Universiteit Leiden

ICT in Business and the Public Sector

A methodology for integrated business-technology planning

Name: Sara Nodehi
Student-no: s2623307

Date: 26/11/2021

1st supervisor: Prof. dr. ir. Joost Visser
2nd supervisor: Dr. Christoph J. Stettina

MASTER'S THESIS

Leiden Institute of Advanced Computer Science (LIACS)

Leiden University
Niels Bohrweg 1
2333 CA Leiden
The Netherlands

Table of contents

List of figures

List of tables

Acknowledgment

I have received a great deal of support and assistance from great people throughout the writing of this thesis. The completion of this master thesis would not have been possible without their support. I am incredibly grateful for all the support that I got during this research project. Moreover, I would like to thank the key people explicitly.

I would first like to express my deep gratitude to Prof.dr.ir. Joost Visser, my first supervisor, for his patient guidance, enthusiastic encouragement, and exciting discussions regarding the topic. I could not complete my master thesis, as it is now, without his full support.

I would also like to thank Dr. Christoph J. Stettina, my second supervisor, for his helpful and constructive recommendations on this project and assistance in keeping my progress on schedule.

Finally, I would like to thank my family for their full support and encouragement throughout my study. You are always there for me.

Thank you all,

Sara Nodehi

Delft, November 26, 2021

Abstract

Background: Information technology (IT) has become a critical part of almost every department within organizations. As a result, organizations have become heavily dependent on IT services to improve their performance and have high expectations of their technology investment to enhance productivity. Although this forces organizations to synchronize their business goals and their IT services to create value propositions for customers, organizations move forward at different paces and with different levels of success. Moreover, some organizations face challenges and issues in synchronizing their business goals and their IT capabilities. Due to this, a need has risen to help organizations become mature in integrating business and IT strategies. A methodology for integrated business-technology planning has been designed and used in education at Leiden University [by Visser] to solve this need. Since the methodology was created for an educational purpose, various limitations exist, which need to be removed to allow the methodology to be used in practice.

Aim: This research aims to improve the pre-existing methodology and solve limitations for guiding organizations to combine IT and business strategies. The resulting methodology should be understandable and usable by a broad set of business and IT stakeholders and should help organizations effectively create integrated business-technology strategies.

Method: We have taken a design-science research approach, where the improved planning methodology constitutes the design artifact. Before embarking on the design activity, we performed seven exploratory interviews with practitioners (application context) and reviewed relevant literature (knowledge context). We then identified specific limitations in the pre-existing method and proceeded to extend the method with additional steps and supporting materials to remove these limitations. Finally, we conducted four evaluation interviews with practitioners to test their perception of the acceptability and usefulness of the extended methodology.

Results: We extended the pre-existing methodology in six major areas (e.g., we added a step for stakeholder and user analysis, we added a step for linking the situation analysis and ambition) and four minor areas (i.e., we added “outcome” and “output” besides “strategic intent” and “criteria of done” terms to increase understandability in design moves element, we added TOWS matrix to help users use the SWOT analysis in an actionable way, and we added actors to the roadmap to indicate accountable actors for implementing actions). Validation of the method demonstrated that it is generally regarded as compatible and easy-to-use. However, some changes should be considered to make the methodology acceptable to all the relevant stakeholders.

Conclusion: The extended and validated methodology can be used by organizations for collaborative development of integrated business-technology strategies, which can be understood by and shared among a wide range of stakeholders and contains clear measures of progress and success.

1 Introduction

1.1 Background

With increased reliance on digital technologies, businesses need to develop and evolve digital strategies that closely integrate business and technology considerations. The digital strategy shows the direction and the tactics that organizations can take for achieving competitive advantages with technology. Using this direction and tactics will lead to creating new products or reimagining current organizational processes (Digital Strategy - The Evolving Business Strategy | Liferay, 2021).

On the one hand, novel and transformative technologies rapidly enter the workplace and enable businesses to innovate and thrive in an increasingly digital world. Digital transformation has been defined to respond to the business ecosystems and help organizations keep up with emerging customer demands in the fast-speed environment. In addition, it allows companies to compete in the economic environment, which has constantly changed in response to technology evolutions.

On the other hand, it should be considered that embarking on a digital transformation of the businesses is not enough. Doing a successful transformation at an appropriate time is essential (Visser, 2019). Consequently, businesses must ramp up their efforts to meet sudden changes and become masters in software evolution. To do that and be adapted to the digital transformation, renovation of the business models is essential to be consistent with the organizations' business strategies (Correani et al., 2020).

Furthermore, as it is clear, challenges exist everywhere, and it is undeniable that adopting digital transformation strategies also involves challenges. "According to recent estimates, 66% to 84% of digital transformation projects fail" (Correani et al., 2020). One of the ways to increase the likelihood of success of the digital transformation is to create consistency between strategy formulation and strategy implementation. Although there are interdependencies between these two concepts, some distinctions also cause challenges for the firms and cause failures in the projects.

Digital strategy formulation talks about the factors related to the external environment and technological potentials in the market that is necessary for modifying the business models. In contrast, digital strategy implementation talks about how firms translate digital strategy into concrete plans and actions. Therefore, firms must consider consistency between the firm's actions and the objectives defined in the digital strategy formulation (Correani et al., 2020).

Thus, digital transformation can help firms create products and services that are more matched and efficient with customer needs in today's competition. To implement this, firms must make a simple approach to formulating their strategic plan and implementation methods. Therefore, a need for linking digital strategy formulation and digital strategy implementation has been raised to ensure the success of the digital transformation.

1.2 Problem statement

Due to the impact of digital technologies on organizations, companies must integrate their capabilities and new technologies to drive their businesses in the market competition. Before integrating companies' business capabilities with advanced digital technologies, companies must understand an essential distinction between IT, business, and digital transformation strategies.

IT strategies have been defined based on the current operational activities of the firms to help the organizations for their future. These strategies show which infrastructures, application systems, financial framework, and organizational framework are essential for a company to fulfill its business operations. In other words, IT strategies talk about the management of IT within firms with limited impact on driving innovations in business development. In addition, these strategies talk about roadmaps that could be useful for firms to use technologies in the future. Nevertheless, they do not talk about the products and processes transformation that integrates technologies. In contrast, digital transformation strategies come from a business-centric perspective. And talk about the products and processes transformation and organizational aspects owing to new technologies (Matt et al., 2015).

In addition to the gap between IT and digital transformation strategies discussed above, an alignment gap between IT and business strategies has been recognized within firms. Many reasons cause this gap, such as lack of communication, lack of strategic alignment between different business areas, etc. (Wen et al., 2005).

Thus, a need has been raised to fit business strategies, IT strategies, digital transformation strategies, and all other functional and organizational features in the firms. In 2013, Bharadwaj et al. defined “digital business strategy” to consolidate IT strategies and business strategies to solve this issue. Digital business strategies talk about the desired future of firms that digital technologies could achieve. These strategies do not include transformational insights and do not mention the guidelines for achieving these desirable states. While a digital transformation strategy is a blueprint that supports companies in governing the transformations that arise owing to the integration of digital technologies and helps organizations do their operations after transformation (Matt et al., 2015).

In 2019, the paper which Schallmo published discussed the development of an approach for a digital strategy. Their approach has been offered after fully considering existing approaches and semi-structured interviews with researchers and consultants in this field. According to their analysis and interviews, although the digital strategy is an essential topic in different industries, it is still in its infancy. Therefore, to further develop digital strategy, this paper offered an integrated approach in six phases. These phases are named: “strategic analysis external, strategic forecast, strategic analysis internal, strategic principle, strategic options, and strategy formulation” (Schallmo et al., 2019).

In addition, in order to show the logic of digital business strategy, a map has been designed by Woodard. This model has been conceptualized in two constructs which are called design capital and design moves. In this map, option value and technical debt have been identified as two salient dimensions of design capital. According to this design capital map, high-quality design capital places a firm in a superior position to execute competitive actions. When the quality of capital improves, firms can launch digitally enabled products and services with more speed and scale (Woodard et al., 2013).

According to the above paragraphs, companies must have a unique value proposition that incorporates digital technologies to succeed in today's economy. Moreover, this value proposition should be defined in a way that competitors could not replicate (Ross et al., 2016).

Although many companies have recognized the need and the importance of digital strategy, there is no straightforward method to help companies transform their digital assets and services. In addition, companies that have this methodology do not have clarity in terms of implementing these methods. In other words, there is currently no integrated, concise, easy-to-apply method that allows companies to create strategic plans for transforming digital assets and services and monitor their implementation.

1.3 Research objective

The objective of the research presented in this thesis is to develop a method to develop a digital transformation strategy and monitor its implementation that integrates business and technology considerations. In addition, we aim to create a concise and easy to apply method that can be used by key business and technology staff alike.

To do this, we aim to study current challenges and solution patterns for aligning business and IT, augment an existing method developed for teaching purposes by Visser [see Appendix III], and validate the augmented method against the experience and judgment of digital transformation experts. Since Visser's method was defined as part of the course Managing Software Evolution, and its objective is to create a plan for evolving a software system, we will from now on refer to this method as Software Evolution Planning (SEP). The original method will be referred to as SEPv1, and the improved version will be referred to as SEPv2. Both SEPv1 and SEPv2 are attached in Appendix III and Appendix IV.

1.4 Research questions

Research question 1: What discrepancies can be observed between IT and business in the case of continually adapting modern digital businesses?

Research question 2: What ingredients should be used to create a strategy design method to help organizations remove discrepancies between IT and business?

Research question 3: Is the future method for strategy design deemed usable by the relevant people to achieve the desired market position?

1.5 Research approach

We have followed a Design Science Research approach, where we started with exploratory literature review and exploratory interviews, then proceeded to design an improved model, and finally evaluated the model with confirmatory interviews.

An exploratory literature review was done in the first stage of this research to understand the relevant existing research and identify current needs and gaps to this particular topic. In the second phase, to better understand and explore research subjects' opinions, behavior, experiences, etc., exploratory interviews with the experts working in both IT and business

domains were done. In other words, this research study uses exploratory interviews to capture the underlying dimensions of IT and business integration and its challenges within organizations.

After conducting seven exploratory interviews coding qualitative data was done to interpret, organize, and structure the exchanged data conducted during the interviews. This qualitative analysis helped us to interpret our findings to meaningful theories. Our findings were summarized in two main parts. The first part describes problems that exist in organizations regarding business and IT integration. The second part shows the possible solutions that organizations use or think can be useful for solving challenges and problems regarding business and IT integration.

In the next phase of this research, we gathered problems and solutions conducted by our qualitative analysis. We thought through each of them to see whether SEPv1 already addresses these. Or do we need an improvement in the evolution plan to address them? For those problems that the SEPv1 could not solve, we tried to find how our future methodology can provide solutions and what features must be added to SEPv2.

After analyzing and evaluating the SEPv1, some limitations were identified and improved. As a result of this step, SEPv2 with new functionalities and improvements was created.

The evaluation part was the final step which had to be done after designing and introducing the SEPv2. This part was required to assure us about the quality of the methodology. Interviews were conducted for doing this part.

Based on the requirements discussed above, on the one hand, we had to design a study to ensure the validity and reliability of the results that address the research aims and objectives of the project. On the other hand, design science research methodology is defined to develop technology-based solutions to solve critical and relevant business problems (Bisandu, 2016). Therefore, the design science methodology was looked fit with this research project and was chosen as a research methodology for this research.

According to (Hevner Alan, 2007), design science research combines three closely related cycles of activities. The central cycle is named design science which is about designing an artifact and somehow evaluating that artifact in an iterative cycle. In this research, the artifact can be referred to as the methodology designed for planning and executing strategy design. Moreover, the evaluation phase can refer to interviews that were conducted with experts in the industry.

In the relevancy cycle, the artifact should be connected to the environment. In this cycle, requirements from the field should be collected. Moreover, an artifact can be brought into the field for testing. For this research, requirements were collected from the environment, the artifact was introduced to the four relevant people in the industry, and their opinions were collected to implement the relevance cycle.

In the rigor cycle, existing scientific theories, methodologies, existing frameworks, experiences, etc., which have been written down in papers or knowledge bases, should be collected as grounding. And at the end, the new knowledge that has been generated from the research should be added to the knowledge base for growth. During this research, literature review and exploratory interviews helped us discover the limitations and the required features for improving SEPv1. In addition, at the end of the research, research works produced during the research are used to produce literature as a knowledge base.

