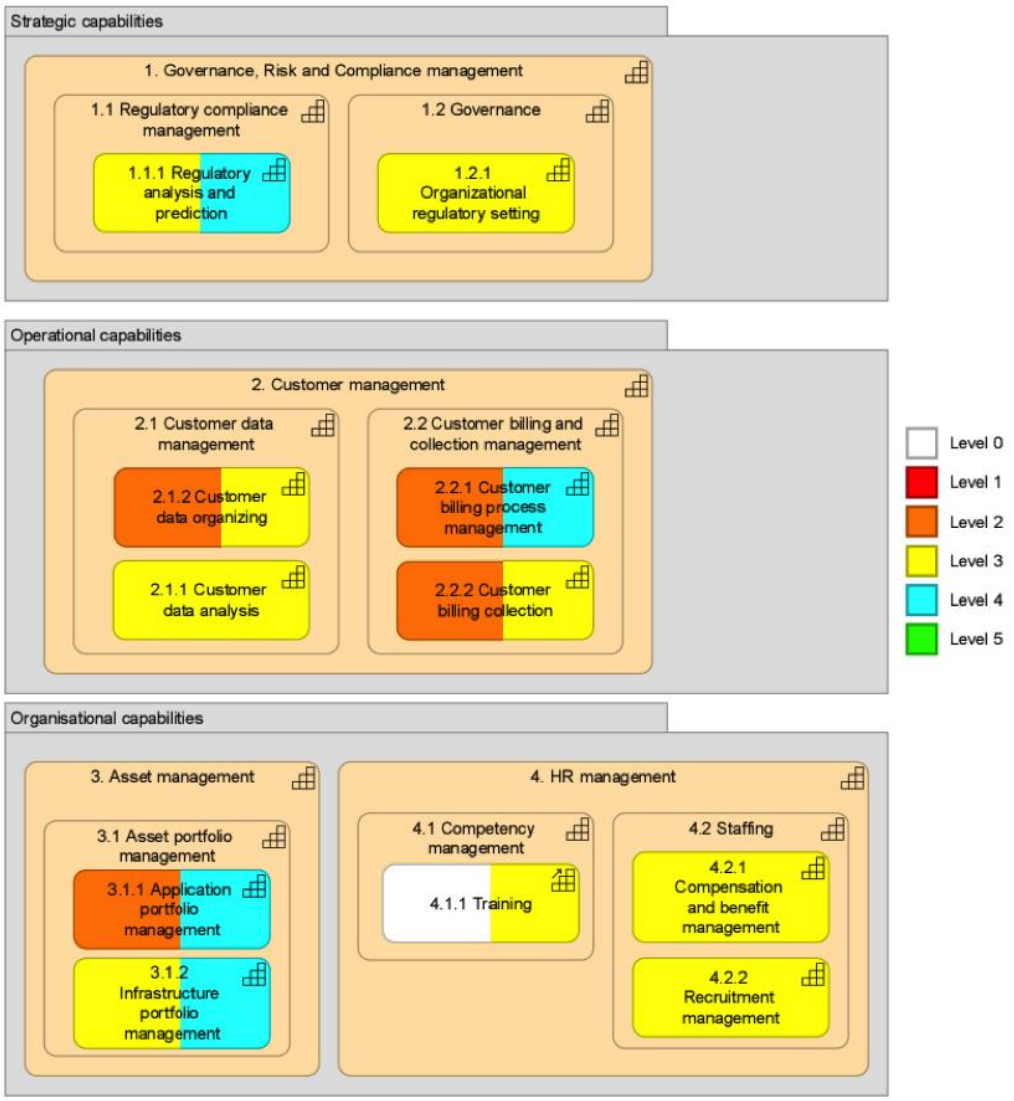


Figure 68: Combined capability heat map for ArchiPharma

From Figure 68 we can make a list of the capabilities that are underperform, which describes on Table 26:

Table 26: ArchiPharma Capability gap analysis

Capability	Current capability performance level	Target capability performance level	Performance gap
1.1.1 Regulatory analysis and prediction	Level 3	Level 4	-1
2.1.1 Customer data organizing	Level 2	Level 3	-1
2.2.1 Customer billing process management	Level 2	Level 4	-2
2.2.2 Customer billing data collection	Level 2	Level 3	-1
3.1.1 Application	Level 2	Level 4	-2

portfolio management			
3.1.2 Infrastructure portfolio management	Level 3	Level 4	-1
4.1.1 Training	Level 0	Level 3	-3

After the underperform capabilities have been identified, we could go deeper into the problem to find out what causes these capabilities underperform. For example, Figure 69 is the combined spider chart of Customer billing process management and it illustrates both current and desired performance level of its capability dimensions. From this figure we find that the value contributed by Physical, Organizational, Technology are not meet the requirements, furthermore, the process to realize the capability also not well organized.

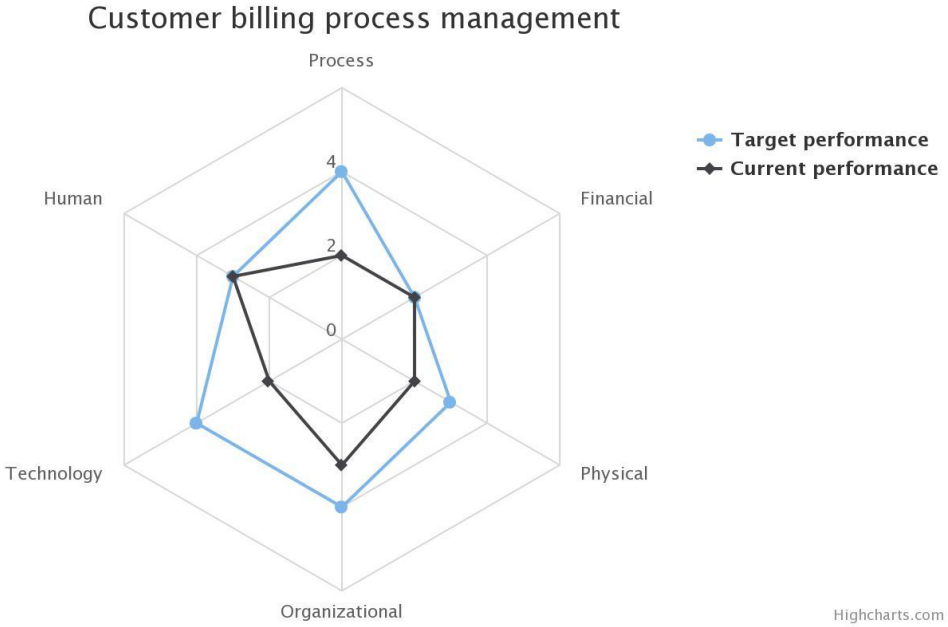


Figure 69: Combined spider chart of Customer billing process management

According to the spider chart, ArchiPharma could find the focus to design the capability development projects to improve the overall performance of this capability.

Select the urgent underperform capability

As mentioned in the previous section, to select the urgent underperform capability to develop depending on the following consideration, which includes:

- Strategic priorities.
- Optimal trade-off.
- Capability gaps.
- Business leaders' choice.

Strategic priorities:

For example, as shown in Figure 70, to achieve the strategic objective "Managing service quality and deliver on schedule" is influenced by the result of "Optimal IT internal process". Therefore, the capabilities that related to "Optimal IT internal process" could have higher development priorities than the capabilities that related to "Managing service quality and deliver on schedule".

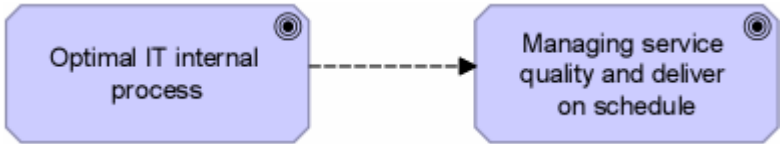


Figure 70: Part of the ArchiPharma Strategy map

Optimal trade-off:
To take the optimal trade-off as the approach to find the most urgent underperform capabilities, ArchiPharma could do the analysis of the relationships among the strategic capabilities, which already done in the Map phase. Figure 71 illustrates that both Governance, Risk and Compliance management and Customer management and their sub-capabilities require the Application portfolio management as the support. The low performance of the Application portfolio management could affect the other capabilities. Therefore, for the concern of optimal trade-off, to develop the application portfolio management has higher priority than the others.

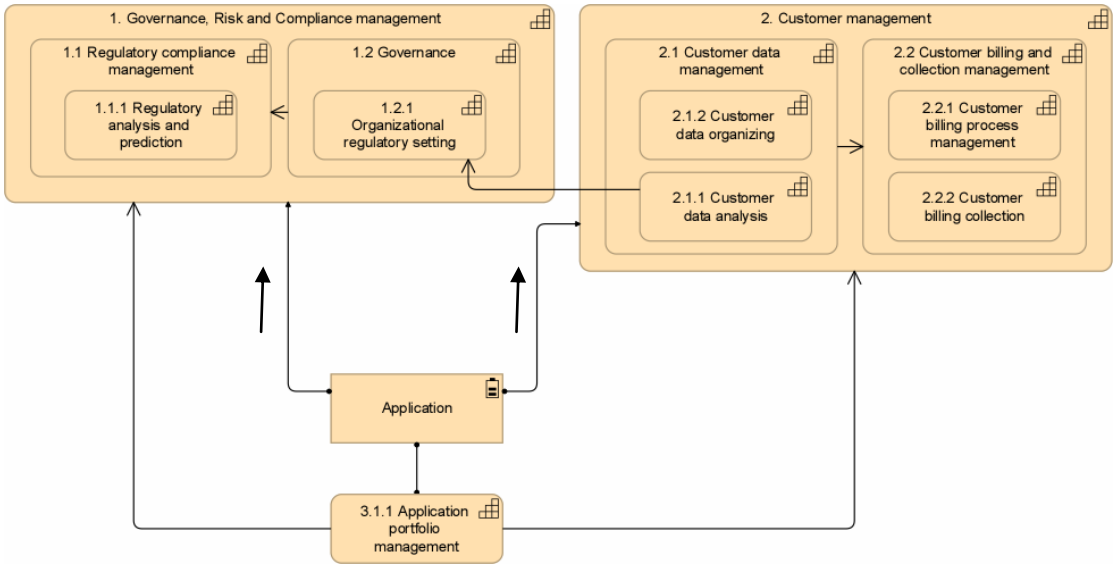


Figure 71: Part of the relationship among the strategic capabilities for ArchiPharma

Furthermore, we could look into more detail level of the capability, which is the capability dimension. For example, from the analysis of the previous section, we knew that the low performance of Customer billing process management is the consequence of the poor performs in its Process, Physical, Technology and Organizational dimension. The performance of the technology dimension is influenced by the value contribution of the applications, which related to Application portfolio management. Therefore, to improve the performance of Application portfolio management can also improve Customer billing process management.

Capability gaps:
And another approach for selecting the urgent capabilities to improve is according to the capability gaps. Table 26 shows there are three capabilities have more than two levels gap, which includes Customer billing process management, Application portfolio management and Training.

Training is the capability that does not exist in ArchiPharma. ArchiPharma need to create this capability in order to successfully execute their strategy. Since the reason of Training is missing is that ArchiPharma outsources the Training to the other organization. Therefore,

ArchiPharma could select the urgent capability from the other two capabilities.

Business Leader's choice:
Business leaders can also make the decision based on their experience combining with the data analysis. Furthermore, there is no sequence to use these four kinds of approaches and they can be used together. According to the analysis results that we just mentioned, the Application portfolio management could be listed as the top priority to improve.

Creating the capability development projects:

According to the case description, in order to achieve the strategy, ArchiPharma developed a set of work packages to facilitate the strategy implementation. And some of the projects of these work packages directly affect the capability improvement. The relationship between the work packages and the strategy are shown on Figure 72.