In summary, this research started from both the knowledge base and the environment for implementing design science methodology and resulted in creating SEPv2. And then, the method was tested in the field. In the end, when the method was validated, it was put into the knowledge base.

1.6 Thesis structure

The thesis structure is structured as follows:

Chapter 2: Research Methodology

This chapter discusses the research design and methodology which has been chosen and used for this study. In other words, this chapter explains what and how this research was done. This chapter provides information to the reader to become familiar with the tools and materials used for this research. In addition, by reading this chapter, readers will understand the rationale behind the choice of these methods.

Chapter 3: Explorative Interviews

This chapter talks about the approach that was used for doing the exploratory interviews. Furthermore, the procedure for selecting interviewees and coding interviews is discussed. At the end of this chapter, the results executed from exploratory interviews have been discussed and analyzed.

Chapter 4: Model Design and Development

As a result of this research, a methodology was created. This chapter introduces the methodology to the reader and introduces the elements in them.

Chapter 5: Evaluation

Evaluation is required in order to confirm that a methodology achieves its intended purposes. Therefore, this chapter discusses the processes taken for methodology evaluation and the evaluation results.

Chapter 6: Discussion

This chapter talks about the meaning of the results of this study. It will explain and evaluate what we found during this research and how our findings are related to the research questions. In other words, this chapter is where we delve into the meaning and relevance of our results.

Chapter 7: Conclusion

This chapter clearly states answers to the research questions defined at the beginning of the research. In addition, it shows what new knowledge we have contributed. At the end of this chapter, proposals for future work indicated by the research are suggested.

2 Research Methodology

Due to the aim of this research and the logic behind the design science approach, this methodology was chosen as an approach for this research.

Research is not just about gathering information while it is about answering unanswered questions or creating new questions that do not exist. In order to have good research, research should be systematic with a specific goal. The research procedure will be organized and planned by systematic research (Goddard & Melville, 2001). In order to have systematic research, the research methodology should be selected. By selecting research methodology, we clarify how we will identify, select, process, and analyze the information about the topic. This topic aims to create a methodology that helps organizations integrate business and IT strategies, and we had to choose an approach that looks suitable for this topic.

To develop a research instrument by traditional research approaches, a new instrument is being developed. And then, the instrument is being subjected to a relatively short pilot test for validation. Due to this, this approach is more suitable when the validity of the theories and instruments are already well established. In addition, due to the emphasis of the traditional approaches on evaluating the explanatory or predictive properties of a research instrument and its underlying theories, the assessment of the descriptive or prescriptive utility is being overlooked (Mclaren & Buijs, 2011).

In contrast to the traditional approaches, the design science approach emphasizes more on assessing the descriptive and prescriptive utility of an instrument. In this approach, the assessment is being done by providing outputs that managers can use for decision-making. Instead of checking the artifact's validity and reliability, the artifact is being evaluated in the design science approach by answering the question ‘How well does it work?’ Because the primary goal of this approach is to produce an understanding guideline for managers to make decisions rather than focusing on exploring and confirming hypotheses that traditional research does. In other words, the design science approach has emerged to develop information system (IS) research artifacts. In the first stage of this methodology goal of the artifacts (constructs, methods, models, or instantiations) are being defined. And building, evaluation, reliability, and validity check of the artifacts are being done in future steps (Mclaren & Buijs, 2011).

In summary, using a design science approach allows a researcher to gain knowledge and understand the problem domain and the solutions needed for solving them. Moreover, applying this approach will result in building and applying artifacts (Hevner et al., 2004).

2.1 Design science approach

Researchers have advocated for the design science research method because it allows bringing the practitioners and academic researchers closer together.

According to (Holmström et al., 2009), the design science approach is a methodology that can bridge the gap between theory and practice. The design science approach is a problem-solving paradigm that seeks to enhance human knowledge by creating innovative artifacts. The main goal behind creating innovative artifacts is to solve the problems that exist in the environment. As a result of implementing this approach, an artifact will be created. In addition to the artifact, design knowledge will be generated to understand better why the artifacts enhance the relevant application context (vom Brocke et al., 2020).

2.1.1 Design science framework

(Hernver et al.,2004) defined a conceptual framework to help researchers understand, execute, and evaluate the design science research approach. Figure 1 shows this conceptual framework. There is a part within the framework called the environment, composed of people, organizations, existing technologies, and planned technologies and talks about the problems, goals, tasks, and opportunities that the stakeholders perceive within the organization. This information helps the researcher to understand the required needs within the organization. After identifying required needs, needs should be assessed and evaluated within the context of the organization. This means that needs should be assessed and evaluated with the organizational strategies, structures, technologies, infrastructure, cultures, etc. Together these steps help the researcher define the research problem to address the needs of stakeholders (vom Brocke et al., 2020).

There is another part within the framework which is called knowledge base. This part is composed of methodologies, foundations, and prior research that are related and were done about the research. The theories, frameworks, models, results of previous researchers need to be considered in this part.

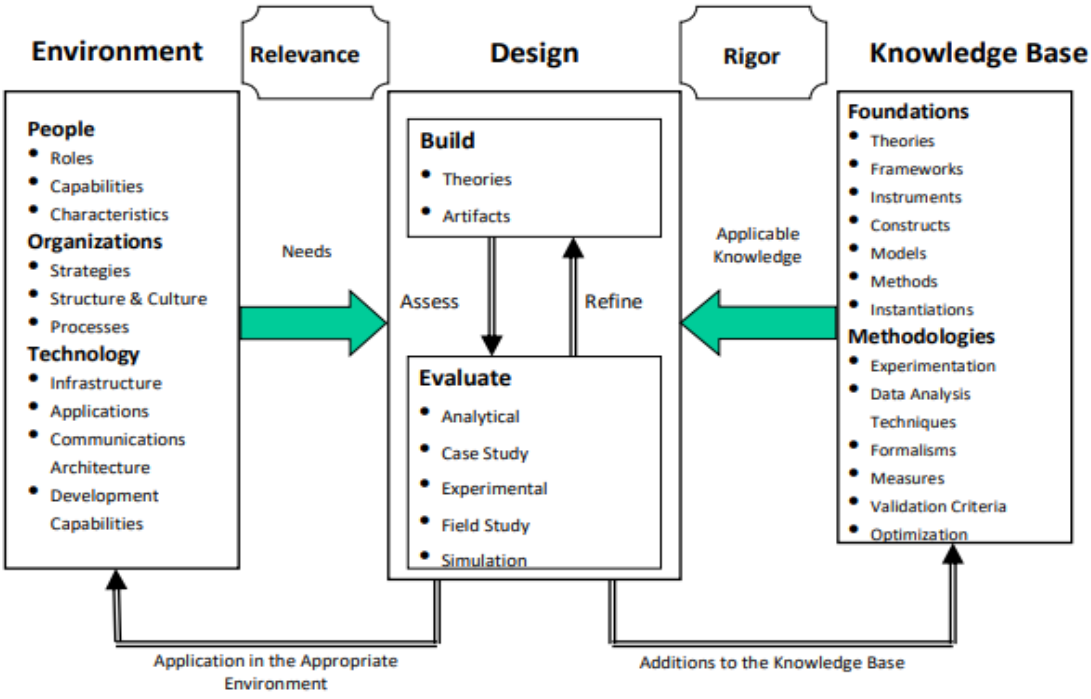


Figure 1) Design Science Research Framework (vom Brocke et al., 2020)

2.1.2 Design science research process

Researchers use different models for performing the design science approach. According to (vom Brocke et al.,2020), the model developed by Peffers, Tuuanen, Rothenberger, & Chatterjee (2008) is the most widely referenced model for performing the design science approach.

The model, defined by (Peffers et al.,2008), consists of six steps and four entry points. The picture below shows the model, and details about each step can be found in the following paragraphs. This research starts from a problem-centered initiation point by doing exploratory interviews as input for the design cycle.

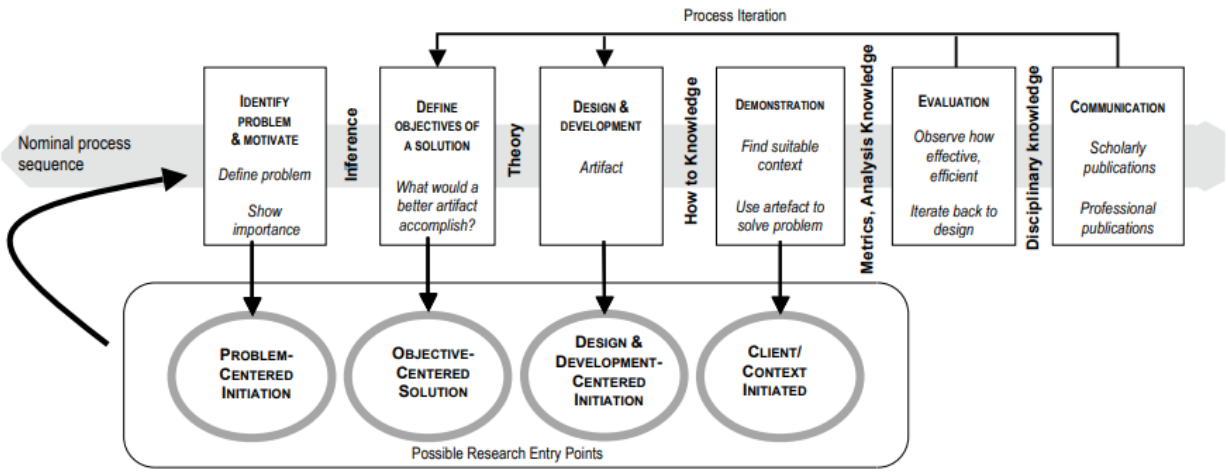


Figure 2) Design science research process (DSRP) model (Peffers et al., 2008)

2.1.2.1 Problem identification and motivation

This step helps the researcher define the problem and justify the solution's value for solving the problem. As a result of problem definition, an effective artifactual solution will be developed. Therefore, atomizing the problem conceptually would be helpful to create a concrete solution for capturing the complexity of the problem. Understanding the state of the problem and the importance of its solution are the required resources for implementing this step. Justifying the value of a potential solution accomplished two advantages. First of all, it impacts the motivation of both the researcher and the research audience to pursue the solution. Secondly, the audience will become familiar with the problem domain (Peffers et al., 2008).

For doing this research, we need to find the existing problems within the organizations regarding business and IT integration. In addition to the problem understanding, we need to understand what existing potential solutions are used to solve these problems. Moreover, we have to know what is still needed to be developed for solving the remaining problems. Therefore, to identify the root cause of the problems and potential solutions, a literature review and exploratory interviews with experts in the industry were done for this research.

2.1.2.2 Definition of the objectives for a solution

Based on the problem definition and possibility and feasibility knowledge, the objectives of the solutions should be inferred. These objectives can be quantitative or qualitative. Qualitative objectives describe how the new artifact can solve and support problems that have been defined in the problem definition. Alternatively, quantitative objectives talk about the terms in which the new artifact can be used and act better than the current solutions. For the implementation of this step, a researcher should know the state of the problem. In addition, he/she should be aware of the available solutions for solving this problem and their level of efficacy(Peffers et al., 2008).

Based on the identified problems and solutions that we gathered during the exploratory interviews, we analyzed the possibility of SEPv1 to solve business and IT alignment problems. Moreover, we identified limitations in his method and the required features to be added to SEPv1 to solve limitations.

2.1.2.3 Design and development

During this step, the researcher should create an artifact. This artifact can be any designed object which embeds the research contribution in itself. For implementing this step, the desired functionality and architecture of the artifact need to be determined, and following that, an actual artifact needs to be created (Peffers et al., 2008).

Based on the required features identified in the previous steps, SEPv2 was created to solve the problems in the organizations regarding business and IT integration.

2.1.2.4 Demonstration

This step defines how the artifact can be used to solve problems and limitations that have been defined in the previous steps. The demonstration can involve using artifacts in case studies, experimentation, simulation, proof, etc. (Peffers et al., 2008).

SEPv2 aims to solve the problems analyzed from the exploratory interviews. To prove the artifact's usability, we scheduled confirmatory interviews, introduced the new version of the method, and discussed how the methods' elements could solve the problems discussed during exploratory interviews. To make the methodology more understandable to the interviewees, we created a worked-out example called Invest4All [see Appendix V] as the demonstrator. The worked-out example was created as a synthetic case for testing the methodology and supporting materials during the confirmatory interviews.

2.1.2.5 Evaluation

This step should measure how well the artifact supports the solutions for solving identified problems defined in the previous steps. For implementing this step, artifacts must be used in the context, and defined objectives must be compared to the actual observed results. Based on the results from the comparison, researchers can decide whether to return to the third step and improve the effectiveness of the artifact or go for the last step and communicate the artifact with the relevant stakeholders (Peffers et al., 2008).

Confirmatory interviews were conducted with four of our interviewees who participated in the exploratory interviews to evaluate the methodology. During these interviews, the methodology was shown and introduced to them. For each methodology element, we asked our interviewees to assess the element based on five criteria: ease of use, compatibility, subjective norm, usefulness, and intention (Riemenschneider et al., 2002). Moreover, their qualitative feedback about each element was collected. At the end of the interviews, we asked our interviewees to assess the methodology as a whole and share their overall feedback about that.

2.1.2.6 Communication

Based on the research goals and the research audience, all aspects of the problems, the artifact, its utility, and novelty need to be communicated to the relevant stakeholders (Peffers et al., 2008).

Results that have been conducted during this research were gathered in the master thesis document and shared with relevant stakeholders to show the efficacy of the artifact in solving identified problems.

3 Explorative Interviews

Conducting interviews is one of the leading research techniques that help researchers to gather data through verbal communication. Doing interviews is being used as a methodology in survey designs and exploratory and descriptive studies. There are different approaches to conducting interviews. Interviews can be done from entirely unstructured to highly structured. In completely unstructured interviews, the interviewee is free to talk about whatever he/she wishes. While in a highly structured interview, the subject responses are limited to answering direct questions (Lacey & Luff, 2001).

3.1 Type of interview

An exploratory interview is used to develop and explore possible ways and ideas for gathering information. In this type of interview, the question areas are predetermined, but the interviewee can respond in his/her way. This type of interview is valuable at the early stages of the research to identify the issues related to the topic (IMA: Research Methods for Information Research: 2.1 Research Interviews: Forms of Interview, 2021).

An exploratory interview was selected as a type of interview for the first stage of this research. This type of interview provided a situation for us to have a conversation with the participant and allowed him/her to tell about the area under investigation (Hunter, 2014).

Exploratory interviews stand in contrast to confirmatory interviews, which we will use as an instrument in the later phase of evaluation, described in Chapter five.

3.2 Interview methods

Video conferencing has become popular for at least the last decades due to the rapid development of technologies. This development provides a situation for people to communicate face-to-face in real-time regardless of their geographical location. Skype has been one of the leading applications used for conducting interviews (Nehls et al., 2014).

Due to the COVID-19 pandemic and the resulting stay-at-home orders, many people work from home, which has increased the use of video conferencing technology (Karl et al., 2021). For instance, Microsoft Teams has seen a significant increase in the number of its users. According to the statistics, in 2019, Microsoft Teams had 20 million users, while in 2020, their number of users has topped 115 million. This increase generated $6.8 billion in revenue in 2020 (Why Microsoft Teams Gained Incredible Popularity During the Pandemic, 2021).

Due to the pandemic situation, exploratory and confirmatory interviews of this research were conducted online via Microsoft Teams application. Although it was hard to build interpersonal connections through online interviews, online interviewing provides flexibility and time efficiency for both interviewer and interviewees. In addition, in online interviews, as in face-to-face interviews, we as an interviewer had this chance to correct a misunderstanding, explain the goals behind the questions, probe responses, and follow up on new ideas during the interviews.

3.3 Locating and selecting interviewees

There are several approaches for selecting interviewees for research. For this research, we needed a straightforward approach to maximize coverage for different categories and determine who could be interviewed for this topic. For these interviews, our main objective was to include as many perspectives as possible; therefore, we tried to include different diversities to gather a wide range of information (Lacey & Luff, 2001).

The approach that provides a wide range of information is called theoretical sampling. In this approach, the number of interviewees is not essential, while the information added by the respondents to the research is essential. These interviews should be continued until the interviewer feels that he/she cannot achieve and uncover new meanings in the interviews. That is the moment that the interviewer can stop interviewing. And this step is called theoretical saturation.

LinkedIn is the world's largest professional network on the internet. Therefore, for finding professional interviewees and building strong professional relationships, a list of potential interviewee candidates that could be helpful for this research was provided by the researcher. The list included the role of people, their organization name, their year of experience, and their contact information. After the consultation with the project supervisor, an invitation message was created and sent to the potential candidates. In total, we sent an invitation message to twenty people. And we received positive responses from eleven of them. However, due to the schedule mismatch, we could not schedule interviews with four of them.

3.4 Getting agreement to undertake interviews

To reach the agreement between the interviewer and the interviewees, a summary of the main objectives behind the research is mentioned in the invitation message to clarify why the study is being done. For interviews, we have looked for people who have a relationship strategy of their own organization or have a relationship as an adviser regarding the strategy of the other organizations, such as consultants. Since we looked for problems, challenges, and solutions in the organizations in this research, we had to reassure interviewees about confidentiality issues. Therefore, we asked them to talk about the problems and challenges of their client companies without mentioning their names and private information.

3.5 Structuring interviews

Different types of approaches for doing interviews provide different advantages and disadvantages. For instance, in a structured interview, a set of questions has been used and provides a situation for the interviewer to compare the results. Nevertheless, the interviewee cannot shape the discussion. While in unstructured interviews, the interviewee has this chance to structure the interview, which can lead to an in-depth analysis of issues. However, the comparative data analysis becomes hard since the interviewer cannot be assured about the full coverage of the relevant issues. Due to the limitations in each of the approaches, researchers prefer to use semi-structured interviews and use the advantages of both approaches and reduce the disadvantages of approaches as much as possible (Young et al., 2018).

Due to the mentioned reasons, a set of questions defined in the following table was created as an interview guide for this research. This means that we tried to have a set of standard questions

for comparing and data analysis. In addition to that, we considered a space for ourselves to ask additional questions if new interesting information arises during the interviews. Although we tried to structure the interviews, we also had to be unbiased and offer no personal views during the discussions. Therefore, we tried to ask neutral questions as much as possible.

Introduction
Could you please tell me what your organization is currently doing? What is your organization size?
How many people are working in your team?
How many years of experience do you have?
Could you please tell me about your role? How do you describe your current duties?
Strategy creation and execution
At your client companies, how is the strategy being made and executed?
Who is involved in strategy creation? Are there people involved in strategy creation throughout the organization, or is it centralized in a couple of people?
What is your process for creating business and IT strategies?
Business and IT integration
To what extent are business strategy and IT strategy integrated within these organizations?
What is going well regarding this alignment? What is not working well?
Does your organization experience problems in terms of achieving alignment between IT and business strategies? If yes, what kind of challenges do you have regarding business and IT alignment when you are on a path of digital transformation? Why is that challenging?
Is your organization successful in achieving business and IT alignment? If yes, how is this integration achieved?
Level of understanding between teams
How well do technical and business staff understand each other within your organization?
Do technical and business staff connect easily and frequently?
Do the staff have the skills needed to be effective?
How well do the technical staff understand business drivers and speak the language of the business?
How well do the business staff understand relevant technology concepts?
Building connections and implementing strategies
How do you connect the individual projects to the overall strategy within your organization? What do you do to make that connection?

When your strategies are in place or formulated, what do you do with them? How do you implement them?
Overcoming challenges regarding the business and IT alignment
What are your organization's tactics to overcome challenges regarding business and IT alignment?
Have you been successful in terms of tackling challenges? What is the result? Do you have specific outcomes?
What is lacking there? What would you like to be there?

Table 1) Interview questions

3.6 Analyzing the interview data

After conducting interviews, the interview results need to be analyzed. However, before analysis, data needs to be prepared. In order to prepare data, data should be transcribed. Data transcription means that the data from interviews, memos, or observational notes should be typed into word processing documents. After transcription, data is ready to be analyzed. “To analyze means to take apart words, sentences, and paragraphs, which is an important act in the research project to make sense of, interpret, and theories such data.” (Brigitte Smit, 2002). This analysis can be done manually or by computer programs. ATLAS.ti is one of the leading programs popular in qualitative analysis (Brigitte Smit, 2002).

According to the ATLAS.ti website, ATLAS.ti is a robust qualitative analysis tool regardless of the user's fields. This tool provides powerful features to analyze even the complex data material. In addition to coding data, it provides an opportunity for users to visualize their findings and links their findings in a meaningful way (What Is ATLAS.Ti | ATLAS.Ti, 2021).

One of the main goals of the analysis is to describe the data and describe the events and objects to which data refers to. Data description is not enough in some situations, and explanations or interpretations are required to analyze the data (Smit, 2002).

For this research, after transcription, the ATLAS.ti program was used to analyze the exploratory interviews. By the use of ATLAS.ti, data was broken up and assigned into new categories. Furthermore, we tried to identify the formal connections between the categories. According to Brigitte Smit, data classification is an essential step in data analysis that provides a meaningful comparison. In other words, by data classification, data becomes understandable for others (Brigitte Smit, 2002). As a result of this analysis, the data of this research is classified into two main categories. The first category talks about the problems and challenges within organizations regarding business and IT alignment. And the second category talks about the potential solutions that can help organizations overcome mentioned challenges and problems.

3.7 Interview results

This part presents the results which have been derived from the exploratory interviews. The results are presented in tables. The subsection of the section provides an overview of the people who were involved in exploratory interviews. The second section shows detailed information on

the interviewee organizations and their roles. The third chapter talks about the people who are responsible within the organizations about the strategy creation. The fourth section discusses the data from the interviews related to the business and IT alignment problems. Finally, the fifth section presents the data about the solutions for integrating business and IT strategies.

3.7.1 Cases overview

This section provides an overview of interviewees, their roles, their organizations, and their experiences. The interviewees who participated in this research work in different organizations and with different clients in the IT industry. Therefore, due to the confidential limitations, the names of interviewees were kept anonymous.

Interviewee	Interviewee Role	Interviewee Experience	Interviewee Organization
A	Principal consultant	18 years	Software Improvement Group (SIG)
B	Consultant Technology Strategy	4.5 years	Deloitte
C	Consultant Strategy & Operations	6 years	Deloitte
D	Senior Consultant Digital Strategy	4.5 years	KPMG
E	Dev Engineer	6 years	ING Nederland
F	Senior Consultant Tech Strategy & Transformation	4 years	Deloitte
G	Senior IT Architect	17 years	VZVZ

Table 2) cases overview

3.7.2 Summary of the organizations and interviewee roles

This section provides more detailed information on the organizations of the interviewees and their roles.

Interviewee	Information of the organization and interviewee roles
A	SIG is a consultancy firm that consists of 120 people in Amsterdam, Kbenhavn, Antwerp, New York, and Frankfurt. They do management consultancy. However, in a niche precisely, they do that based on IT quality management. So, they give advice on IT strategy based on measuring software. The interviewee's role is a principal consultant. He leads consultants who deliver the services of the organization to the commercial sector.
B	Deloitte is a firm in which tens of thousands of professionals in independent firms worldwide collaborate in different fields such as financial advisory, audit & assurance, consulting, tax, etc. The interviewee works in the technology strategy and transformation team. This team does two things. On the technology and strategy side, they offer advice to companies regarding how IT and technology and their business strategy are aligned. Then the transformation side is more about executing the projects that come from the strategic analysis.
C	The interviewee is active in the business and operations team at Deloitte. The team specifically specialized in business process transformation. Moreover, that team also splits into different teams. They have a strategic focus team that looks at the processes of companies and advises them on process improvement. They also have a team that looks at automation tooling, intelligence, RPA, etc. The interviewee is working on the strategy side.
D	KPMG is an international accountancy and consultancy firm that provides services in 147 countries. The interviewee is a part of the KPMG digital strategy group. There are about 30, 35 people in this group. They also have a strategy and operations group. These groups do digital strategies together. In addition, the interviewee is also part of a digital health team.
E	ING is a bank that supports retail customers the same as other banks. The interviewee is in the front-end cyber security department. And he is working on the applications that help detect fraud and act on that. Before ING, the interviewee worked in SIG as a full-stack developer.
F	The interviewee works in a strategy group at Deloitte. And their primary focus is more on technology and transformation, Not the strategy part but the part that comes after that.
G	VZVZ is a not-for-profit business. It is an organization that was set up to make interoperability in the healthcare sector. This company was started with a national switch point, the LSP. A central system where mostly pharmacists and the GPs exchange data with each other and hospitals as well. The interviewee works as an IT architect at VZVZ.