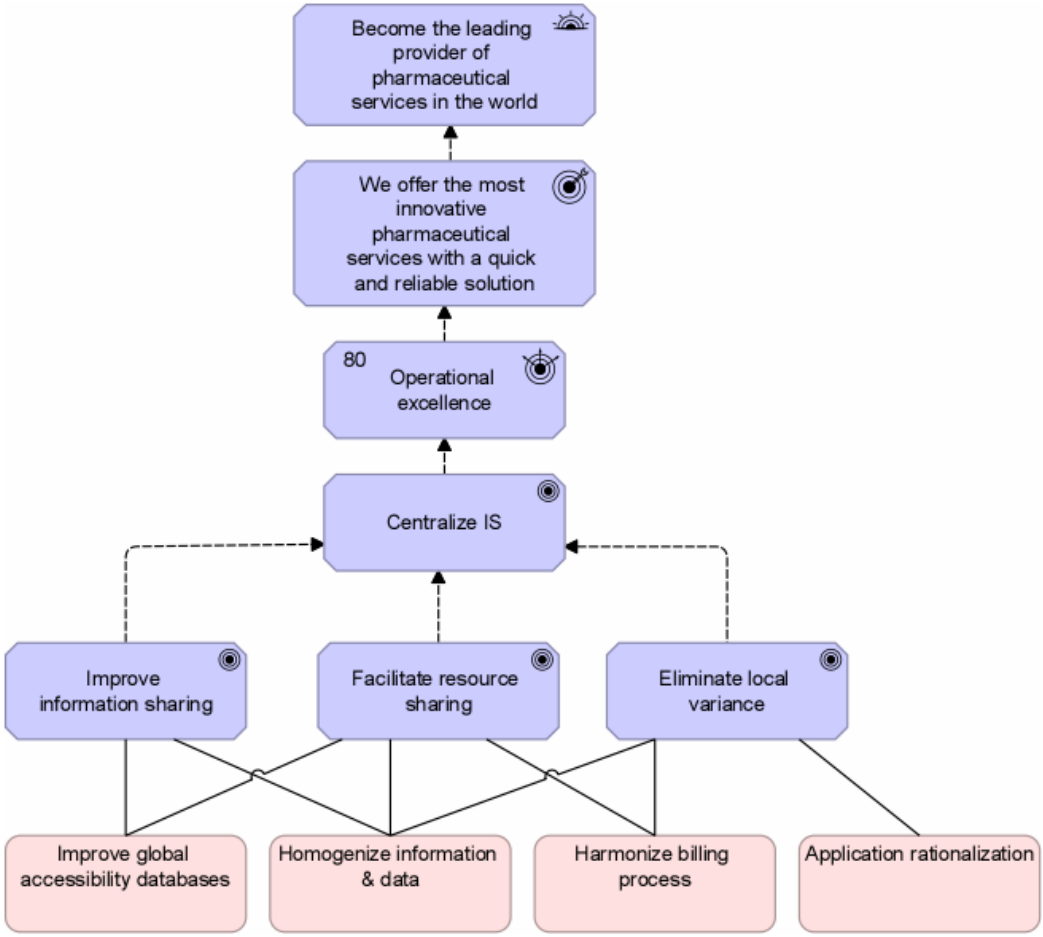


Figure 72: The relationship between the work packages and the strategy

According to the assessment results, the current Application portfolio management is underperforming. And the details of this underperform capability can be shown in the spider chart, which shows Figure73:

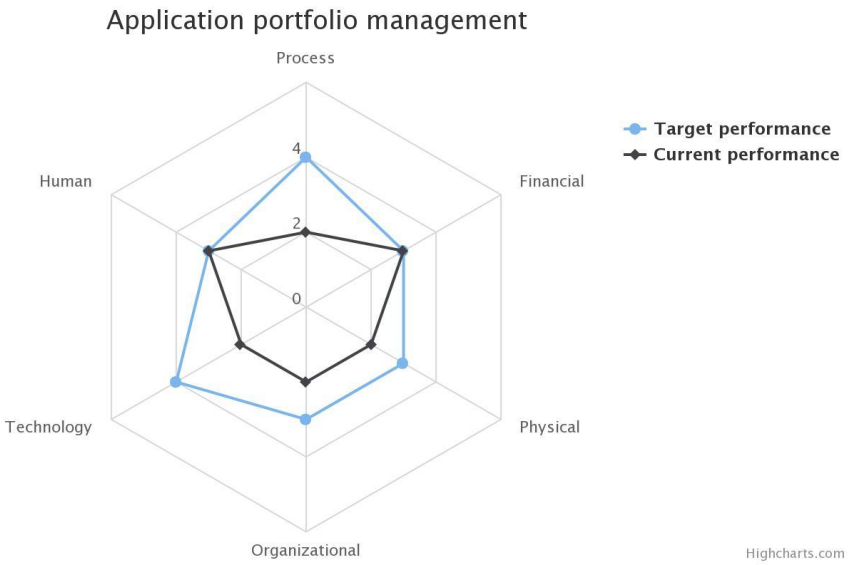


Figure 73: Combined spider chart of Application portfolio management

There are a lot of planned projects of these work packages can facilitate the improvement of the Application portfolio management. The Application rationalization work package could improve the performance in the technology dimension of this capability, and the Improve global accessibility databases could facilitate the performance in the physical dimension. Moreover, except for these work packages, we can find that there is another work package called Installment of APM process. This work package is used to help ArchiPharm to realize the goal of minimizing operational cost. However, it could be also used for improving the performance in the process dimension of Application portfolio management. Therefore, we could create a figure to link all the related work packages and their projects to the development of Application portfolio management.

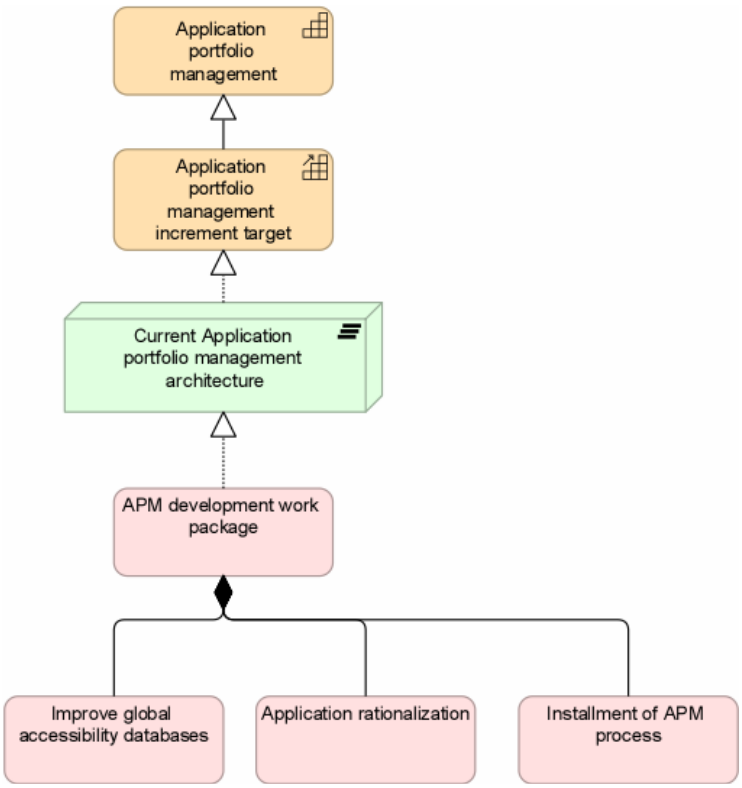


Figure 74: Work packages for capability increment of APM

These work packages have a lot of different projects, but not every project is worst to develop. Therefore, ArchiPharma should do the investigation of Balance of Investment, to evaluate which projects should be executed and which are not.

Balance of Investment (BOI):
BOI involves evaluating the requirements of the cost, resource demand, risk, applicable time frames and any other possible constraints for the project development. Therefore, this part is related to the portfolio management.

According to the case description, ArchiPharma creates the Portfolio scorecard to illustrate the risk, benefit and the strategic value projects of all the projects. Table 27 shows the projects that related to the Application portfolio management.

Table 27: Project portfolio scorecard

Project Name	Work package	Benefit (€)	Risk	Total costs (€)
Define valuation model	Application Rationalization	1000	Very low	32000
Develop application rationalization roadmap		1200	High	15000
Identify obsolete applications		1750	Medium	15000
Install application lifecycle management approach		2500	High	1500
Inventory applications		750	High	2500
Migrate and eliminate identified applications		7500	Medium	75000
Valuate applications		1500	Very high	20000
Choose, configure, test and install APM applications	Installment of APM process	10000	High	75000
Design and populate application portfolios		2000	High	25000
Design enterprise-wide APM process		7000	Medium	75000
Analyze data sources	Improve global accessibility database	500	High	2500
Develop database authentication protocols		1800	Very high	9500
Develop integrated reporting		8000	Very low	40000
Install database authentication		150	High	15000
Install federated database management system (FDMS)		250	Medium	75000
Prepare and adapt databases		1100	low	60000
Publish database information		1500	Very low	12000

According to the analysis result of these projects, ArchiPharma could determine which projects are worst to invest than the others. Furthermore, ArchiPharma should also consider their current resources and budget that could be used for these project developments. They should abandon the projects that are high risk and low Return on Investment (ROI), if they run out of the budget that they could use in developing this capability.

Therefore, we create the Figure 75 shows the projects and work packages that can be used for developing the Application portfolio management. And on the top left corner of the notation shows the planned cost (€) of the projects and work packages.

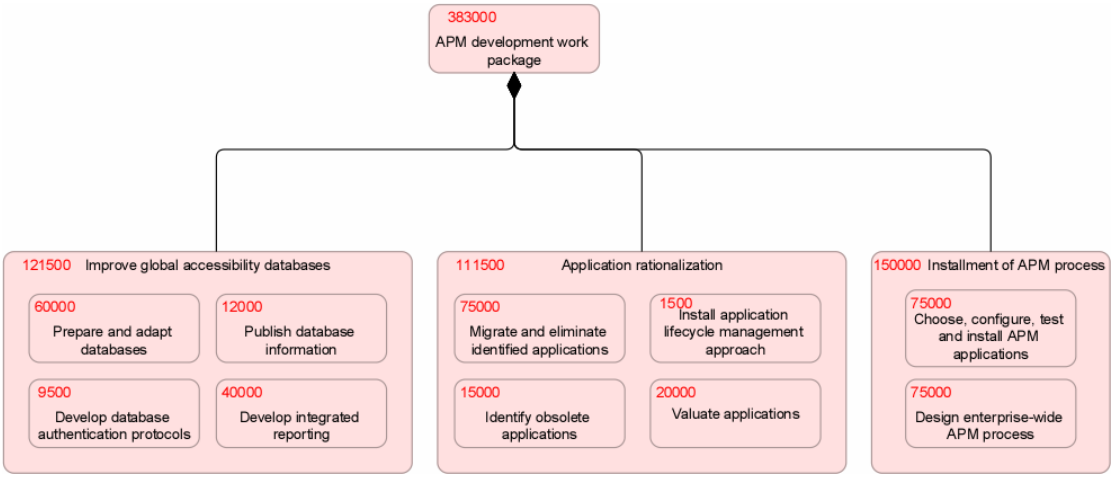


Figure 75: Application portfolio management development work package

Afterward, ArchiPharma can plan the development projects to improve the capability of Application portfolio management according to the emergent level of the underperform capabilities and their resources and the other possible constraints. According to the analysis result, ArchiPharma could construct a capability development roadmap. The capability development roadmap for Application portfolio management is shown on Figure 76.