Table 3) Information of the organization and interviewee roles

3.7.3 Involved people in creating strategies

This section provides an overview of people who have been involved in strategy creation at interviewee companies or their client companies.

Interviewee	Who is involved in strategy creation? Is that something that spreads through the organizations, or is it a couple of people in charge?
A	The management team is responsible for strategy definition and evolution. The management team consists of the CEO, CFO, COO, and the commercial director. The management team describes the strategy in a document and reminds everybody of what it is.
B	The management team is responsible for the overall strategy definition. The Board of directors defines corporate strategy. CIO is responsible for IT strategy and is not on the board of directors. CFO is responsible for IT strategy in medium-sized companies. The Board of directors does not like to outsource its strategy.
C	The management team is responsible for strategy definition. The Board of directors is always the decider. The manager, director, or the CEO always decide about the final decision
D	The Board of directors defines corporate strategy. The CIO or the CTO or IT director is responsible for IT strategy.
E	The Board of directors defines corporate strategy. The Board of directors needs to approve the ideas that come from the bottom.
F	The CEO or the shareholders are the owners of the strategy.
G	C-level people have made decisions. People in the C-level think from a functional perspective. The IT architecture board advises the C-level people to decide. The management team decides whether to do a business case or not.

Table 4) Involved people in strategy creation within organizations

3.7.4 Sample of seven problems in integrating business and IT strategies

This section provides a sample overview of the problems and challenges in interviewees' organizations which will later use as an input for methodology design. These problems were collected during the exploratory interviews. The complete overview of sixty-five problems can be found in Appendix I. In the section later, we will discuss how these problems can be linked to solutions. And how it can feed into the design of our extended method.

What challenges do you have regarding business and IT alignment when you are on a path of digital transformation?							
Challenges	A	B	C	D	E	F	G
A long time is required for digital strategy formulation.	×						
Strategy implementation takes much time, especially in big organizations. During the implementation phase, due to the failures, you might come back and update the strategy.	×		×	×	×	×	×
There are different ways of interpreting strategies. People do not know what strategy means for them because it is described at a very high level.	×	×	×				
Implementation of the strategy is challenging. The strategy makes many straightforward rules. However, in reality, it is not so simple to implement strategies.	×			×	×	×	×
Different levels of understanding between IT and business teams cause problems. Moreover, if people do not understand the strategy very well, they will work far from it.	×	×	×	×	×		
Finding ways that comply with the strategy of the organization is challenging.	×	×	×				
Reminding people of what they should do and how to execute strategy is challenging.	×	×		×	×	×	×

Table 5) Sample overview about problems in integrating business and IT strategies

3.7.5 Sample of seven solutions for integrating business and IT strategies

This section provides a sample overview of the solutions and tactics in interviewees' organizations or their clients' organizations to overcome business and IT integration challenges. This information will be later used as an input for methodology design. The complete overview of thirty-seven solutions can be found in appendix II.

What are your organization's tactics to overcome challenges regarding business and IT alignment?							
Solutions	A	B	C	D	E	F	G
Setting central KPIs and incentives help people to act in the right way.	×	×	×				
Companies should explain to employees why they want things and how things work by training. IT people should be trained for what needs to happen for future progress. Moreover, business people should be trained on things like digital advances that are happening.	×	×	×		×		
A one-to-one conversation between employees and managers in organizations with a limited number of employees can work as a solution.	×	×			×		
Offering bonuses and setting target scores quarterly or monthly with the people to get them to move in the same direction.	×	×					
The healthier relationship is to put business people to say the final words, but IT should have a decisive role and teach businesses how to do IT right. In addition, it should be considered that business should not overrule everything IT says.	×						
The strategy should be translated into tactics to help people to make decisions.	×						
Business people and IT people should listen to each other, and IT people should be invited from the beginning in the decision-making process. Involvement of both groups is required for strategy creation and to keep change going.	×	×	×	×	×	×	×

Table 6) Sample overview of solutions for overcoming mentioned challenges

3.8 Grouping interview results

Based on the results of the interviews, eleven categories have been defined for grouping the sixty-five problems gathered from interviews. Although most identified problems have been categorized in these eleven categories, sixteen problems have not been classified. The following table shows these eleven categories. Moreover, to clarify these categories in the problems table in the appendix, we highlighted each category with a specific color to give an overview to the reader.

Problem category	Description
Problems in strategy implementation	Once the organization has agreed on the strategies, it can implement them. This step is where some organizations face challenges and failures. These failures can happen due to both micro and macro organizational issues. Macro-organizational issues are system-wide issues that affect people in the organization (e.g., technology, decision processes, reward systems and structure). Micro-organizational issues depend on the organization's individuals' behaviors to implement strategies. (e.g., organization culture, employee acceptance, resistance to change). These issues prevent organizations from successfully implementing the defined strategy (*Strategy Implementation | Encyclopedia.Com*, 2021). This category is defined to discuss the problems companies face to turn the plans defined in strategy formulation into actions for reaching desirable outcomes.
IT autonomous teams	Some interviewees mentioned that autonomous teams pursue goals that are not aligned with the organization-wide goals set by the defined strategy, and they have organizational latitude for establishing their own goals and objectives, they have just spent the budget on implementing new and overly sophisticated features and functionalities without thinking about the usefulness and necessity of those features. In other words, these teams give their own objectives precedents over the cooperate and overall team goals. Therefore, this category is defined to discuss challenges that IT autonomous teams cause in organizations.
Domination of business teams	Our interviewees mentioned that sometimes there is not an equal weight between IT and business teams within firms. Moreover, the business team is dominant in the conversation between teams. It means that business teams want new features and functionalities to pursue near-term financial goals. As a result, they constantly push and ask the IT team to implement those features. Due to overruling the words of the IT people, imperfect and slow systems are created. This category is defined to discuss problems that organizations face due to the domination of business teams.
Lack of an appropriate conversation between business and IT teams	The overall goal of each organization is to achieve its objectives. Therefore, decisions should be formulated, integrated, and implemented between IT and business teams to achieve this goal. For implementing this idea, IT and business teams need to be in close relation with each other. According to the exploratory interviews, most of our interviewees mentioned that no appropriate conversation exists between business and IT teams within their firms. Moreover, this poor conversation results in over-

	expensive tools. This category is defined to discuss these challenges.
Diversity of stakeholders	During the exploratory interviews, some interviewees said that some projects have different stakeholders with different expectations. And sometimes, it is hard for organizations to understand stakeholders' expectations and address them. Therefore, we defined this category to discuss the problems that arise due to the existence of different stakeholders within the projects.
Lack of awareness within organizations	Lack of awareness might happen due to many reasons such as inaccuracy, inaccessibility, absence of information, etc. Some of our interviewees mentioned that lack of awareness about new digital technologies prevents some organizations from improving. This category shows problems that exist in organizations due to the lack of awareness.
Lack of a central coordinating point for prioritization	Some of our interviewees mentioned that project coordination should exist to ensure the defined project steps are progressing to the prescribed timeline. Therefore, they have thought that a coordinating point should be considered in organizations to help organizations control projects, manage risks and validate the tasks**.** This category discusses the problems that occur due to the absence of a coordinate point for prioritization within firms.
Lack of an appropriate analysis of the current situation of the organization	Our interviewees mentioned that it is essential for the teams to get a comprehensive overview of the project before starting them. They believed that most problems happen during the projects' implementation due to inappropriate situation understanding. Therefore, this category discusses the problems that occur due to the inappropriate understanding of an organization's current situation.
Limitations of the existing frameworks and tools	Some of our interviewees mentioned that some well-known frameworks and models such as SAFe and “the Spotify model” (Kniberg & Ivarsson, 2012) could be used to remove the gaps between business and IT teams. They also mentioned that these frameworks need structural changes, which means that organizations should resolve their organizational issues before using these tools. Due to this, they thought that it would be hard for some organizations to use these new frameworks and models directly. This category discusses the limitations of the current frameworks and models that exist in the market.
Problems in defining a clear, focused, shared goal	Our interviewees mentioned that business and IT teams have their own goals and targets. Moreover, each team wants to achieve its goal. And this caused conflicts between teams and prevented them from improving. This category classified problems that exist within firms regarding the goal definition.
Problems in strategy formulation	The world is changing fast, and new technologies are entering the market. Due to this, it was thought by our interviewees that it is hard for some organizations to formulate digital strategies properly. This category discusses the problems in choosing the best actions for realizing organizational objectives.

Table 7) Problem categories

Based on the problem categories and solutions discussed during interviews, a mapping table has been created to link the possible solutions to the problem categories discussed in the previous table. The following table shows this information.

Problem category	Possible solutions
Problems in strategy implementation	Firstly, central KPIs, incentives, and bonuses can be set to help teams act in the right direction. Secondly, strategies need to be translated into tactics to help people to make decisions. Thirdly, companies need to start with inspiring projects that may have a less widespread impact but showcase digital power. Moreover, this helps them to gain trust.
IT autonomous teams	Both business and IT teams need to be trained. IT people should be trained for what needs to happen for future progress, and business people should be trained on things like digital advances.
Domination of business teams	Involvement of both IT and business teams is required for strategy creation and to keep change going. In addition, visibility in agendas and receiving feedback during the implementation will help them to build collaboration.
Lack of an appropriate conversation between business and IT teams	Using the roles such as product owner, information manager, etc., that exist in the organizations to bridge the gap between business and IT teams.
Diversity of stakeholders	For the success of the projects, goals should be defined by all stakeholders of the organization. In addition, target translation is essential. Targets need to be translated into clear steps.
Lack of awareness within organizations	Training is a helpful solution to explain to employees why we want things and how things work by training. IT people should be trained for what needs to happen for future progress, and business people should be trained on things like digital advances. In addition, creating success stories is one of the best ways to involve more decentralized people and increase their awareness.
Lack of a central coordinating point for prioritization	One central coordinating point is helpful for digital strategy transformation and shaping strategy. In addition, a central role creates more progress in a shorter amount of time. These people should be in charge of projects to control. Different roles can do this task, such as product owner, information manager, CIO, etc.
Lack of an appropriate analysis of the current situation of the organization	Use of inside-out and outside-in perspectives is required for understanding the current situation of the organization.
Limitations of the existing frameworks and tools	Famous frameworks such as SAFe and Spotify can be used to remove the gaps between business and IT teams. However, organizational issues in the old organizational framework need to be resolved before using these tools.
Problems in defining a clear, focused, shared goal	Business and IT teams have their own goals and targets. These goals need to be prioritized based on their added value.
Problems in strategy formulation	Digital strategy should be defined with a big horizon, but re-evaluation is required due to the fast digital world.

Table 8) Possible solutions for problem categorizes

4 Chapter 4: Model Design and Development

4.1 Evolution plan template

As a result of this research, we created SEPv2 discussed in the introduction chapter. New elements have been added to SEPv1 for solving limitations. The following table shows SEPv2 with its new elements. These changes are written in red to give an overview to the reader.

	Planning Stages	To Do	Elements of the methodology
Current Situation What is?	**Analyze the initial state** •Where are you? •What are the problems and potentials?	•Identifying and grouping stakeholders •Assessing strengths, weaknesses, opportunities, and threats of the business. •Match external opportunities and threats with internal strengths and weaknesses of the system.	•Stakeholder analysis •SWOT analysis •TOWS analysis
Ambition State What should be?	**The vision of intended change** •Where do you want to go? •What results do you want to achieve?	•Analyzing the outcomes and impacts of intended results •Comparing the current situation with desired and expected situation of the system. •Defining the ambition state	•Gap analysis •Ambition element
Design Moves How to fill the gap?	**Design of project Strategy** •What are the ways to achieve ambition state? •What are the external factors that have an impact on the project? •What benefits are going to be generated for each stakeholder by design moves?	•Defining required design moves with their strategic intent •Analyzing risks and actions for mitigating risks •Defining benefits that are going to be generated for stakeholders by each design move	•Design moves element •Risk assessment •Mitigation actions •Benefit generation for stakeholders
	Design of project organization •What are the required roles and responsibilities? •How can the project be steered and evaluated?	•Defining roles and responsibilities (Allocating resources) •Fill in the monitoring and evaluation template during the execution.	•Roadmap •Monitoring and evaluation matrix

Table 9) Overview of the evolution plan

4.1.1 Current situation understanding

In order to change the story of an organization or a system within an organization, it is necessary to understand the current state of the organization and the system. Situation understanding is the first place that helps people to find their way to achieving their ambition state. By doing this stage, people will become aware of the requirements needed to achieve the ambition state. Understanding the people, technologies, processes, etc., which exist in the organizations will be helpful for people to have an overview of their current state. To consider this step in the evolution plan, stakeholder analysis, SWOT analysis, and TOWS analysis have been considered. The following sections will discuss the details of these three elements.

4.1.1.1 Stakeholder analysis

Satisfied stakeholders can have a significant impact on the progress and the performance of the projects and ultimately contribute to the success of the projects. Thus, developing the support and managing the expectation of the stakeholders can be counted as one of the crucial steps that need to be taken at the beginning of the projects (Kennon et al., 2009).

In SEPv1, there was little explanation of the stakeholder analysis. It was mentioned in SEPv1 that the main stakeholders of the projects need to be identified. However, there was not an explicit approach for identifying the stakeholders. A new table has been created in SEPv2 to analyze the projects' stakeholders to manage the social capital and human resources. This table is created to group the stakeholders and identify their level of impact and support.

Furthermore, this table helps the methodology users clarify the reasons for resistance or support of each stakeholder group. In the end, based on the information filled out in the table, required actions for addressing each group of stakeholders will be defined. The following table gives an overview of this table, and the following paragraphs will discuss each column of the table.

Stakeholders	Impact level	Support level	Reasons	Actions
Who are your stakeholders or stakeholder group?	What are the impacts of stakeholders on a business?	How supportive of the project objectives is the stakeholder?	What are the reasons for resistance or support?	What are the actions to address this stakeholder group?

Table 10) Stakeholder analysis

4.1.1.1.1 Stakeholder group

A project stakeholder is a person who benefits from the project when it succeeds and shares the pain with you when you face a failure. In other words, if a person does not lose anything when you face a failure during a project, he/she does not have a stake in it. Influence can be defined as the person's power to affect the project implemented in a particular direction. As a result of plotting these two dimensions, the following map will be created for grouping stakeholders (Verwijs, 2021).

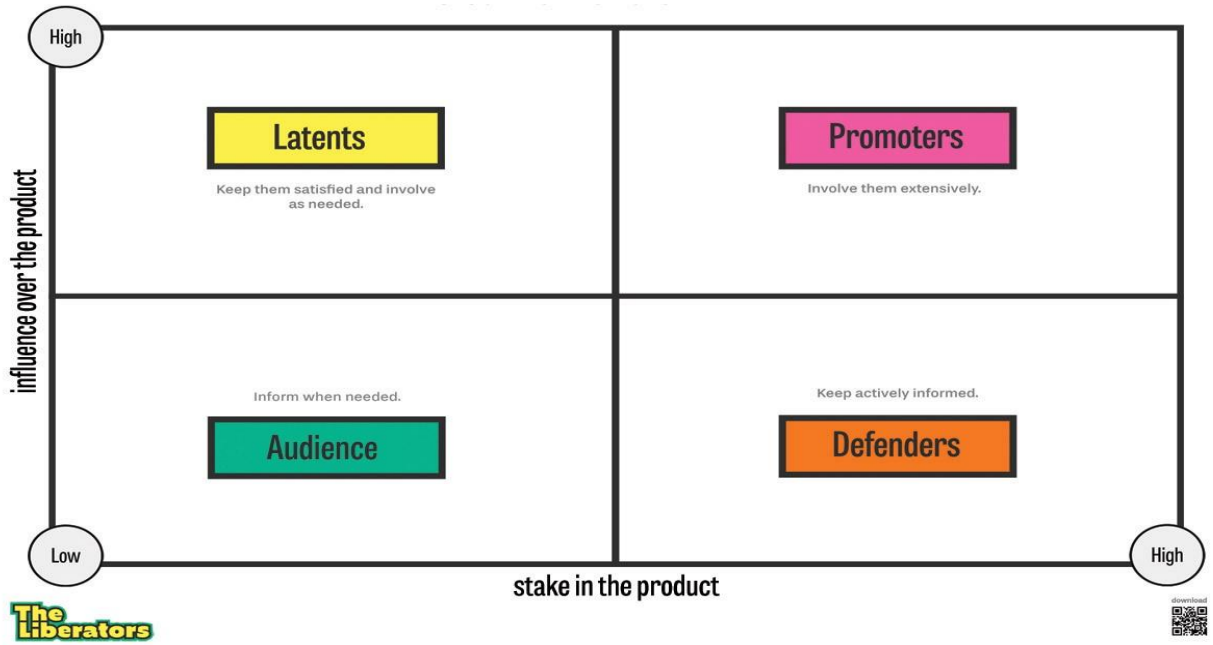


Figure 3) Stakeholder map (Verwijs, 2021)

Based on the above map, stakeholders of the projects can be identified in four different groups. The following paragraphs will discuss each of these groups.

Promoters: This group of stakeholders has a significant influence and stake in the product. This group should be involved extensively. Therefore, they need to be invited frequently, and their needs and assumptions should be identified and validated. This group consists of crucial customers, prominent investors, vocal users, etc. (Verwijs, 2021).

Defenders: Although this group of stakeholders has a significant stake in the product, they have a low influence. This group of stakeholders needs to be updated about the new changes in the product. Users who frequently use the company's product can be categorized in this group (Verwijs, 2021).

Latents: This group of people significantly influences the product but do not have a stake in it. Due to the level of influence, this group needs to be satisfied. The customers who buy other products of the company can be categorized in this group. Moreover, it is undeniable that a company’s success can move these people to the promoters (Verwijs, 2021).

Audience: This group of people does not have influence and stake on the product. Therefore, this group should be informed when it is needed (Verwijs, 2021).

4.1.1.1.2 Impact level

The following categories have been defined to help methodology users to define the level of impact of stakeholders.

Decision authority: This level of impact refers to the stakeholders who have the power and right to make decisions. In addition to the decision-making task, these stakeholders are the ones who are responsible for the success or failure of the projects and should respond to them.
Affected: Stakeholders of a project can be either affected or be affected by a project. This group consists of people who have been affected during the project. This effect might be by actions, policies, objectives, employees, etc., of the organization.

Impactful: This level of impact refers to stakeholders whose actions and opinions strongly impact organizational performance.

4.1.1.1.3 Support level

The following categories help methodology users to define the support level of their stakeholders.

Supportive: This group of stakeholders is kind and helpful to the project at difficult times of implementation.

Neutral: This group of stakeholders is the ones who do not support or detract from you during projects. This group is just going with the flow.

Resistance: This group of stakeholders is resistant to any changes in the project's execution. These people are unsupportive about the project and its outcomes. Actions need to be taken in order to attract the trust of this stakeholder group.

The remaining columns are reasons and actions. The reasons column will help methodology users find the reasons for resistance or support of each stakeholder. Moreover, the actions column helps the methodology users define the required actions for addressing each stakeholder group.

4.1.1.2 SWOT analysis

Environmental analysis is a vital stage to do strategic management. The SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) framework categorizes internal and external environmental factors to the organization, project, or business venture. Many people have used this framework due to its simplicity and practicality. Although this framework is easy to use, it should not be used as a static analytical tool, and it should be used dynamically during the business development process (Pickton,1998). Due to its simplicity, this framework was considered in SEPv1. Moreover, it helps its users identify the system's strengths, weaknesses, opportunities, and threats by asking the following questions defined in the following table.

Strengths	**Weaknesses**
What does the system do well? What unique capabilities does the system have?	What could be improved? What capabilities are lacking?
Opportunities	**Threats**
How else could the system be used? What emerging demand could the system satisfy?	How could the system fail? What damage could the system do?

Table 11) SWOT analysis

4.1.1.3 TOWS analysis

As discussed in the above paragraph, although SWOT analysis helps users identify strengths, weaknesses, opportunities, and threats, it cannot help them primarily create a strategy. Due to this, we added the TOWS matrix in SEPv2. According to Warren Lynch (2021), TOWS analysis is an action tool that Heinz Weihrich created. This tool is the variant of the SWOT analysis tool and helps organizations identify strategic options that need to be pursued by matching internal factors to external factors. In other words, TOWS helps users to take advantage of the opportunities, overcome weaknesses, reduce threats and exploit strengths. As a result of the TOWS analysis, four strategies can be defined to cover all strategic perspectives (Lynch,2021). The following table shows the questions that can guide users during the definition of these strategies.

	Weaknesses	**Strengths**
Threats	**Counter weaknesses and threats:** How can you minimize the system's weaknesses to avoid the identified threats?	**Leverage strengths to minimize threats:** How can you use the system's strengths to minimize the identified threats?
Opportunities	**Counter weaknesses through exploiting opportunities:** What actions can you take to minimize the system's weaknesses using the identified opportunities?	**Leverage strengths to maximize opportunities:** Which of the system's strengths can be used to maximize the opportunities you identified?

Table 12) TOWS analysis

Based on the answers which the above table can provide, four following strategies can be identified:

The WT strategy: This strategy has been used in organizations that face both external threats and internal weaknesses. In the case of this situation, the organization/system needs to fight to survive. There are different options for controlling this situation, such as merging, cutting back the operations to overcome weaknesses or diminishing threats over time, liquidation, and so forth (Weihrich, 1982).

The WO strategy: This strategy has been used in organizations with internal weaknesses and identified external opportunities. Therefore, the main aim of this strategy is to reduce the weaknesses which cause obstacles for the organization to take advantage of the market demands. There are options that organizations might use during this situation. For instance, if weaknesses can be removed by training current employees or hiring new employees' organization should act immediately. Alternatively, if a technology can be borrowed from other organizations, it can be borrowed. But if the organization cannot solve the weaknesses in the organization, it should leave the opportunity to its competitors. Because without removing the weaknesses, organizations will not be able to take advantage of the market demands (Weihrich, 1982).

The ST strategy: This strategy has been used in organizations that should use their strengths while dealing with the threats that exist in the external environment. Organizations in this situation need to maximize their strengths while minimizing their threats (Weihrich, 1982).

The SO strategy: This situation is the best place that any organization would like to be. In this situation, the organization wants to maximize its both strengths and opportunities. To do this, an organization can use its internal resources and capabilities (strengths) to take the advantages which exist in the market demands (opportunities) (Weihrich, 1982).

4.1.2 Ambition

Although recessions impact hard on the business and cause severe damages, some businesses came out more vital than ever. Ready and Truelove did a study in 2011 for three years on companies that defied conventional logic. This study was done to understand how these organizations achieved success. During this study, interviews were taken by "dozens of CEOs, senior executives, and mid-level managers". As a result of this study, a model was constructed and shows how these organizations become successful. The model is called collective ambition. This model contains different elements such as the reasons for the organization's existence that have been defined by the leaders and employees, the goals that leaders and employees hope to accomplish, the ways to achieve their ambition, and the ways to align their promises with their core values. According to this study, Collective ambition is used by these successful companies to achieve and sustain excellence (Ready, 2011).

Based on the idea of this model, if organizations want to succeed and stay ahead in market competition, they should shape an ambition for themselves and consider elements needed for achieving that ambition. Due to the importance of defining ambition, the following table was created in SEPv1 for helping methodology users to formulate their ambition. It should also be considered that situation understanding and its main stages in the previous sections play a crucial role in defining ambition properly. In our methodology, an ambition stage is where the users formulate the goals they want to achieve in 12-18 months. In addition to the goal identification, the ambition element will help users clarify which stakeholder will benefit from each goal and how. Furthermore, the motivations behind each goal will be clarified by answering questions that have been shown in the following table.

Goal	Stakeholder interest	Motivation
What to achieve in 12-18 months?	Who benefits and how?	Which strength is used to seize which opportunity? Which weakness is remediated to mitigate which threat?

Table 13) Ambition definition

4.1.3 Gap analysis

Gap analysis is the process in which organizations can measure the distance between their current state and their ambition state. An ambition state is a place where organizations can act better to meet the organization's needs, while the current state is where organizations stand at

this moment. Based on the result of the gap analysis, organizations will become aware of the needs required for the success of the organizations to accomplish their goals. In addition, it helps organizations find ways to remove the issues that prevent the improvement of the organizations (Murray, 2000).

Based on the analyses discussed in the previous paragraphs, our methodology users have to become aware of their current and ambition states at this stage. Therefore, the following table has been added to SEPv2 to measure the distance between these stages and help organizations see how far they are from their ambitious state.

Gap	Type of the gap	Current state	Ambition state	Possible solution directions
What is the name of the gap?	What is the area of the gap?	What are you know?	What would you like to be?	What are the possible or alternative ways to solve the gaps?