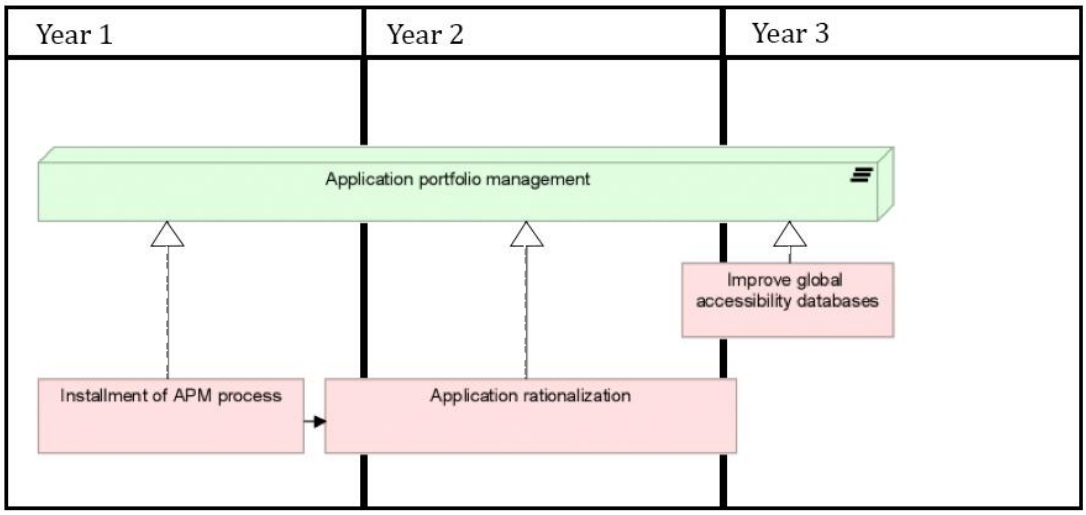


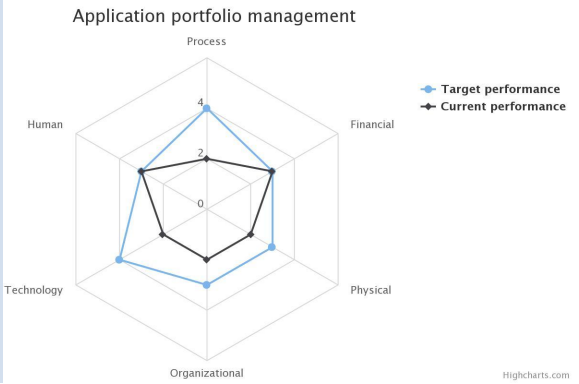
Figure 76: APM development roadmap

Documenting the Capability development plan

For each specific capability, there could be a table to represent the important information of its development plan. Table 28 shows the Capability development plan for the Application portfolio management.

Table 28: Application portfolio management development plan

Capability	Application portfolio management
Capability goal	Eliminate the redundancy application and narrow down the application landscape. Ensure different application should have minimized overlap

	function and provide a standard platform for ArchiPharma business units to handle their services.
Capability gap	
Development projects	- Application Rationalization - Installment of APM process - Improve global accessibility database
Estimate resource	- Project group with skilled business analysts, software engineers etc.
Estimate spend	383000 (€)
% of total budget	30%
Direct Benefit	43150 (€)
Impact of doing nothing	A large legacy application landscape, which could cause the heterogeneous business process, products, database and make ArchiPharma difficult to adapt to the change of the external environment.
Developing timeline	Last for 28 months, details are shown on figure 4.23

From this table we could realize the capability improvement is achieved by executing a set of projects. However, one project could contribute value to one or more than one capabilities. Therefore, there is seldom one to one relationship between the capability improvement and the projects. Figure 77 shows the Project development timeline for ArchiPharma to achieve the desired performance level of their strategic capabilities. The investments of these work packages are on the top left corner of the notation, and the different colors represent the risk of these projects.

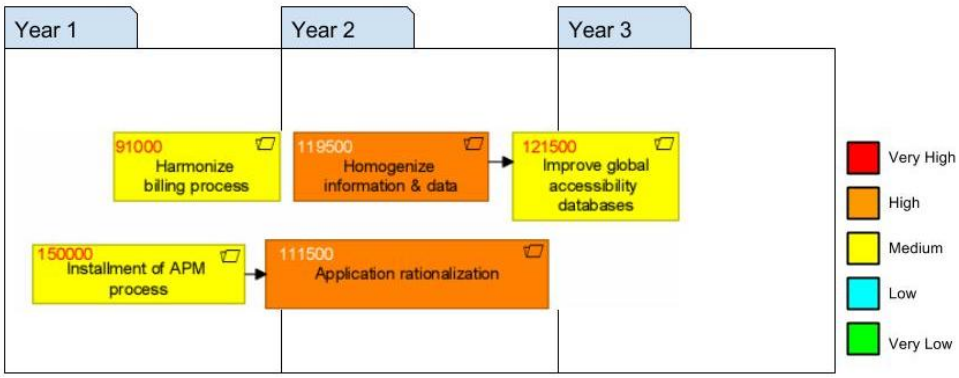


Figure 77: Project development timeline

To combine this information, ArchiPharma could construct the overall Capability development roadmap to show the whole capability development plan. Figure 78 shows the roadmap of the improvement of the strategic capabilities with their related development projects. According to the capability relationships that we mention in chapter 4.3, the

improvement of one capability can also influence the performance of the other capabilities.

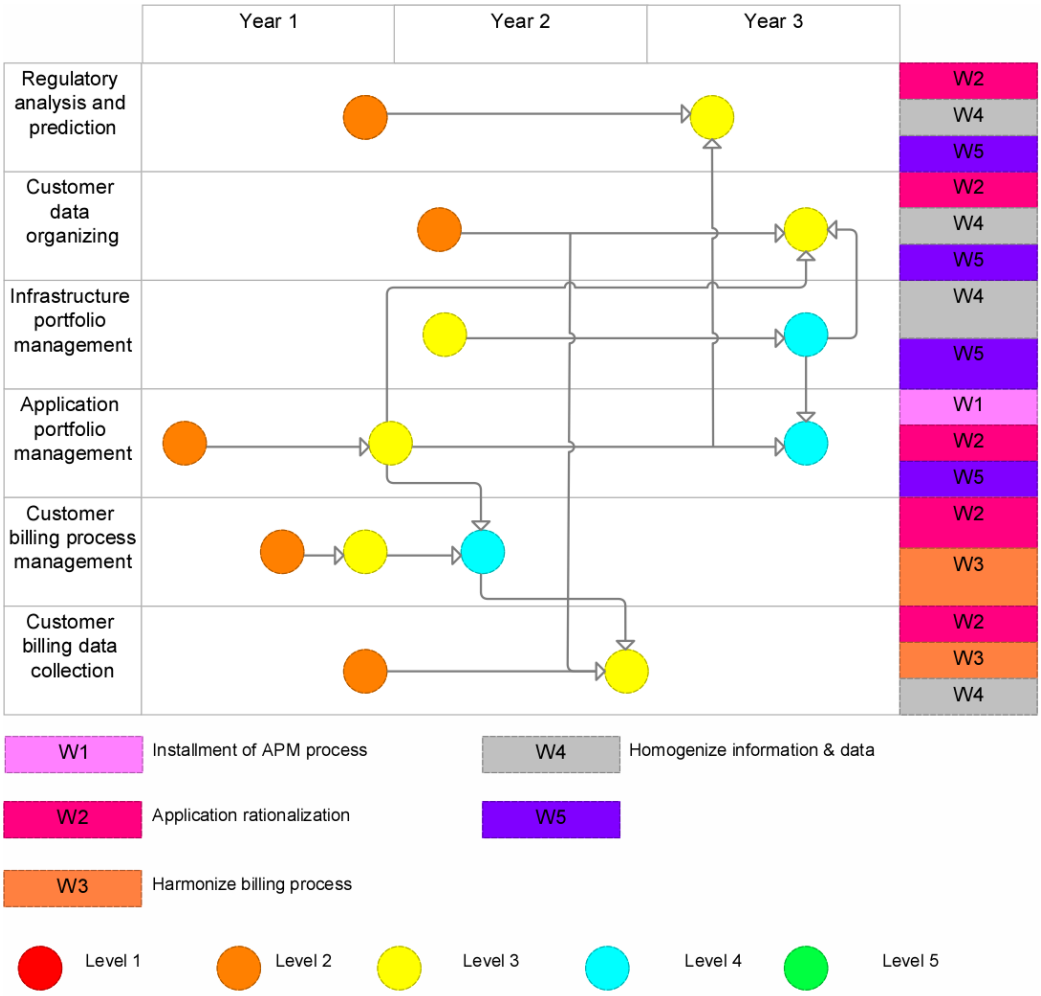


Figure 78: Visualized Capability Development Plan

Therefore, in order to achieve the chosen strategy, ArchiPharma should implement these selected work packages to improve the performance level of their strategic capabilities. And the specific project development plan is shown in Figure 77, which includes the investment and risk.

Summary

The purpose of this chapter is to use the ArchiPharma case to describe how to adopt the suggest CBP method to a business case.

The case study follows the three main steps of the suggested CBP method, which includes Map, Assess and Plan. The data input includes the Strategy Map, Balance Scorecard and the organization information asset of ArchiPharma.

According to the data input and the suggested CBP method, we find out the required capabilities of ArchiPharm to achieve the operational excellence strategy. Furthermore, we estimate the desired performance level of them. Comparing the assessment result with the current situation of ArchiPharma, we come up with five work packages, which involve a set of

projects respectively, to improve the current capabilities of ArchiPharma.

Eventually, ArchiPharma can achieve a better performance of their strategic capabilities to facilitate the implementation of their strategy.

5. Evaluation

As described in chapter 1.4, this thesis follows the structure of Design Science Research Methodology (DSRM). Evaluation is the fifth part of DSRM to observe and measure how well the artifact supports a solution of the problem. (Peffers et al., 2007) Therefore, the purpose of this chapter is to evaluate the utility of the suggested method, whether it is effective or/and efficient or not to translate strategy into implementation.

To achieve the goal of evaluation, this chapter is organized as follows. In order to gather the required information for the evaluation, chapter 5.1 is to define the assessment criteria of this evaluation. After that, we could define the questions that we would like to ask for the interviewers based on these criteria, which is presented in chapter 5.2. And chapter 5.3 is to analyze the results of the evaluation interview. Finally, it is the summary.

5.1 Assessment criteria

The goal of this evaluation is to assess the effectiveness and the efficiency of the Capability-based planning (CBP) method that we proposed in this study. According to the DSRM, the evaluation activity should involve the comparison of the solution objectives with the actual observed result from the use of the method that proposed in the demonstration. In order to generate the information that can be used for the evaluation.

The suggested CBP method can be evaluated by answering the internal validity knowledge questions that proposed by Wieringa. (Wieringa, 2009) Wieringa categorized the core knowledge questions of validation can be divided into the causal question and the value question. In respectively, the causal question is related to the expected effect of the proposed method: What will be the effects of the artifact in a problem context? While the value question is related to the expected value of the method: How well will these effects satisfy the criteria? (Wieringa, 2012)

First is the expected effect, which is focusing on asking the questions that aim to address the quality of the proposed method. Second is to assess the expected value by asking the question that related to the usability. Wieringa stated that the effect questions should reflect the requirements of the artifact, which could involve the quality properties like suitability, accuracy, usability etc. (Wieringa, 2014) Therefore, our evaluation criteria will be constructed according to the chosen quality properties of an artifact, which is illustrated in Table 29.

Table 29: Evaluation dimensions

Evaluation Criteria		Description
Accuracy in design	Correctness	To evaluate the logic of the designing of the method.
	Completeness	To evaluate the completed level of the method.
Ease of understanding		To evaluate the complexity of understanding the method.
Usability		To evaluate whether the method is doable.
Utility and Suitability		To evaluate whether the method is applicable in the real business and contribute the value to the strategy implementation.

5.2 Interview setting

According to the description of the evaluation phase in DSRM, to assess the performance of an artifact we could collect the feedback from the potential clients. And in the case study that proposed in Peffers et al. research, to collect the feedback could be achieved by constructing the interview. (Peffers et al., 2007)

Therefore, we will structure the interview as the semi-structured interview format to generate the comment and feedback from the experts to evaluate the proposed method of this research. Table 30 illustrates the interview setting and we would like to follow this schedule to interview all the respondents.

Table 30: Interview setting

Duration	Activities
20-30 minutes	● Introduction ● Method demonstration with running case
20 minutes	Interview questions
10 minutes	Open discussion: Comment, feedback and suggestions for improvement

Presentation:
The purpose of the presentation is to introduce the main concept of the proposed CBP method, which includes the steps and the techniques.

First, the background of doing this research will be introduced. After that, the steps and the techniques that used in this proposed method will be discussed respectively, which follow the general phase of this method: Map, Assess and Plan. In order to make the introduction clearer, we will use the running case to elaborate this method, which is part of the case study of this paper.

Interview:
This evaluation will structure according to the semi-structured interview format. In the semi-structured interview, the interview should be scripted beforehand. The questions should be prepared earlier, and we should make sure that all the interviewees answer the prepared questions. The specific topics of the interview should be set that we want the interviewees would like to explore during the interview. Further, it is advisable to ask questions based on the comments of the interviewees, which could help to make the feedback from general to specific. (Myers & Newman, 2007)

The participants or respondents to the interview sessions are selected based on their expertise in the area of their researches. They are all from the Research & Development department of BIZZdesign, which are more familiar with the similar topic and have the experience of using different methods in practices.

Table 31: Interview question script

Evaluation Criteria	Questions
Correctness	1. From the theoretical perspective, do you consider the steps of this CBP method to be logical? If not, which step is incorrect and need to be changed?

	2. Do you consider the techniques that used in this CBP method to be appropriate? If not, which technique should be changed?
Completeness	3. According to your experience, does this CBP method include all the required steps? If not, which step should be added? 4. Does this CBP method include all the required techniques? If not, which technique should be added?
Ease of understanding	5. Do you consider the steps of this CBP method to be clear? If not, which step needs further elaboration? 6. Do you consider the techniques of this CBP method to be clear? If not, which step needs further elaboration?
Usability	7. Do you consider the process of this CBP method to be too complex to use? If yes, why? 8. Do you consider the required data input to be easy to get? If not, what is the data input that you consider can be the replacement?
Utility and Suitability	9. Do you consider this CBP method to be feasible to implement in different kinds of industry? 10. Do you consider this CBP method to be useful for facilitating the strategy implementation? If (Yes/No), why? 11. Do you think you could apply this suggested method in practice according to the presentation?
Open discussion	12. Do you have any comments, feedback and suggestions for the improvement of this suggested method?

5.3 Interview result and analysis

In this section, the summary of the interview results will be generated, which is described in chapter 5.3.1. And then we will discuss the evaluation results in chapter 5.3.2, which is based on the interview answers.

5.3.1 Interview result

The purpose of this part is to generate the interview results to give the reader an overview of the overall comments from the interviewees. Table 32 shows the summary of the answer and the general idea from the three interviewees. And the transcript of the interview will be listed in the Appendix.

Table 32: Summary of interview results

Evaluation criteria	Questions	Interviewee 1	Interviewee 2	Interviewee 3
Correctness	Steps	Yes	Somewhat yes	Yes
	Techniques	Yes	Somewhat yes. But the dependency of	Yes

			the capabilities need further discuss.	
Completeness	Steps	Yes	It could also consider adding the evaluation phase after the Plan phase, to evaluate the development plan.	Yes, maybe more details in some part.
	Techniques	Yes	Yes	Yes, maybe more details in the architecture part.
Ease of understanding	Steps	Yes	Yes	Yes, generally it is clear.
	Techniques	Yes	Somewhat yes. But so far, it is a bit difficult to assess.	Yes
Usability	Complexity	Not complex	Not complex, but it requires a lot of work.	Not complex
	Acquire input data	It is possible, but not that easy.	Not easy, but also depend on the organization.	It is difficult to assess, it might be a problem.
Utility and Suitability	Feasible to adopt in all kinds of industry	Yes	Technically, yes.	Yes, it could be more suitable for using in the financial organization and government
	Facilitate Strategy implementation	Yes	Yes	Yes
	Use in practice	Yes	Yes	Yes
Open discussion	Suggestion	In gap analysis, using the color or the other kind of tool to visualize the performance gap of the capability.	Do not know yet. To give the suggestions requires more details of the method.	It is a clear scale to use red to green to represent the capability performance. But the blue color between yellow and green it does not make sense.

According to the answer of the interviewees, we know that in general, most of the questions have the positive feedbacks. For each evaluation criteria, they all give some comments and suggestions, and we will have further discussion of their answers, which will be described in the next section.

5.3.2 Interview analysis

In this section, the results of the interview are discussed respectively in each evaluation criteria. To evaluate the answers from the interviewees could help us to have more insight to the quality of the expected effects and values of the proposed method.

Accuracy in design:
To discuss the accuracy in design, which involves evaluating the correctness and the completeness of the proposed method. And the correctness and the completeness will be discussed respectively.

Correctness:
Most of the interviewees considered the steps and the techniques of the method had certain correctness. The method includes three major steps that are Map, Assess and Plan, which have been considered as logical. The first interviewee thought the method start with making the match of the strategy and the capability, and based on the current situation and design the "to be" situation and make the gap analysis, which seems logical and also fit with the ArchiMate. The third interviewee also considered the steps look like logical and easy to follow. The second interviewee thought the steps seems proper so far, however, it could not simply answer the steps are correct or incorrect.

For the techniques that used in this method, two of the interviewees considered they were appropriated. The first interviewee thought the strategic models that we used in the proposed method were most commonly used, and it could be a good choice. But to find the indicator to assess the capability dimension could be difficult. However, the capability dimensions that defined in the method are most used. The organization could up to their needs to define more capability dimension to assess the capability.

And from the second interviewee points of view, the techniques are appropriate, but quite labor intensive, like finding the goals of the level 3 capabilities. Furthermore, it is interesting to see the relations between level of Strategy Map and the level of the capability Map. But the second interviewee was not sure about the dependency relation among the capabilities. Because some of the people consider the capabilities are independent, while some of the others find that some capabilities will use the other capabilities.

Completeness:
Two of the interviewees considered the method are completed. The third interviewee thought that since the introduction of the method is quick (in 20 minutes), it is too hard to know much detail. In general, it is completed, but it could be required to add some details on both steps and techniques of this proposed method.

The second interviewee considered the method could add the evaluation phase after the plan phase, which could help the user to check and monitor the planned projects. It is depending on the purpose of using this method, but it should be something that needed to consider. And the second interviewee considered the techniques that used in this method is completed. But it was possible to add the alternative techniques for the analysis of the Balance of Investment.

Ease of understanding:
All of the interviewees considered the steps and the techniques of the proposed method are easy to understand. But the second interviewee thought that the introduction was too short to know all the details of the techniques and he also preferred to apply the techniques before really understand the techniques. Therefore, he was not sure that which part of the technique required further elaboration. But so far, the techniques were clear.

Usability:
After evaluating the expected effects of the CBP method, we could assess the expected value according to the interview results. First, we should think about whether the method doable or not. All of the interviewees considered the process of the proposed method were not that complex to execute. The first interviewee thought that the method was staying really close to the ArchiMate, for example, the Plan phase of the proposed method was matched well with the project portfolio management.

Even though the second interviewee considered this method was not too complex to use, it would cause a lot of work. For example, relating the capabilities with the strategic objectives could be already difficult for the customer and also could be subjective. Furthermore, the assessment of the capabilities could also labor intensive. However, if we would like to get the value from the CBP method, that is something that we should do. And the user should also think about how far to go to find the dependency between the capabilities, which would be also difficult. The first interviewee also mentioned that it was not the method itself complex, but the problem was complex. Therefore, the method was not that complex to use, but it would cause a lot of efforts.

However, all of the interviewees considered the data input for the method to be not easy to get. The data input for this proposed method was really depending on the organization. For example, the first interviewee mentioned that in the strategic level, some organizations might be better organized than the others, as well as for their capabilities. However, the second interviewee also said that it could be already difficult for many organizations to get clear of their strategic objectives. Therefore, both of the interviewees thought that it could require a few interviews to help the organizations to figure out their strategic objectives and their capabilities. However, if the organization would like to do the strategic level analysis, they should have these data and do these interviews.

And to get the information for assessing the capabilities could be also not that easy. The second interviewee suggested, if there were some information difficult to get, the organization could consider changing the metric to assess the capability. However, to use a method should also inspire the organization to try to get the data.

Utility and Suitability:
After assessing the proposed method whether doable or not, we should consider whether the proposed method is feasible to use, and whether the target users are capable to use it in practice. More importantly, does this CBP method could facilitate the strategic implementation, which is closely related to the main research question of this study.

In general, all of the interviewees considered this method to be feasible to use in different kinds of industries. The third interviewee thought the proposed method could be more suitable to use in the financial industry and the government. However, the second interviewee thought even the method was technically fitting for most of the industries, more importantly, we need to see how willing these industries to use it. And it required the added value that we could show to these industries and the efforts that they needed to take.

In general, all of the interviewees agreed that the method was useful to facilitate the strategy implementation and it could use in practice.

Open discussion:
All of the interviewees have the positive feedback for the general quality of the proposed CBP method. The first interviewee thought that the combined heat map that we used in the method did not clearly show the level of the gap. There could be another way to make the level of the

gap more visualized. For the third interviewee, he thought it was common to use the color coding to represent the performance level, and the scale from red to green was also common. However, to use the blue color to represent the performance level between yellow and green did not really make sense, which could be possible to use the light green or dark green to replace it.

Furthermore, the third interviewee also showed the interested in the relationship between the capabilities. Currently, we use "used-by" relationship between different level 3 capabilities, but the third interviewee considered to use the "contribute" relationship to represent this kind of dependency will be better. However, there is no "contribute" relationship between different capabilities in the current version of ArchiMate, it is fine to use "used-by".

The focus:
We find there are three focuses of the interviewees according to the analysis of the interview result, which are the dependency relations between capabilities, the efforts for using this method and the data input.

Most of the interviewees feel interesting for making the connection between different capabilities. Using dependency relationship in the capability analysis could help the organization to plan the project and/or analyze the capability performance. On the other hand, to define how far to go to analyze these dependency relationships could be also another problem. But it is something interesting that can be investigated in the future.

Furthermore, this proposed method could be labor intensive. How to make the method simpler is still a problem right now. Therefore, to inspire the organization to use the proposed method we should find more added value of using this method in practice.

And the data input of this proposed CBP method might be not that easy to get. It requires a few interviews and could be labor intensive to get this required data. But it also highly depends on the organization itself, some of the organizations are more organized in the strategic level.

Summary

This chapter evaluates the proposed CBP method by doing the interviews with the experts in the related area. In general, the evaluation results in every aspect show the positive value of this proposed CBP method. They made some remarks about this method, which included the strong points and the weak points. The strong points of this proposed method are: 1) The steps and the techniques of the proposed method are clear and easy to follow. 2) It is applicable for different kinds of industries. 3) It models the capability and the capability dependency relationship in ArchiMate. 4) It could be related to the other techniques and methods, for example, project portfolio management. On the other hand, the weak points of this proposed method are: 1) It is doable, but labor intensive. 2) To use the capability dependency relationship in this proposed method is required further investigations.

According to the remarks that are proposed by the interviewees, we could have the idea of how to improve the proposed method. Moreover, we could get the idea of what would be the potential future research in this field. However, due to the limited number of the interviewees and the time constraints, there might be some problems of this proposed method have not been revealed. In general, the proposed method could facilitate the strategy implementation, which could help us to solve the main question of this study.

6. Conclusion

In previous chapters, this research has proposed the Capability-based planning (CBP) method to help the organization to facilitate its strategy implementation and applied a case to demonstrate the proposed method. This chapter provides a conclusion of what the research has done in the previous chapters and answers the research questions that proposed in chapter 1. Additionally, this chapter discusses the contributions and the limitations of this research, and the recommendations for the future work in the related area.

6.1 Answers to the research questions

The research goal of this research is to use the CBP to facilitate the strategy implementation of an organization. To meet this goal, the main research question has been formulated as follows:

How to develop a capability-based planning method to support strategic alignment?