Table 14) Gaps analysis

To categorize the gaps, we have decided to group the gaps based on the area of the gaps. (Peterson, 2019) defined four areas for categorizing the gaps, and we used his categories for our methodology. The following paragraphs will discuss each of these gap areas.

Performance gap analysis: This type of gap exists when there is a variance between the achieved goals and objectives and defined goals and objectives of an organization. In other words, this type of gap exists when an organization is distant from its main objectives and goals. To survive as a business, the company needs to remove this gap and achieve its remaining objectives (Peterson,2019).

Product (or market) gap analysis: This type of gap is found in organizations where the demand is greater than the supply or the other way around. This type of gap analysis will help organizations make evidence-based decisions rather than opinion-based or observational decisions for controlling the market (Peterson,2019).

Profit gap analysis: This type of gap exists in organizations that have problems in profit forecasting, and their profit forecasts are over-shot. Different factors cause this gap, such as a shift of market trends, aggressive competitions, political implications which are unforeseen, etc. In addition, this type of gap might have occurred during the planning, execution, or even both phases. The profit gap analysis will help organizations understand the root cause of the problem, plan the best actions, and prevent the repeat of mistakes (Peterson,2019).

Manpower (or HR) gap analysis: This type of gap analysis exists in organizations that face problems in hiring, training, on-boarding, off-boarding, in-sourcing, and outsourcing employees. In other words, these types of organizations face problems regarding their human resources. Manpower (or HR) gap analysis will help these organizations have a clear understanding of the competencies of their workforce and identify the required competencies that are lacking and required in their organizations (Peterson,2019).

Based on the above categories, users will become capable of categorizing the gaps. Moreover, based on that, they can suggest possible or alternative ways to solve these gaps and, they should fill them in the last column, which is named possible solution directions.

4.1.4 Design moves

Discrete strategic actions should be taken to change the structure or function of a digital artifact. (Woodard et al., 2013) defined these strategic actions as design moves. According to Woodard, these actions need to be strategic. It means that these actions should be taken with a strategic intent to achieve a competitive advantage. In addition, these moves should be discrete, which means that these actions can be identified separately or can be in a temporal sequence, or can be a part of a more significant design move (Woodard et al., 2013).

The design moves table is created in the methodology to compose the gap analysis into a complete solution. According to the following table, a design move has strategic intent [outcome] and the criteria of done [output]. Strategic intent clarifies the crystallized vision of the design move while criteria of done talks about the measurable terms of the outcome of the design move, which is acceptable to the relevant stakeholders. The following table shows the design moves table in SEPv2. This version has tiny differences from SEPv1. These differences are related to the new terminologies added to some of the columns of the table.

In addition to the columns discussed above, there are four more columns in this table. Actions column is used for identifying needs that should be taken for implementing design moves. The cost column defines required costs, efforts, expertise, and prerequisites needed for fulfilling design moves. Moreover, the last column talks about the risks that might affect the design moves during the execution.

Design move	**Strategic intent [outcome]**	**Criteria of done [output]**	**Actions**	**Cost**	**Risks**
What is the name of the design move?	What benefit are you trying to achieve? What is the marked effect or influence of this design move?	What is the measure of success?	What changes need to be made to the software? What other actions need to be taken?	What are the costs, effort, required expertise, prerequisites that need to be fulfilled?	What risks need to be controlled to assure a successful outcome?

Table 15) Design moves

4.1.5 Benefit generation for stakeholders

Most companies' main focus and purpose are to deliver value to their primary stakeholders through their products or services. And they use a value creation process for implementing this objective. Value creation is when companies use their resources and relationships (inputs) and turn them into results (outputs) to create values for stakeholders. As a result of value creation,

the purposes of the companies will be connected to the project's stakeholders and their desired outcomes. Moreover, this will create a basis for the organization's success (UNDERSTANDING VALUE CREATION, 2020).

Although SEPv1 consisted of a design moves table to help organizations achieve their ambitious state, it was unclear which benefits would be generated for which stakeholder of the project and who is responsible for the benefit generation. Therefore, in SEPv2, the following table has been added to clarify which benefit will be generated or optimized for which stakeholder by implementing design moves and which stakeholder is responsible for generating benefits.

In the following table, benefits have been separated into two different categories. Some design moves will have an effect sooner than the other design moves. Therefore, we call them short-term benefits. In contrast, some design moves affect the distant future, and the long-term is required for achieving them. Therefore, we categorized these benefits as long-term benefits.

Action/ Design move	**Responsible stakeholder**	**Benefiting stakeholder**	**Immediate benefit**	**Long term benefit**
By which design moves or in which step in the roadmap does the benefit get created?	Which stakeholder is responsible for this benefit generation?	Which stakeholder is benefiting from the benefit generation?	What is the short-term goal? What immediate benefit is there?	What is the long-term benefit?

Table 16) Benefit generation

4.1.6 Risk assessment

In general, during the execution of projects, unexpected events might have occurred. These events might cause positive or negative impacts on the projects. Moreover, it might deviate the project from its plan. Positive events might create opportunities for the projects, while adverse events might generate losses in the projects. Based on this definition, risk can be defined as terminology which focuses on avoiding loss from unexpected events (Ahmed & Amornsawadwatana, 2007).

The risk management process helps organizations uncover their weaknesses to manage the risks during the projects. Managing risks means avoiding risks, reducing risk likelihood, reducing risk impact, and transferring risk (Ahmed & Amornsawadwatana, 2007). Our methodology helps people define the required design moves to achieve the ambition state in previous steps. Although a column in a design move table in SEPv1 showed the risks that might happen during the evolution, there is no detailed information about the risks, such as risk severity and risk likelihood. The following table has been added to SEPv2 to define risks and help users to have more control over implementing their design moves. In other words, as a result of completing this table, users will have a chance to imagine the risks upfront. This table consists of seven columns and helps users classify the risks based on risk description, risk impact level, risk likelihood, and the risk level as a whole.

Risk ID	Risk	Related design move	Risk description	Risk Impact	Risk Likelihood	Risk Level
What is the risk ID?	What is the name of the risk?	During which design move might this risk occur?	What is the description of the risk?	If a risk occurs and is not mitigated, what is the impact of the most likely problem that will occur?	What is the state of being probable or chance of a threat occurring?	What is the level of the risk?

Table 17) Risk assessment

4.1.7 Mitigation actions

The risk assessment section helps the methodology users assess the risks that might happen during their design moves. After clarifying the risks, we need to define the required actions to eliminate or reduce these risks. Therefore, another table is created and added to the methodology to clarify the mitigation actions needed for controlling these risks. The following table shows the mitigation actions and their impact on risk likelihood, impact, and risk level as a whole.

Risk ID	Risk	Mitigation actions	Revised Risk Impact	Revised Risk-Likelihood	Revised-Risk Level
Which risk ID?	What is the name of the risk?	What are the actions to reduce or eliminate the risk?	What is the risk severity after risk mitigation?	What is the risk likelihood after risk mitigation?	What is the risk level after risk mitigation?

Table 18) Mitigation actions

4.1.8 Roadmap

According to (Mirzoyan,2020), a roadmap is a graphical and high-level overview of the objectives and deliverables of a project presented with a defined timeline. The roadmap is used to manage stakeholders' expectations and communication between team members within an organization. In addition, due to the functionality of the roadmap, this tool can be used as a supporter for team members to fully realize a project regardless of what tasks of the project they might be working on. Moreover, since the roadmap is defined with a time frame, this helps teams to plan their implementation in an acceptable timeline (Mirzoyan,2020).

SEPv1 includes a roadmap table and helps users define which actions need to be taken in the time frame to achieve the ambition. In addition, it indicated the pre-conditions which are required

for starting the actions. The only difference added to the SEPv1 and considered in SEPv2 is a column to define the actors for implementing actions. In other words, this column has been added to the table to show who should act for the action.

Nr	Action	By which month (Expected month)	Dependent on	By whom
What is the number of the action?	Which action to take first?	When will the action take place?	What pre-conditions are required before the action starts?	Who should act?

Table 19) Roadmap

In addition to the table, another template was created in SEPv1 to give a graphical overview of the roadmap. Actors have been added to this template as well. The following picture shows the graphical view of the roadmap template.

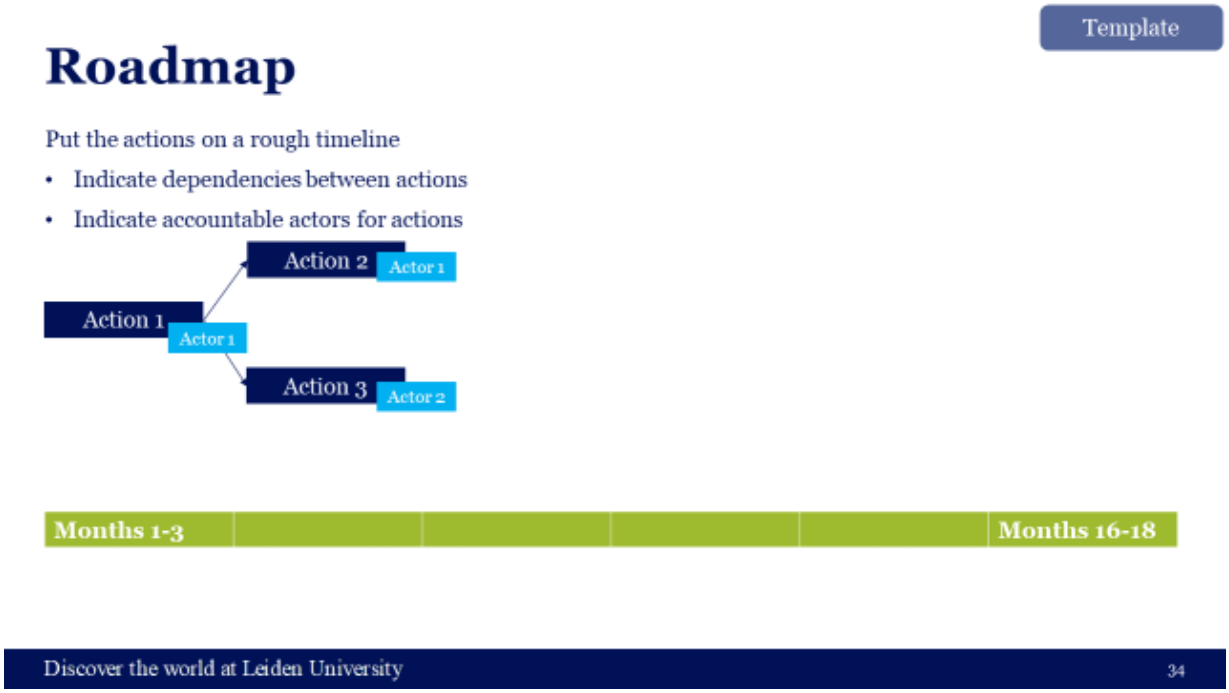


Figure 4) Graphical Roadmap

4.1.9 Monitoring and evaluating the plan

These days, the performance of the organizations and their employees is measured based on numbers, and stories are no longer used to measure their success. In other words, “Quantifying the qualitative has become a norm rather than a choice.” And this results in implementing monitoring and evaluation frameworks within organizations (Atlan,2016). These frameworks help organizations ensure that everything is going on plan and the team is acting effectively to achieve its ambition.

In order to monitor and evaluate the methodology, a new table has been added in SEPv2. We created a table to identify the best ways to allocate resources for implementing plans efficiently. The idea of this table has been inspired by the Logical Framework Approach (LFA). LFA has been used for planning, managing, and monitoring development interventions. This framework was initially created for the US military for planning, and later, it was adopted for the use of development projects. This framework considers the procedures for problem analysis, developing objectives, developing indicators to measure the success for achieving objectives, assumptions, and risks during project implementation. As a result, it feeds this information into the matrix called log frame (Fujita, 2010).

By the inspiration of the LFA, the following table has been added to SEPv2. This table can be used within the teams to answer questions that might be raised during the implementation. For instance, users want to know whether they are initiating or progressing in their activities? Or whether their outputs were achieved? Or whether they have achieved their goals? To answer these questions, we considered different columns for the users to compare what they have achieved during the execution to what they expected in the planning phase.