To answer this main question, a set of sub-questions are defined:

- **RQ1: What is the relationship between strategy implementation and capability?**
  Chapter 2 provides a theoretical foundation for this research to explore the relationship between strategy and capability. A broad literature review shows the capability generates the competitive advantage of an organization and provides a foundation for the organization to execute their strategy.

  Especially for the strategy implementation, since capabilities are unique and not easy to change, they are needed to enable the delivery of the chosen strategy. Therefore, strategic decision should be based on the organization's capabilities.

  Furthermore, as discussed in the Chapter 2.3, the organizational CBP method aims to give the suggestions for the organization to make appropriate projects to develop their capabilities, which could facilitate the organization achieve their strategy. The chosen strategy is the necessary data input for the organization to execute the CBP method, which means the development plan of the capabilities should be associated with the strategy.

  In conclusion, the successful implementation of the strategy depends on a proper deployment of the organization's capabilities. The improvements of the capabilities are based on the organization's strategic needs.

- **RQ2: How to design a method to link strategy and capabilities?**
  The Map phase of the proposed CBP method which is described in Chapter 3.2.1 addresses the solution for this research question.

  The Map phase of this method mainly uses the Strategy Map and Capability Map as the techniques to link the capabilities with the strategic objectives of the chosen strategy. The Strategy Map provides a hierarchy way for the organization to demonstrate the strategic

objectives in the cause and effect relationship as well as the Capability Map. Chapter 3.2.1 discussed how to use link the capabilities from different specific level to the strategic objectives from different perspectives of the Strategy Map, which could help the organization to construct the Target Capability Map to present the required capabilities for the organization to achieve their strategy.

Therefore, the chosen strategy and capabilities of the organization can be linked according to the Map phase of this proposed CBP method.

- **RQ3: How to define indicators based on strategy to assess capabilities?**
  To address this research questions, the capability dimension, indicator specification table and the capability assessment framework have been defined in Chapter 3.2.2.

  Before defining the indicators based on strategy to assess the capabilities, the measures and the targets of the strategic objectives for the chosen strategy are required, and the information can be acquired through the Balanced Scorecard (BSC) of the organization. Later on, we can set up the capability goals based on this information that we get from this BSC. These capability goals can give us the direction to find the directions to assess the required capabilities, which would fit for the strategy requirements.

  After the capability goals and the sequence to assess the capabilities have been defined, we can continue to find the indicators to assess the capability. First is to identify the target architecture for the specific capability to have the overview of how this capability works according to its capability goal. Then, accompany with the target architecture and the possible capability dimension, the indicators for each capability dimension can be defined. Since the capability goals are defined according to the BSC, the indicators that are used to assess the capability dimensions that should fit for the strategy requirements. After these indicators are defined, we can fill in the indicator specification table to find out the performance level of the specific capability dimension. And then, according these results and the capability assessment framework, the capability performance level of the chosen capability can be determined. And the whole process is guided by the chosen strategy.

- **RQ4: How can an organization develop and arrange a set of capability development projects based on the strategic needs?**
  The Plan phase of the proposed CBP method is addressed to answer this research question.

  To ensure the organization can achieve its strategic goal, the required capabilities should meet the capability goals that defined in the Assess phase of the CBP method. If there some capabilities do not meet these requirements, the organization should make a development plan to improve the performance of these underperform capabilities. The capability development plan includes deploy the improvement projects and constructs an architecture implementation roadmap for these projects. This roadmap gives the organization a general picture of how to execute the projects to improve the performance of the underperform capabilities.

- **RQ5: How can the method be applied in practice?**
  To validate the proposed method, we used the business case to demonstrate the CBP method and conducted the interviews with the experts in the related area to evaluate it.

  According to the case study, we can know how to use the proposed CBP method and its techniques in business. The case study demonstrates the process of using this method to help the organization to translate the chosen strategy into implementation by making the

development plan of the required capabilities.

For the evaluation, we conducted the interviews with the experts in BIZZdesign. They evaluate the possible value of the proposed method and also gave the comments for the improvement.

6.2 Research contributions

According to the evaluation results that discussed in chapter 5, we conclude the key contributions of this research can be divided into the theoretical contribution and the practical contributions, which are summarized below:

Theoretical Contributions:

1. Linking capability to strategy in different level: The first contribution of this research is using the Strategy Map to describe how an organization creates value by connecting strategic objectives in the cause and effect relationship with each other among the four different perspectives (Financial, Customer, Internal, Learning & Growth), and then decomposing the capabilities in order to link these capabilities with the strategic objectives in an appropriate level.
2. Modelling capability dependency relationship in ArchiMate: In chapter 3.3.3, we use the i* strategy dependency model as the reference, to use ArchiMate language to describe the relations that could exist among the capabilities. Therefore, the capability that defined in this research is not totally independent. We adopted the idea that there would be certain relationships between some capabilities and these relationships can be modeled in ArchiMate.
3. Linking the CBP with EA: This research uses the capability concepts that proposed by Iacob et al (Iacob et al., 2012) and present how to structure a specific capability in EA. Furthermore, this research gives a guideline of using an architecture implementation roadmap to construct the capability development plan.

Practical Contributions:

1. Modeling capability in ArchiMate language: Similar to the third theoretical contribution that mentioned above, the proposed CBP method in this research is staying close to the usage of ArchiMate as well as the other techniques, for example, the portfolio work package. The solutions of the CBP method can be adapted and implemented in ArchiMate language.
2. Using objective indicator to quantify the capability performance: In chapter 3.3.4, we proposed that each capability can be decomposed into six dimensions. We also have defined the capability performance model to illustrate the expected properties of each capability dimension. Furthermore, for each dimension, the organization could define one or more indicators to assess the value of the specific dimension. This research suggested that the value and the capability performance model can be combined together to determine the actual performance level for the specific capability dimension, which could make the result more objective.
3. Helping decision-making: The solutions of the proposed CBP method could give the organization a direction of the improvement for their capabilities. In chapter 3.4.5, the capability development plan has been documented and it includes the projects development roadmap for the organization to execute.
4. Adapting CBP to the commercial organization: The organizational CBP method is created in defence usage. And the proposed CBP method could be used in the commercial industry, which is demonstrated in the business case of a Pharmaceutical organization.

6.3 Research limitations

This research has several limitations that have been found through the evaluation of the proposed method, which might influence the final result of this research. First, we proposed to use the Strategy Map and Balanced Scorecard (BSC) as the data input for the proposed CBP method, which represented the ideal information that we required for our method. However, the other kind of Strategy model or data input could also be used. To only choose the Strategy Map and BSC as the suggested data input is considering these two techniques are popular and the accommodation of the limited of time assigned to the thesis. Therefore, our research only shows one situation for the input data.

Second, we consider one capability could depend on the other capabilities. However, the study about the capability dependency relationship is kind of new, there are not too many researches in this area. Therefore, how many kinds of dependency relationships could exist between the capabilities and how far we should investigate these kinds of relationships are still not clear yet. To reveal the capability dependency relationships in an appropriate level could facilitate the organization to do the CBP, but it also could cause more efforts. Due to the time limited, this research did not go too far for the capability dependency research, which could become the future work.

Third, step C3 and step C4 in the plan phase are done in a simple way. Step C3 is selecting and creating the projects for the improvement of the specific underperform capabilities. It mentions that the capability development project should be planned in capability increments in the different capability dimensions and should be aligned to the strategic initiatives. However, we did not do too much investigate in the projects selection. Same as step C3, due to the time limited, we only simply mentioned some techniques that can be used for the Balance of Investment, but we did not demonstrate how to use these techniques in details. The results of our proposed CBP method, which is the capability development plan, could give the guideline for selecting the project. However, the project portfolio management is out of the focus of our research, therefore, it required further development.

Fourth, the available literature in the area of defining the performance level for each capability dimension is limited. Even though the Capability performance level estimation framework is created by using Architecture Capability Maturity Model (ACMM) and Capability Maturity Model (CMM) as the references, the description for each specific box is still lack of enough scientific support. We fill in the missing parts of the Capability performance assessment framework according to the assumption, which could possibly affect the final result less objective.

Fifth, the proposed CBP method is tested by the ArchiPharma case. The ArchiPharma is an anonymized pharmaceutical organization, which is used as an example for demonstrate the usage of ArchiMate. The proposed method did not tested by the external business case. The usefulness of this method could be differed when the other organization use it. Furthermore, the proposed CBP method should fit for any kinds of industries, which required further testing.

6.4 Future work

Considering the limitations that mentioned above, further researches and analysis are required to improve the result of this research. Furthermore, the limitations of this research could be conducted as several interesting research for the future work.

An interesting direction for the future research in to explore what kind of the dependency relationships could exist between different capabilities of an organization. According to the i* strategy dependency model, one capability could contribute resource or/and service to another capability. However, if we do not consider the capability to be independent, every capabilities could be discovered a lot of dependency relationships with the other capabilities. Therefore, in order to use the capability dependency relationship in practice and add value for the organization, a further research to explore the way to define this relationship and use it in practice could be valuable.

Moreover, the plan phase of the proposed CBP method includes creating and selecting the projects for the capability development. Further investigation is needed in order to determine the relationship between the capability development projects and the strategic initiatives. Some projects that are related to the strategic initiatives of the organization could also benefit for the improvement of the capability. To investigate how to relate the capability development projects to the strategic initiatives could also be another future work. Furthermore, how to use techniques to help the organization to do the Balance of investment, to choose the projects to develop can be related to the project portfolio management. The future research can focus on linking the project portfolio management tool with the CBP method.

We proposed to use the "used by" relationship to model the relationship between different capabilities. However, due to the evaluation result, we have been suggested that the "used by" relationship could be replaced by the "contribute" relationship. But such as "contribute" relationship, which does not exist in ArchiMate yet. To see whether to use the "used by" relationship or the "contribute", or even the other kind of relationship between different capabilities is required further research. And the "contribute" relationship could be introduced to ArchiMate, or we can use the other existing relationship to model the contribution.

According to the evaluation result, the experts mentioned that to use this proposed CBP method, the organization should put a lot of efforts. Therefore, in order to improve the usability of the CBP method, the further researches could focus on investigating how this method can be made easier to use for business.

Finally, to evaluate the value and suitability of the Capability development plan, which is the results of the plan phase, an evaluation phase could be added in this proposed CBP method. Therefore, the process of the CBP method could be changed into Map, Assess, Plan and Evaluate. To add one more phase of this method could be depended on the need of the business, which still requires doing further research.

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Appendix

Appendix A: ArchiMate Motivation Extension

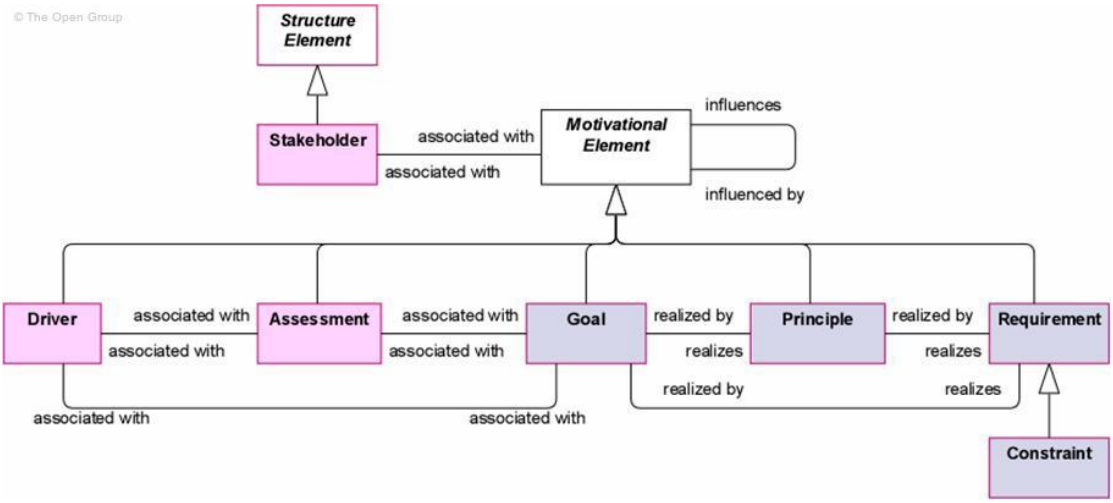

Figure 79 : Motivation Extension Metamodel (The Open Group, 2013)

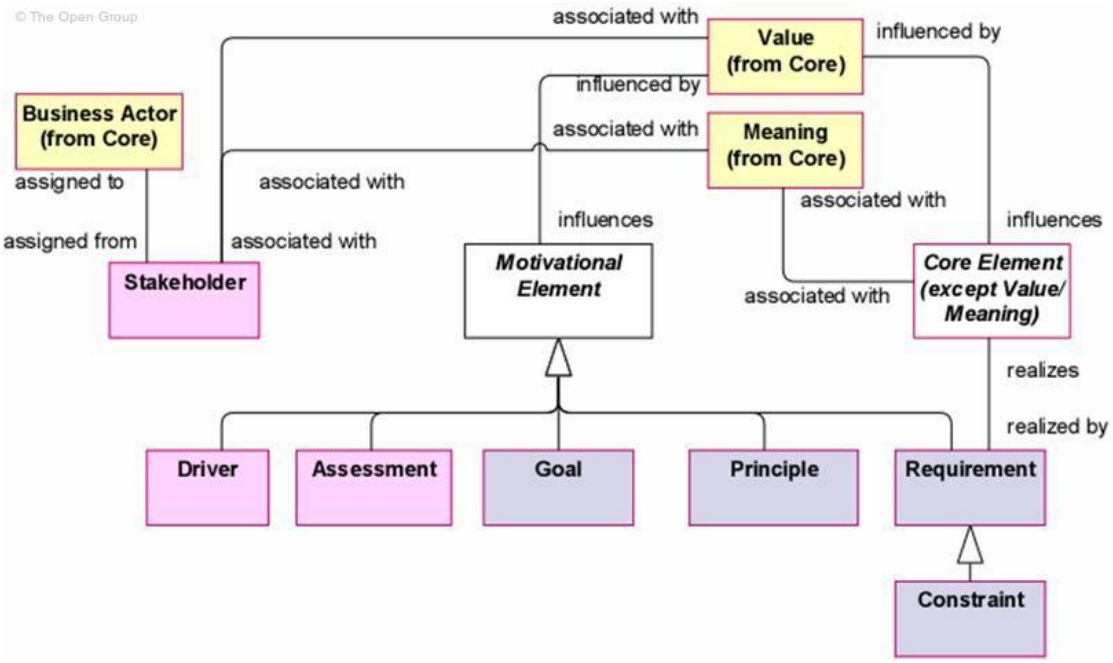

Figure 80: Relationships between Motivation Extension and the ArchiMate Core Concepts (The Open Group, 2013)

Appendix B: ArchiMate Implementation and Migration

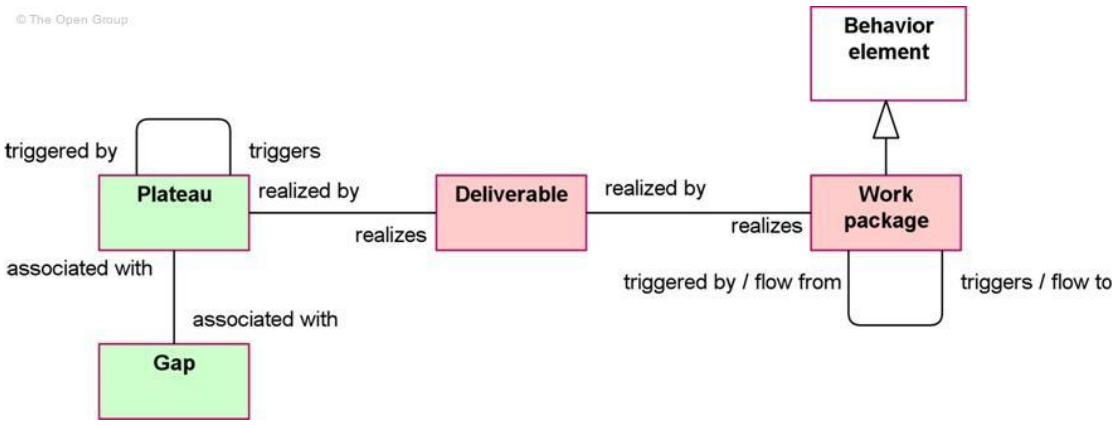

Figure 81: Implementation and Migration Extension Metamodel (The Open Group, 2013)

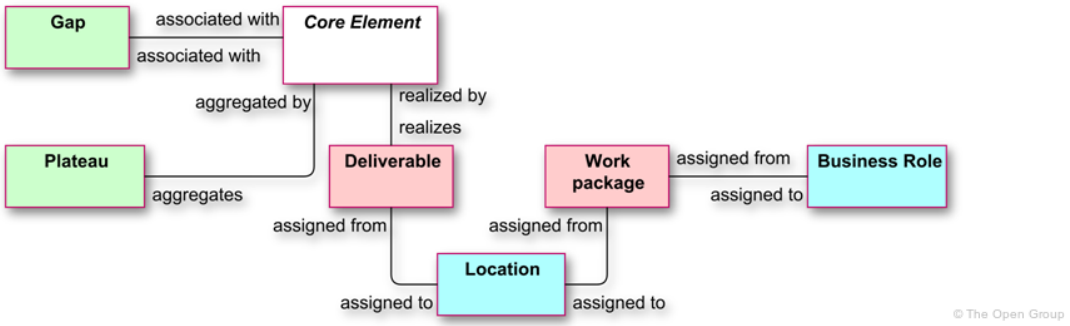

Figure 82: Relationship between Implementation and Migration Extension and the ArchiMate Core Concepts (The Open Group, 2013)

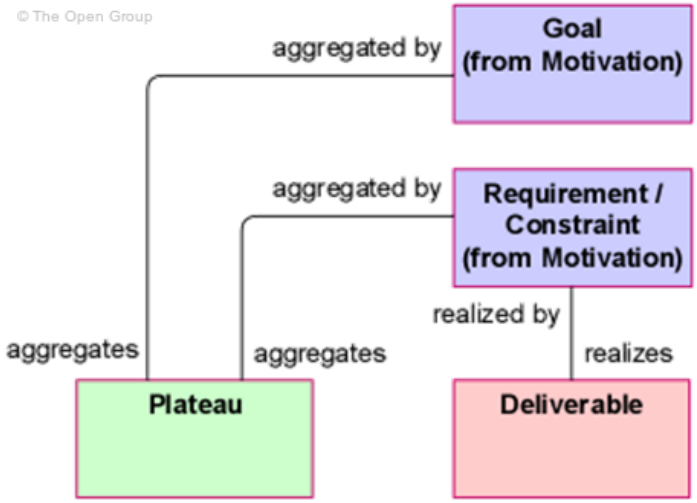

Figure 83: Relationships between Plateau, Deliverable, and Motivation Concepts (The Open Group, 2013)

Appendix C: EAM KPI Catalog

Table 33 : KPI Property section (Matthes et al., 2012)

KPI property	Property value	Best-practice
Measurement frequency		Quarterly
Interpretation		Good if >80% Normal 60%-80% Problematic if <60%
KPI consumer		
KPI owner		
Target value		80% in 2014
Planned value(s)		70% in 2012 75% in 2013
Tolerance value(s)		
Escalation rule		

Measurement frequency: The interval between two measurement points.

Interpretation: Description of how the calculated number can be interpreted, e.g. which range is acceptable and when intervention is necessary.

KPI consumer: The person who is interested in the value of the KPI.

KPI owner: The person who is responsible for the value of the KPI.
Target value: The KPI value to be achieved.

Planned value(s): The KPI values to be achieved while targeting the target value.

Tolerance value(s): The allowed deviations from planned and target values.

Escalation rule: The rule specifying the way of escalation if uncontrollable influences render the target value achievement impossible.

Appendix D: The State of Victoria KPI Catalog

Table 34: Example KPIs & Categories (The State of Victoria, 2010)

KPI	*Benchmark*	*Possible Measures*	*Possible Target*	*Method*	*Responsible Owner*	*Frequency*	*Undertaken By*
Governance	Documented records management strategy	Current and workable records management strategy	100% complete, relevant and up to date	Review and report	Board/Secretary/CEO	Annual	CIO

Appendix E: IT Architecture Capability Maturity Model

Table 35: IT Architecture Capability Maturity Model (DoC, 2003)

Architecture Characteristics	Level 0: No Architecture	Level 1: Initial	Level 2 Under Development	Level 3: Defined	Level 4: Managed	Level 5: Optimizing
1. Architecture Process	Not established or does not exist.	Exists in ad-hoc or localized form or early draft form may exist. Some IT Architecture processes are defined. There is no unified architecture process across technologies or business processes. Success depends on individual efforts.	Being actively developed. Basic IT Architecture Process program is documented based on OMB Circular A-130 and Department of Commerce IT Architecture Guidance. The architecture process has developed clear roles and responsibilities.	The architecture is well defined and communicated to IT staff and business management with Operating Unit IT responsibilities. The process is largely followed.	IT Architecture process is part of the culture, with strong linkages to other core IT and business processes. Quality metrics associated with the architecture process are captured. These metrics include the cycle times necessary to generate IT Architecture revisions, technical environment stability, and time to implement a new or upgraded application or system.	Concerted efforts to optimize and continuously improve architecture process.
2. Architecture Development	No IT Architecture documentation to speak of.	IT Architecture processes, documentation and standards are established by a variety of ad hoc means and are localized or informal.	IT Vision, Principles, Business Linkages, Baseline, and Target Architecture are identified. Architecture standards exist, but not necessarily linked to Target Architecture. Technical Reference Model and Standards Profile framework established.	Gap Analysis and Migration Plan are completed. Architecture standards linked to Business Drivers via Best Practices, IT Principles and Target Architecture. Fully developed Technical Reference Model and Standards Profile. The architecture aligns with the DoC and Federal Enterprise Architectures.	IT Architecture documentation is updated on a regular cycle to reflect the updated IT Architecture. Business, Information, Application and Technical Architectures defined by appropriate de-jure and de-facto standards. The architecture continues alignment with the DoC and Federal Enterprise Architectures. An automated tool is used to	Defined and documented IT Architecture metrics are used to drive continuous process improvements. A standards and waivers process is used to improve architecture development process improvements.

					improve the usability of the architecture.	
3. Business Linkage	No linkage to business strategies or business drivers.	Minimal, or implicit linkage to business strategies or business drivers.	Explicit linkage to business strategies.	IT Architecture is integrated with capital planning and investment control and supports e-government. Explicit linkage to business drivers and information requirements.	Capital planning and investment control are adjusted based on the feedback received and lessons learned from updated IT Architecture. Periodic re-examination of business drivers.	Architecture process metrics are used to optimize and drive business linkages. Business involved in the continuous process improvements of IT Architecture.
4. Senior-Management Involvement	We do not need it. That won't work here. Everything is fine the way it is.	What is Architecture? Why do we need it? Limited management team awareness or involvement in the architecture process.	Management awareness of Architecture effort. Much nodding of heads. Occasional/ selective management team involvement in the architecture process with various degrees of commitment/ resistance.	Senior-management team aware of and supportive of the enterprise-wide architecture process. Management actively supports architectural standards.	Senior management reviews architecture and variances.	Senior-management team directly involved in the optimization of the enterprise-wide architecture development process and governance.
5. Operating Unit Participation	No part of Operating Unit participates or is involved with IT Architecture process.	Limited Operating Unit acceptance of the IT Architecture process. AWe support the architecture process as long as it represents the standards we have already chosen. Standards will only inhibit our ability to deliver business value.@	IT Architecture responsibilities are assigned and work is underway. There is a clear understanding of where the organization=s architecture is at present time. Recognition that it is painful supporting too many kinds of technologies. Perhaps tired of distributing Anot fully-developed or tested applications@ to Operating Unit IT operations and support.	Most elements of Operating Unit show acceptance of or are actively participate in the IT Architecture process. Recognition that architectural standards can reduce integration complexity and enhance overall ability to Operating Unit IT to achieve business goals.	The entire Operating Unit accepts and actively participates in the IT Architecture process.	Feedback on architecture process from all Operating Unit elements is used to drive architecture process improvements.
6. Architecture Communication	None.	Little communication exists about the IT Architecture process and possible process improvements. The DoC IT Architecture Web Page contains the latest	The Operating Unit Architecture Home Page, which can be accessed from the DoC IT Architecture Web Page is updated periodically and is used	Architecture documents updated and expanded regularly on DoC IT Architecture Web Page. Tools are used to support maintaining architecture documentation. Periodic	Architecture documents are updated regularly, and frequently reviewed for latest architecture developments/ standards. Regular presentations to IT staff	Architecture documents are used by every decision maker in the organization for every IT-related business decision.