Overall ambition	Strategic intent	Actions	Dependent on	Expected output	Achieved output	Achieved output	Expected outcome	Estimated cost	Current cost

Table 20) Monitoring and evaluation template

In addition to the table discussed above, a matrix has been created for visualizing the monitoring and evaluation template during the execution. We created this matrix based on the idea of the log frame and added it to the methodology to be used as an interface for the execution part. In other words, this matrix can be used in quarterly meetings to check where teams are in terms of planning. The following picture gives an overview of this matrix. Cells of this matrix should be completed during the planning phase, and empty boxes should be put in front of them; and during the plan execution, methodology users should use checkmarks to show how far they are there.

	Project Summary	Indicators	Dependent on
Goal/ Ambition state	What are you trying to achieve? Why are you working on this problem? What is your overall goal?	What are the key measures and targets that reflect the achievement of the overall goal ?	What are the external factors that are essential to sustain objectives in the long term?
Outcomes	What is the effect or immediate development outcome at the end of the project?	Which indicators clearly show that the objective of the purpose has been achieved?	Which external factors and conditions are necessary to achieve project objective?
Outputs	What are the specifically deliverable results envisaged to achieve the specific objectives?	What are the indicators to measure whether and to what extent the action achieves the expected results?	What external conditions must be met to obtain the expected results on schedule?
Actions/ Design moves	What are the key actions to be carried out and in what sequence in order to produce the expected results?	What are the means required to implement these activities, e.g. personnel, equipment, supplies, etc.	What pre-conditions are required before the action starts?

Figure 5) Monitoring and evaluation matrix

Furthermore, as it is apparent, time is not being considered in the monitoring and evaluating table. Therefore, users cannot monitor the timeline during the execution. We created the following table for solving this limitation. This table is similar to the roadmap table, but the only difference is that this table contains two more columns, and the title of one of the columns is changed. “By which month (Expected month)” column is changed to “By which month (Originally expected month).” Moreover, two other columns with the title “By which month (Currently expected month)” and “By which month (Achieved expected month)” are added to the table. These three columns allow users to monitor the timeline and compare the original, current, and achieved expected months during the execution.

Nr	**Action**	**By which month (Originally expected month)**	**Dependent on**	**By whom**	**By which month (Currently expected month)**	**By which month (Achieved expected month)**
What is the number of the action?	Which action to take first?	When will the action take place?	What pre-conditions are required before the action starts?	Who should act?	When will the action take place?	When did the action take place?

Table 21) Monitoring roadmap

5 Evaluation

To evaluate SEPv2, we constructed a demonstrator in the form of a worked-out example of a hypothetical evaluation plan, and we conducted confirmatory interviews where participants were asked to review each step of the methodology, each part of the templates, and the instantion of the template for the worked-out example, and then answer closed and open questions regarding their perception of the methodology.

5.1 Design of the Evaluation

We used the artifact in the demonstration to measure how well the artifact supports the solutions for solving identified problems. For implementing this step, we brought the artifact into the context. We interviewed four of our interviewees who participated in the exploratory interviews to evaluate the methodology.

To make the methodology more understandable to the interviewees, we created a worked-out example, and each time, we showed each element of the methodology plus the worked-out example. Then we asked questions and their feedback about that specific element. We continued this for all the elements of the methodology. In the end, we had an open discussion, and we asked for their overall feedback about the entire methodology.

To define the measurement scales for the evaluation, we took five criteria introduced in a methodology paper on technology acceptance (Riemenschneider et al., 2002). For each methodology element, we asked interviewees to evaluate the element based on the mentioned criteria on a scale from -3 to +3. The following paragraphs will discuss each of the criteria used for the assessment.

Ease of use: We chose this criterion to define how the interviewee perceives that using the element will be free of effort.

Compatibility: We chose this criterion to assess how the element is perceived as consistent with the current interviewees working way.

Subjective norm: We chose this criterion to define to which degree the interviewee thinks that others, such as colleagues, supervisors, clients, etc., who work in his/her organization, will accept to use the element.

Usefulness: We chose this criterion to define to which extent the use of the element will enhance the interviewee's job performance and increase his/her effectiveness.

Intention: We chose this criterion to assess to what extent the interviewee would use this element in the case of having the opportunity to use it.

To consider the above criteria in our evaluation interviews, we created the following slide and asked interviewees to assess each element based on them.

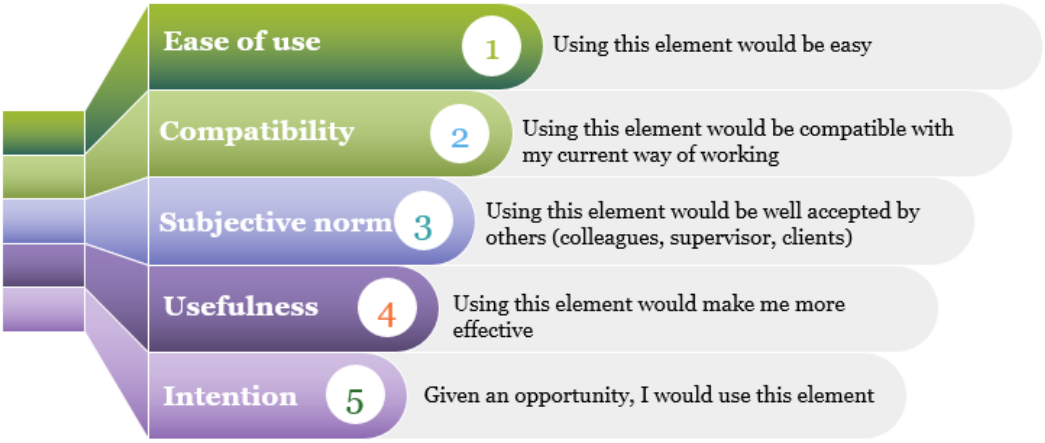


Figure 6) Assessment criteria

In addition to the above criteria, we asked our interviewees to give overall qualitative feedback about the element. The following sections will provide an overview of the results of interviews for each element and discuss how our interviewees perceive each element in terms of five defined criteria.

5.2 Evaluation: Executive summary

The following table gives an overview of how our interviewees perceive executive summary in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	-1	0	-1	3
C	2	3	3	3	3
E	3	3	3	0	3
F	2	3	2	0	0

Table 22) Assessment results of the executive summary

Ease of use: All interviewees thought that using this element would be easy and would not need much effort. Therefore, they graded this criterion with two and three.

Compatibility: Three of the interviewees thought that this element is compatible with their way of working. However, it was thought by interviewee B that although this element is compatible with his current way of working but this slide should summarize a client's question and focus more on the ambition in terms of an executive summary for a digital strategy. Therefore, he graded this criterion with -1.

Subjective norm: All the interviewees except interviewee B mentioned that this element would be well accepted by the other working people in their organizations. Therefore, they graded this criterion with the highest grade. Interviewee B graded this element with zero, and his reason for that was the same reason he mentioned for the compatibility criterion.

Usefulness: Three interviewees thought that the executive summary would not significantly enhance their job performance and would not impact their effectiveness. Interviewee F believed that the way of writing an executive summary impacts the level of usefulness; therefore, he preferred to assess this element as a neutral. Interviewee B graded this element with –1

because he believed that the use of this element is not in the context of his working style. Interviewee E thought that this element is high level and just contains the problem statement. He mentioned that he prefers to see the whole platform by himself to understand it. Interviewee C was the only person that thought this element would increase her effectiveness, and she graded it with three. In addition, she recommended asking methodology users to keep this element as short as possible and use as many bullet points as possible.

Intention: This element looked attractive to the three of the interviewees, and they mentioned that given an opportunity, they are going to use it. Interviewee F was the only person who was not interested in using the element and thought that the executive summary depends on what you deliver and the quality of the deliverables. Therefore he graded it with zero.

5.3 Evaluation: Situation

The following table gives an overview of how our interviewees perceive the situation element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	3	3	0	2	2
C	0	2	1	3	3
E	3	3	3	3	3
F	2	3	2	1	2

Table 23) Assessment results of the situation

Ease of use: Three interviewees thought that using this element would be easy and would not need much effort, and they graded it with high grades. Interviewee C was the only one who graded this element with zero because she thought that based on her experience describing a situation is the hardest step in actual cases.

Compatibility: All the interviewees evaluated this element with high grades, and they mentioned that it is compatible with their current way of working in their organizations.

Subjective norm: Interviewees used different grades for assessing this element in terms of the subjective norm. Interviewees E and F thought that others would well accept this element in their organizations; therefore, they graded this criterion with three and two. Interviewee C mentioned that they use quantitative description instead of qualitative description in their everyday work, so she graded this element with one. Interviewee B graded this element with zero. He mentioned that sometimes they do not have a current state description because sometimes people want an expert opinion based on the target state and are not limited by assumptions about the current state.

Usefulness: Three of the interviews thought using this element would impact their effectiveness and graded this criterion with three and two. At the same time, interviewee F graded this element with one and mentioned that he preferred to understand the current situation, challenges and define the next steps by asking questions. And since there are no questions in the situation element, he felt that this element would not impact his job performance. In addition to interviewee F, interviewee B proposed that having tools or ways to define critical questions or critical problems would improve the usefulness of this element.

Intention: This element looked attractive to all the interviewees, and they mentioned that given an opportunity, they are going to use it. Therefore, this criterion was graded with two and three for the situation element.

5.4 Evaluation: Ambition

The following table gives an overview of how our interviewees perceive the ambition element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	2	-3	0	1
C	2	3	3	0	2
E	0	0	0	0	0
F	-2	-1	0	-1	0

Table 24) Assessment results of the ambition

Ease of use: Two interviewees thought that using this element would be easy and would not need much effort, and they graded it with two. Interviewee E graded this element with zero because he believed that agility had not been considered in this element, and this would cause problems in the implementation phase. Moreover, interviewee F graded this element with -2, and he believed that the use of this element depends on the client cases, and it would not be easy to define.

Compatibility: Interviewees B and C thought that this element would be compatible with their current working methods, and they graded this criterion with two and three. At the same time, interviewees E and F did not see this element as compatible. The only thing that affected interviewee E's assessment was the time period we defined in the ambition table. Apart from the time period, he was interested in the element, and he felt that the ambition element was compatible with his way of working. His recommendation to improve this element was to adjust the model to be more agile or decrease the time period to provide flexibility.

Subjective norm: Interviewee C was the only person that thought her colleagues in her organization would accept the ambition element. Reasons discussed in the above criteria impacted the grades of interviewees E and F for the subjective norm, and they chose zero for this criterion. Interview B was the only person who graded this element with the lowest grade. He felt that the stakeholders' column should not be included in the ambition table. He believed that the ambition element should craft a story that applies to all the readers, not only benefiting stakeholders.

Usefulness: Interviewee B thought stakeholders' interests should be discussed in internal meetings and not be put in the deliverables. Due to this, he graded this criterion with zero. Interviewee C thought that although using the element would make methodology users more effective, it has to be used well, and she found this element a bit tricky since it depends on the execution quality. She mentioned that it is a tree in the sense of communicating, culture change, etc., and if people do not do that well and do not make it visible, then the usefulness is actually on the other side of the scale, where it gets maybe into the minus.

Intention: Three interviewees were not intended to use this element due to the reasons discussed in other criteria. Interviewees E and F graded the intention with zero, and interviewee

B graded it with one. Interviewee C was the only one who was positive in terms of intention and graded it with two.

5.5 Evaluation: Gap analysis

The following table gives an overview of how our interviewees perceive the gap analysis element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	3	3	3	3	3
C	3	3	3	3	3
E	3	3	3	3	3
F	-2	2	2	0	1

Table 25) Assessment results of the gap analysis

Ease of use: Three interviewees thought that using this element would be easy and would not need much effort, and they graded this criterion with the highest grade. Interviewee F was the only person who thought it was not easy to use the gap analysis element because it is always quite challenging to do it properly.

Compatibility: All the interviewees evaluated this element with two and three, and they mentioned that the gap analysis element is compatible with their current way of working in their organizations.

Subjective norm: All the interviewees mentioned that this element would be well accepted by the other working people in their organizations. Therefore, they graded this criterion with two and three.

Usefulness: Three of the interviews thought using this element would impact their effectiveness, and they graded the usefulness with the highest grade. At the same time, interviewee F graded this element with zero and proposed that to make this element more helpful; you can use numbers or percentages to show how far people are from their target states. Moreover, he recommended considering prioritization in this analysis to show which gap needs to be solved sooner than the others. Interviewee B also mentioned that it would be nice to make the gap analysis results more visual by using colors.

Intention: The gap analysis element looked attractive to three interviewees, and they graded this criterion with the highest grade. Moreover, they mentioned that given an opportunity, they are going to use it. Interviewee F was the only person who graded the intention with zero because he thought the features discussed in the usefulness part needed to be added to the gap analysis.