		version of the Operating Unit=s IT Architecture documentation. May have been handed out to IT staff.	to document architecture deliverables. Few tools (e.g., office suite, graphics packages) are used to document architecture. Communication about architecture process via meetings, etc., may happen, but sporadic.	presentations to IT staff on Architecture content.	on Architecture content. Organizational personnel understand the architecture and its uses.	
7. IT Security	No IT Security considerations in IT Architecture.	IT Security considerations are ad hoc and localized.	IT Security Architecture has defined clear roles and responsibilities.	IT Security Architecture Standards Profile is fully developed and is integrated with IT Architecture.	Performance metrics associated with IT Security Architecture are captured.	Feedback from IT Security Architecture metrics are used to drive architecture process improvements.
8. Governance	None. Everyone does their own thing.	No explicit governance of architectural standards. Limited agreement with governance structure.	Governance of a few architectural standards (e. g. desktops, database management systems) and some adherence to existing Standards Profile. Variances may go undetected in the design and implementation phases. Various degrees of understanding of the proposed governance structure.	Explicit documented governance of majority IT investments. Formal processes for managing variances. Senior management team is supportive of enterprise-wide architecture standards and subsequent required compliance.	Explicit governance of all IT investments. Formal processes for managing variances feed back into IT Architecture. Senior-management team takes ownership of enterprise-wide architecture standards and governance structure.	Explicit governance of all IT investments. A standards and waivers process is used to improve architecture development and governance - process improvements.
9. IT Investment and Acquisition Strategy	No regard for Enterprise Architecture in formulation of strategic IT acquisition strategy by Operating Unit.	Little involvement of strategic planning and acquisition personnel in enterprise architecture process. Little or no adherence to existing Standards Profile.	Little or no formal governance of IT Investment and Acquisition Strategy. Operating Unit demonstrates some adherence to existing Standards Profile.	IT acquisition strategy exists and includes compliance measures to IT Enterprise Architecture. Operating Unit adheres to existing Standards Profile. RFQ, RFI and RFP content is influenced by the IT Architecture. Acquisition personnel are actively involved in IT Architecture governance structure.	All planned IT acquisitions are guided and governed by the IT Architecture. RFI and RFP evaluations are integrated into the IT Architecture planning activities.	Operating Unit has no unplanned IT investment or acquisition activity.

				Cost-benefits are considered in identifying projects.		

Appendix F: Capability Maturity Model

Table 36: Maturity Level (CMMI Product Team, 2006)

Maturity Level	Description
Maturity Level 1: Initial	At maturity level 1, processes are usually ad hoc and chaotic. The organization usually does not provide a stable environment to support the processes. Success in these organizations depends on the competence and heroics of the people in the organization and not on the use of proven processes. In spite of this chaos, maturity level 1 organizations often produce products and services that work; however, they frequently exceed their budgets and do not meet their schedules. Maturity level 1 organizations are characterized by a tendency to over commit, abandonment of processes in a time of crisis, and an inability to repeat their successes.
Maturity Level 2: Managed	At maturity level 2, the projects of the organization have ensured that processes are planned and executed in accordance with policy; the projects employ skilled people who have adequate resources to produce controlled outputs; involve relevant stakeholders; are monitored, controlled, and reviewed; and are evaluated for adherence to their process descriptions. The process discipline reflected by maturity level 2 helps to ensure that existing practices are retained during times of stress. When these practices are in place, projects are performed and managed according to their documented plans. At maturity level 2, the status of the work products and the delivery of services are visible to management at defined points (e.g., at major milestones and at the completion of major tasks). Commitments are established among relevant stakeholders and are revised as needed. Work products are appropriately controlled. The work products and services satisfy their specified process descriptions, standards, and procedures.
Maturity Level 3: Defined	At maturity level 3, processes are well characterized and understood, and are described in standards, procedures, tools, and methods. The organization's set of standard processes, which is the basis for maturity level 3, is established and improved over time. These standard processes are used to establish consistency across the organization. Projects establish their defined processes by tailoring the organization's set of standard processes according to tailoring guidelines. (See the glossary for a definition of "organization's set of standard processes.") A critical distinction between maturity levels 2 and 3 is the scope of standards, process descriptions, and procedures. At maturity level 2, the standards, process descriptions, and procedures may be quite different in each specific instance of the process (e.g., on a particular project). At maturity level 3, the standards, process descriptions, and procedures for a project are tailored from the organization's set of standard processes to suit a particular project or organizational unit

	and therefore are more consistent, except for the differences allowed by the tailoring guidelines. Another critical distinction is that at maturity level 3, processes are typically described more rigorously than at maturity level 2. A defined process clearly states the purpose, inputs, entry criteria, activities, roles, measures, verification steps, outputs, and exit criteria. At maturity level 3, processes are managed more proactively using an understanding of the interrelationships of the process activities and detailed measures of the process, its work products, and its services. At maturity level 3, the organization must further mature the maturity level 2 process areas. The generic practices associated with generic goal 3 that were not addressed at maturity level 2 are applied to achieve maturity level 3.
Maturity Level 4: Quantitatively Managed	At maturity level 4, the organization and projects establish quantitative objectives for quality and process performance and use them as criteria in managing processes. Quantitative objectives are based on the needs of the customer, end users, organization, and process implementers. Quality and process performance is understood in statistical terms and is managed throughout the life of the processes [SEI 2001]. For selected sub processes, detailed measures of process performance are collected and statistically analyzed. Quality and process performance measures are incorporated into the organization's measurement repository to support fact-based decision making [McGarry 2000]. Special causes of process variation are identified and, where appropriate, the sources of special causes are corrected to prevent future occurrences. (See the definition of "special cause of process variation" in the glossary.) A critical distinction between maturity levels 3 and 4 is the predictability of process performance. At maturity level 4, the performance of processes is controlled using statistical and other quantitative techniques, and is quantitatively predictable. At maturity level 3, processes are typically only qualitatively predictable.
Maturity Level 5: Optimizing	At maturity level 5, an organization continually improves its processes based on a quantitative understanding of the common causes of variation inherent in processes. (See the definition of "common cause of process variation" in the glossary.) Maturity level 5 focuses on continually improving process performance through incremental and innovative process and technological improvements. Quantitative process improvement objectives for the organization are established, continually revised to reflect changing business objectives, and used as criteria in managing process improvement. The effects of deployed process improvements are measured and evaluated against the quantitative process improvement objectives. Both the defined processes and the organization's set of standard processes are targets of measurable improvement activities. A critical distinction between maturity levels 4 and 5 is the type of process variation addressed. At maturity level 4, the organization is concerned with addressing special causes of process variation and

	providing statistical predictability of the results. Although processes may produce predictable results, the results may be insufficient to achieve the established objectives. At maturity level 5, the organization is concerned with addressing common causes of process variation and changing the process (to shift the mean of the process performance or reduce the inherent process variation experienced) to improve process performance and to achieve the established quantitative process improvement objectives.

Appendix G: IT Organization Strategy Maps

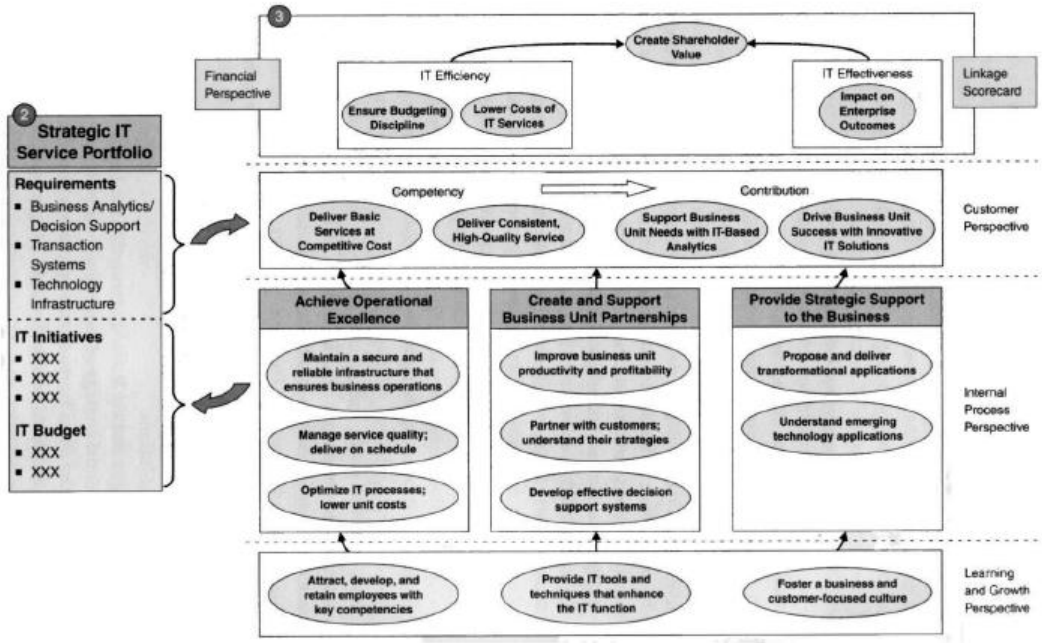

Figure 84 : IT Organization Strategy Maps (Kaplan & Norton, 2006)

Appendix H: Interview Transcript

Table 37: Interview transcript

Interview 1	
Interviewee's function	Research consultant
Interview date	13/07/2015
Correctness	
From the theoretical perspective, do you consider the steps of this CBP method to be logical? If not, which step is incorrect and need to be changed? I think from my point of view, it looks very logical, and I also think it fits really well with the other works that I have seen. So, with ArchiMate in general, when you first try to look from both perspectives in your case, from strategic capabilities and then try to make matches and then based on the current organization's situation and design your "to be" situation, and make the gap analysis. I think it fits really well, some also logical for me stepwise. Do you consider the techniques that used in this CBP method to be appropriate? If not, which technique should be changed? Yes, for me it is. I am not that familiar with all the strategy methods. But what I know about it that what you use is the most commonly used. So I think it is always a good choice. And for finding the indicators, you identify there are six different dimensions, it also used for ArchiPharma case. I find it very difficult to find the indicator that you can always use with capability and it looks like be the one that most commonly used in the literature. So I think it is a good choice. I think you capture the most used dimensions, but I also think that if we learn from practices later on that are also other dimensions are not too difficult to add, there could be seven or eight dimensions, just in case that we need it. So I think it is very appropriate techniques to use now.	
Completeness	
According to your experience, does this CBP method include all the required steps? If not, which step should be added? No, I think the steps are good and it also complete. The only thing is what I will be interested in to see, especially the latest stage, for example, first you need to get to level 3 in the Application portfolio management capability before you can go trying to achieve the next level. I find it is very interesting relation you made there and I think it is very valuable for the organization also to know especially when they planning project. It would be interesting to see maybe it has on your thesis, on how to describe that relation, because I think it is actually quite difficult but also interesting. Does this CBP method include all the required techniques? If not, which technique should be added? Same as above.	
Ease of understanding	
Do you consider the steps of this CBP method to be clear? If not, which step needs further elaboration? No, I think it is very clear. The steps sound very logical to me so they are clear. Do you consider the techniques of this CBP method to be clear? If not, which step needs further elaboration? Yes, the techniques some of them I know and they are familiar to me maybe easier. But the techniques are definitely clear.	
Usability	

Do you consider the process of this CBP method to be too complex to use? If yes, why?
No, I don't think it is too complex. I think it is actually, as I also mentioned before, it matches very well and stay really close to ArchiMate but also to the others, for example, the planning phase match really well with the project portfolio management. I like that a lot, so I think it also really well applicable.

Do you consider the required data input to be easy to get? If not, what is the data input that you consider can be the replacement?
That is an interesting question. I think the data input will be really important. I think when it is in the strategic level that might be, something might be linked around. The organization might be very well organizing at the strategic level, but on the capability level the same. There are many ways of cutting the space in the different levels. You also want to decompose the capability in three levels. I guess that might also require quite some interviews also to the new organizations. And I think maybe also what might be still interesting to see is it better they agree quite quickly on the performance. You rely on certain maturity model with different level, which means that they make a statement on very SMART and detail and within a certain time. So yes, it is important to improve our customer satisfaction level, for example, how to measure that, and how the good level is and what is good enough, I think it might be an interesting discussion for the organization. But it always is the case, if you want to measure something you need to come with the input. So I can image it might not be that easy. It might depend on some interviews. But if you want to do some analysis with your organization, these are something that needs to be done. You are not asking for very strange or incredible details. So I think, yes, it might be challenging for consultant but it should be doable.

Utility and Suitability

Do you consider this CBP method to be feasible to implement in different kinds of industry?
I think it should be feasible to implement in all kinds of industry. You abstract from the very particular level. So I do not see any problems.

Do you consider this CBP method to be useful for facilitating the strategy implementation?
Yes, I think so. I think using the capability can give you the options to do the strategy implementation. And it forces the people who come up with the strategy to really think about what techniques of the organization that they don't get away anymore, just hang away in somewhere and it should be improved and they should go better. It really forces they think about how they are goanna to do that, and they will do the investigation about the required information.

Do you think you could apply this suggested method in practice according to the presentation?
Yes, I think so. I think it will be interesting to see how far we get. And I think it is applicable method. And it fits really well with other things that we do, which I think it is applicable. And I very interesting to see how it will end up in the end, where I see that to make the dependency. But I think it is possible.

Open discussion:

Do you have any comments, feedback and suggestions for the improvement of this suggested method?
I like it a lot, especially in the planning phase, you will use the dependency, I am interested to look to your thesis to see what you actually do there. For your suggestion you also use indicator, which is new. So I think that might be some interesting works for the future.

The only thing, what I am considering that you had the gap analysis of the combined heat map. You can see from the combined heat map, the color is not equal and it means that there some mismatches, but it also could be your current capability is already higher than the capability that you required. And I find to be difficult on this picture to see is whether the gap

is big or whether it needs some works on. Well, it could be the capability already higher than the capability you need. So I think maybe it can come up here with a different visualization also. I am not immediately sure on how to do that, it is interesting to use color. But I think maybe you could use color to represent the gap. For example, the customer data organizing have the brown and yellow, which means the gap is one. Then you can use one color to represent the small gap, kind of. And with another one, which you have gap of two, so that will be more a severe gap. So maybe the other way around, the performance even better, then you can change to green. Maybe it will also work.

Interview 2	
Interviewee's function	Research consultant
Interview date	14/01/2015
Correctness	
From the theoretical perspective, do you consider the steps of this CBP method to be logical? If not, which step is incorrect and need to be changed? Yes, they are logical. But I do not think you can say either is correct or incorrect. Maybe what you also like to do later on is to see, to check your plan, to monitor your plan. I think that is not in the method here. The method here is how to come up with the implementation of your strategy. And for that, I think, these are the proper steps. If you also like to monitor later on whether your plan is ok, whether the projects are executed according to the plan. You may need something extra. Maybe you could make it as four steps. Do you consider the techniques that used in this CBP method to be appropriate? If not, which technique should be changed? It is interesting to see the relations between level of Strategy Map and the level of the capability Map and the relation of the Balanced Scorecard. It seems logical because it is one of the strategic techniques that and try to identify what you measure. The BSC also can be used on the later in step. If you also do that, you may even have more benefit from the BSC, I think. You mainly use it for the assessment of the capability. About the Balance of Investment, it is interesting to combine the techniques for the project selection. So I think the techniques are appropriate, I can image that you do in your method are quite labor intensive, like finding the capability goal of the level 3 capability. I think this is something you need to do anyway, because otherwise, the meaning and the use of capability map is not so clear. And you define the dependency relations of the capability that are something I personally doubting about and struggling about how far you should go if defining the dependency between capabilities, and on one hand people like to make capability as independent as possible. But on the other hand, some capabilities will use the other capabilities, so it has some dependency. But for this case, this has already become some complicate graphs, but with a lot of relationships. But I guess these relationships are again useful for defining your projects, because it implies certain project dependency.	
Completeness	
According to your experience, does this CBP method include all the required steps? If not, which step should be added? It depends on what the purpose. So, it is something that you need to consider. I know that because these three steps come from Adina, and she positioned this method for capability-based planning also relation to strategy, Enterprise Architecture, project portfolio management. Maybe something you want to position there in monitoring project portfolio management or it something or it is something related. I don't know, but I think it is	

something that might be considered.

Does this CBP method include all the required techniques? If not, which technique should be added?
I cannot think of any other techniques right now, of course the alternative techniques may be considered for balancing your investment, for example you mentioned some. But I don't think the organization will use a lot of them, select one. You mention useful techniques there, for the assessment, you develop the whole method. So, I can't think of techniques should be known. I think you are rather complete that what you do.

Ease of understanding

Do you consider the steps of this CBP method to be clear? If not, which step needs further elaboration?
I think it is clear, I asked for some classification in the beginning. But it because 20 minutes is too short to graph everything. But I think I get the picture. So, yes, I think it is not difficult to understand.

Do you consider the techniques of this CBP method to be clear? If not, which step needs further elaboration?
It is a bit difficult to assess. When I look at the techniques, you could make it more detail. But the time is a bit short for that, right now. I think the idea of the techniques is clear, but applying the techniques. Let me say another way, I always want to apply the techniques before I can say I really understand them. So I think it is a bit difficult to assess that. At first side, yes, they are clear, but I cannot say what needed to be done for further elaboration. I think is clear.

Usability

Do you consider the process of this CBP method to be too complex to use? If yes, why?
I think not too complex. But I see some points where can become difficult for customers, where it is a lot of work. Relating capabilities to strategic objectives, I think it can be already difficult for customers and can maybe become quite subjective. When you ask where the techniques are missing, I also think about this part, if something it could be provided to help customers there. But I could not think of anything, I think it will be many of works. The assessment can be rather labor intensive. But I think, if you really want to value out of the Capability-based planning, this should be something you willing to do. So that is not the measures of complexity, but more a question about a lot of work. And I think, identify the dependency between capabilities, and how far you go there? Because when you, in the end everything can be related to everything. That's something that you would like to abstract from, and others you don't, because they are important. So, to find the proper level of identifying dependency that can be also difficult, I think. Because, I can image that if there are a lot of dependencies, the whole planning process can be too complex, and hard to measure all constraints there. But on the other hand, the difficulties and the problems, I think it is not in the method between the problems itself. So, in that sense, I would not say that the method is too complex, but the problem is complex. And the method can help you to abstract from the things are not so relevant. Yes, I think you do that so.

Do you consider the required data input to be easy to get? If not, what is the data input that you consider can be the replacement?
I think that depends on the organizations. But, starting at the strategic level, it could already be difficult to get clear what the strategic objectives are in the organization. But it simply means that should spend some time on it, because it is important to know about your strategy. The relation between the capabilities and the strategic goals and the strategic objectives, I don't know what kind of data would be needed. I think you need to do some interview and person assessment of that.

For the assessment of the capability, yes, you have your example of your business process, where you need to assess certain properties, and I think in general can is difficult to get that information of your organization, because first of all, it should be somewhere maintained, and some unavailable. But then, in that case, you could say, OK, from now on we start monitoring this and storing the information. So, for the assessment, I can image that simply that information is missing in your organization, and first you need to organize that. If you could replace by other data? I don't know, maybe in some case you may change your metrics, because you don't have that information that you need. So, I think yes, in general, it may not be that easy to get the data, on the other hand, that should not be the reasons do not use that method. The method should inspire the organization to try to get the data.
Utility and Suitability
Do you consider this CBP method to be feasible to implement in different kinds of industry? Technically, yes. How willing they are that will depend on that the efforts that they need to use the method. And you can show the added value of this method and that's, of course, something that is difficult, for example, to show if you use this method, you could have the better strategic alignment and you may better use your resource for your project. If you could show something like that, they might be willing to use it. And I think technically, it is low possible to implement it. Do you consider this CBP method to be useful for facilitating the strategy implementation? Yes. Do you think you could apply this suggested method in practice according to the presentation? Yes, it's also what I said a bit for question one. It depends on how well we can show the added value and the effort.
Open discussion:
Do you have any comments, feedback and suggestions for the improvement of this suggested method? For the improvement, I don't know. I already quickly have a look at your thesis, but I have to look at more. But I think you did some nice work and interesting. And for sure, something that I and Adina goanna to use and the solution that we develop in BIZZdesign. My feedback would be interesting work.

Interview 3	
Interviewee's function	Research consultant
Interview date	14/07/2015
Correctness	
From the theoretical perspective, do you consider the steps of this CBP method to be logical? If not, which step is incorrect and need to be changed? Yes, I think so. I am not that familiar with the strategic process, but it looks like logical, it is quite easy to follow these steps. Do you consider the techniques that used in this CBP method to be appropriate? If not, which technique should be changed? Yes, I think so.	
Completeness	
According to your experience, does this CBP method include all the required steps? If not, which step should be added? I doubt it can really miss anything, maybe more detail in some parts. But it is a bit difficult for me to assess.	

Does this CBP method include all the required techniques? If not, which technique should be added?
I think of the goal of this research, I think it was completed case. Maybe you can have more details in the architecture part, but I don't think it is the goal for this.

Ease of understanding

Do you consider the steps of this CBP method to be clear? If not, which step needs further elaboration?
Generally it is clear. But it is a bit quick, of course. It is an overview, so I have to read the thesis to know more detail. It is a bit quick for me, but I think in general it is fine.

Do you consider the techniques of this CBP method to be clear? If not, which step needs further elaboration?
Yes, I think it is the same.

Usability

Do you consider the process of this CBP method to be too complex to use? If yes, why?
I don't think it is too complex to use properly. I think should be some tools support, it should be also.

Do you consider the required data input to be easy to get? If not, what is the data input that you consider can be the replacement?
Yes, it should be probably a question. So it is a bit difficult to assess. So you define the score, it might be a problem in practice.

Utility and Suitability

Do you consider this CBP method to be feasible to implement in different kinds of industry?
Yes, I think it can more frequently used in several industries. Financial and government, I think they more familiar with these kinds of techniques.

Do you consider this CBP method to be useful for facilitating the strategy implementation?
I think yes.

Do you think you could apply this suggested method in practice according to the presentation?
Yes, normally personally. But I think yes. You describe several steps in the big process, so yes.

Open discussion:

Do you have any comments, feedback and suggestions for the improvement of this suggested method?
Maybe some small things. I think it is the color coding that you use in the development. I think it is more common to use the scale from red to green, but the blue is a bit confusing to me. Because it is not clear that the blue is something between yellow and green, so I expect something like orange between red and yellow, something between yellow and green. Maybe like light green, dark green something. But it is a clear scale from red to green. Then it is clear to people to see what the level it is. Because blue is not fitting any sense. You can get some guideline from red to green.

And I also think about the relationship between the capabilities. And you use kind of used-by relationship. The capability is not officially part of ArchiMate yet, the used-by relationship doesn't exist I think between the capabilities. Because from the proposal of the ArchiMate, we don't use used-by relationship, but we do have the contribution relationship. It is maybe a bit can be used here. But because it is not officially used, that will not that much of a problem. And we discuss about the resource concept, we might probably add it as well.