5.6 Evaluation: Design moves

The following table gives an overview of how our interviewees perceive the design moves element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	1	2	0	2	3
C	1	0	2	0	0
E	3	3	3	1	0
F	1	1	1	0	2

Table 26) Assessment results of the design moves

Ease of use: Three interviewees thought that using this element would not be easy and require much effort, and they graded it with one. Interviewee E was the only person who perceived this element easy to use and graded it with the highest grade. Interviewee C mentioned that users have to define many elements for completing the design moves table, and adequately completing this table would be tricky. Moreover, the reason behind the choice of interviewee B was that there is not an element of comparing the options that people can use for choosing the best solution for removing gaps. To remove this limitation, he recommended considering a place in the methodology to weigh the pros and cons of each possible solution before moving to the design move table.

Compatibility: Each interviewee graded this criterion differently. Interviewee E was the only person who graded this element with the highest grade. Interviewee B did not grade this with the highest grade, and that is because of the lack of comparison feature discussed in the ease of use criterion. Interviewees C and F graded this criterion with zero and one because they thought this element is not compatible with their field of work.

Subjective norm: As the same as compatibility, each interviewee graded this criterion differently. Interviewee B graded this criterion with zero because he thought that the name of the design moves should be changed to make this element more understandable to people. Otherwise, from his point of view, it would be hard for people to understand this element properly. Interviewee C graded this criterion with two, and she thought this element could not be a good option for creating buy-in. Interviewee E graded this element with the highest grade, and he mentioned that the design moves element is similar to the tool they have already used in his organization. The tool they have already used calls Epics, and he saw lots of similarities between these two. Therefore, he believed that other people in his organizations would accept the design moves element.

Usefulness: Interviewee F thought that using the design moves element would not improve his performance since prioritization has not been considered in it. In addition, he mentioned that this table does not show which value will be generated by each design move for the company and the user. Therefore, he graded it with zero. Interviewee E also graded this element with zero because they have already used Epics in his organization. And from his point of view, the design moves element is similar to Epics. Interviewee C graded this element with zero because she thought that this element is not helpful in her function. However, she mentioned that using this element would be a different story with the IT team. Interviewee B graded this criterion with two. He thought that changing the element's name and adding solutions comparing feature to the element could improve the usefulness.

Intention: Due to the existence of Epics in the interviewee's E organization, he did not intend to use the design moves element, so he graded it with zero. Interviewee C also graded this element with zero, and she thought that this element is not needed in her function, but it might be helpful for the IT teams within her organization. Interviewees B and F were interested in using design moves, and they graded it with three and two. Moreover, it was mentioned by interviewee

B that they are using the same approach in his organization, so there is no specific reason or situation where they would not use design moves.

5.7 Evaluation: Benefit generation for stakeholders

The following table gives an overview of how our interviewees perceive the benefit generation element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	2	3	1	2
C	2	2	2	0	1
E	3	3	3	1	2
F	-1	2	2	-1	2

Table 27) Assessment results of the benefit generation for stakeholders

Ease of use: Three interviewees thought that using this element would be easy and would not need much effort; therefore, they graded it with two and three. Interviewee B graded this criterion with two because he believed that methodology users have to gather information from the client to complete this table. From his point of view, this would be more complex because sometimes they have to rely on their company's estimations. Interviewee F was the only person who graded this criterion with -1, but he did not mention any specific reason for his choice.

Compatibility: All the interviewees thought this element is compatible with their current way of working, and they graded it with two and three.

Subjective norm: All the interviewees thought that since this element is compatible with their current work style, other colleagues in their organizations would also accept using it.

Usefulness: Interviewees B and E graded this criterion with one. Moreover, interviewee B believed that benefits should not be categorized as immediate and long-term. Because, from his point of view, design moves take time, and there is no immediate benefit. To solve this, he recommended that it be better to consider a timeline and discuss what will be delivered based on it. Interviewee C graded this criterion zero, and she thought combining this table with the design moves table would be more helpful.

Intention: Three of the interviewees intended to use this element and graded this criterion with two. Interviewee C graded it with zero because she thought that separating design moves and benefits that are going to be generated by each design move would be confusing for the methodology users.

5.8 Evaluation: Risk assessment

The following table gives an overview of how our interviewees perceive the risk assessment element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	3	3	3	3	3
C	2	2	1	0	2
E	-1	2	2	3	3
F	-1	2	1	0	1

Table 28) Assessment results of the risk assessment

Ease of use: Interviewees E and F graded this criterion with -1. Interviewee E mentioned that design moves were designed for 12-18 months, and there is no flexibility there; therefore, he graded this criterion with -1. Moreover, he mentioned that the grade for ease of use would increase if the time period got limited. Interviewee F also mentioned that based on the agenda of this evolution plan, it would not be easy to do the risk assessment properly. In contrast, Interviewees B and C thought that using this element would be easy and would not need much effort; therefore, they graded it with three and two.

Compatibility: All the interviewees thought this element is compatible with their current way of working, and they graded it with two and three.

Subjective norm: Interviewees C and F graded this criterion with one. Interviewee C mentioned that acceptance of this element depends on how it is created, but she believed that this tool could be helpful in a team setting where people can look at it all together and brainstorm on the risks. Interviewee F mentioned that based on the reasons discussed in ease of use, lack of a column to define ownership of the risks and responsible people for resolving them might impact the acceptance of other people in his organization. For interviewees B and E, this element looked acceptable to be used by other people in their organizations, and they graded this criterion with three and two.

Usefulness: Due to the reasons discussed in ease of use and subjective norm criteria, interviewees C and F graded this element zero. They felt that the use of this element would not make them effective. Interviewee C mentioned that this element would help people put things on the map, but effectiveness has a meaning when people take actions to solve those risks. For the two other interviewees, using this element would affect their level of effectivity, and they graded with two and three.

Intention: Interviewee B and E were interested in using this element, and they graded this criterion with the highest grade. Interviewee C graded the risk assessment element with two. She thought it would be more interesting to make this element more explicit by describing if people would not address the risk and the scenarios that could evolve from that. From her point of view, in this way, the element will become more valuable to CFO or CIO for making more educated decisions. Interviewee F graded this criterion with zero due to the absence of a column for defining risk owners and responsible people for resolving risks.

5.9 Evaluation: Mitigation actions

The following table gives an overview of how our interviewees perceive the mitigation actions in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	-1	3	3	3	3
C	2	2	2	2	2
E	2	3	3	3	3
F	0	1	1	-2	1

Table 29) Assessment results of the mitigation actions

Ease of use: Interviewees C and E thought that using this element would be easy and would not need much effort; therefore, they graded it with two. Moreover, interviewee C recommended considering another column in this element to show what will happen if users take this action or do not take it. Interviewee E recommended adding another column to the table to signify whether this mitigation is accepted or not. Moreover, he proposed that it would be nice to add another column to show who decides about these decisions at high levels. Interviewee B graded this criterion with -1 because he believed that since we have separated the risks assessment table from mitigation actions in our methodology, it will be difficult for the users to see and compare risk levels and the delta between them. To solve this, he recommended having these two in one table. Interviewee F graded this criterion with zero, but he did not mention any specific reason for his grade.

Compatibility: Interviewees B, C, and E thought this element is compatible with their current way of working, and they graded it with two and three. Interviewee F graded this element with one, and he did not mention any recommendations for improving the element in terms of compatibility.

Subjective norm: As the same as compatibility, interviewees B, C, and E thought this element would be well accepted by other people in their organizations; therefore, they graded it with two and three. Interviewee F graded this element with one, and he did not mention his reason for choosing this grade.

Usefulness: Interviewees B, C, and E thought this element would affect their level of effectiveness, while interviewee F felt differently and graded it with -2.

Intention: This element looked attractive to three of the interviewees, and they mentioned that given an opportunity, they are going to use it; therefore, they graded this element with two and three. Interviewee F was not much interested in using this element and graded this criterion with one. However, he did not mention the reasons for his choice and recommendations for improving this element.

5.10 Evaluation: Risk mitigation matrix

The following table gives an overview of how our interviewees perceive the risk mitigation matrix in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	3	3	3	3	3
C	1	2	2	2	2
E	3	2	3	3	3
F	2	2	2	2	2

Table 30) Assessment results of the mitigation matrix

Ease of use: Three interviewees thought that using this element would be easy and would not need much effort; therefore, they graded it with two and three. Interviewee C graded this criterion with one since it was hard for her to understand this matrix, and from her point of view, it would take a bit of time to understand this matrix properly. She proposed to put a description in this element to make it more understandable to the methodology users.

Compatibility: All the interviewees thought this element is compatible with their current way of working, and they graded it with two and three.

Subjective norm: All the interviewees thought that since this element is compatible with their current way of working, other relevant people in their organizations would accept using it. Therefore, they graded it with two and three.

Usefulness: All of the interviews thought the use of this element would impact their effectiveness level. Therefore, they graded it with two and three.
Intention: This element looked attractive to all the interviewees, and they mentioned during the interviews that given an opportunity, they are going to use it. Therefore, they graded it with two and three. To improve this element, interviewee F recommended considering a part to clarify how these scores are calculated. Moreover, interviewee B proposed that it would be nice to use a different color for the risks before and after mitigation.

5.11 Evaluation: Roadmap

The following table gives an overview of how our interviewees perceive the roadmap element in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	3	3	1	1
C	3	3	3	3	3
E	-1	0	-1	0	0
F	-2	1	1	-1	1

Table 31) Assessment results of the roadmap

Ease of use: Interviewee B graded this criterion with two because he believed that this element would be helpful for the visualization, but from his point of view, methodology users should have input from the company for creating this roadmap, and sometimes they have to deal with imperfect input, which makes it difficult. Interviewee C graded this element with three, and she believed that using this element would be easy and would not need much effort. Interviewee E graded this element with -1 that is because he did not see flexibility in the roadmap. From his point of view, this roadmap should be split into multiple roadmaps to create more agility. Interviewee F assessed this criterion with -2, and he did not mention any specific reason for his choice.

Compatibility: Interviewees B and C agreed that this roadmap is compatible with their current work style; therefore, they graded it three. The lack of flexibility mentioned by interviewee E had an impact on his assessment for compatibility as well. Therefore he graded it with zero. Interviewee F graded the compatibility with one and recommended adding the owner of the actions in the roadmap to make it compatible.

Subjective norm: Interviewees B and C thought that since this element is compatible with their current work style, other people in their organizations would also accept using it. Interview F graded this criterion with -1, and the only reason for choosing this grade is the lack of agility in the roadmap. Moreover, he mentioned that it is not necessary to put everything on the roadmap from now. From his point of view, the roadmap could be split into multiple roadmaps instead of having one big one where the users can have a little more agile. Interviewee F graded this criterion with one, and no specific reason was mentioned for his choice.

Usefulness: Interviewee C graded this criterion with the highest grade. She thought that roadmap is super helpful in managing expectations. Moreover, she recommended having a top-level road map and a detailed road map for stakeholders at different levels. Interviewee B graded this criterion with one. He thought our roadmap element follows a waterfall approach, which is what strategy usually is, but there are situations where it would be more agile. And since we do not have clear milestones and timelines in the agile situation, this map would not really make much sense. Interviewee E also graded this criterion with zero due to the lack of agility. Interviewee F graded this criterion with -1, but he did not mention any reason for his choice.
Intention: Interviewee B graded this criterion with one, and he mentioned that there is no specific thing that could be added to the roadmap. He mentioned that this element would be usable most of the time, and sometimes it would not be. Interviewee C graded this criterion with the highest grade. Due to the time period, interviewee E graded this criterion with zero. Interviewee F graded this criterion with -1, and he did not mention any specific reason for his choice.

5.12 Evaluation: Monitoring and evaluating matrix

The following table gives an overview of how our interviewees perceive the monitoring and evaluating matrix in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	-2	-2	-3	-1	-3
C	0	0	2	1	1
E	1	2	2	2	2
F	0	-1	0	-1	0

Table 32) Assessment results of the monitoring and evaluating matrix

Ease of use: Interviewee C graded this criterion with zero, and she mentioned that using a traffic light for tracking could be more effective than having someone in place to put checkmarks. Moreover, she thought the use of a table instead of a matrix would be easier. Interviewee B graded this criterion with -2. He mentioned that understanding this element takes time. Instead of having this matrix, he suggested having a slide explaining how people will monitor and evaluate the plan. From his point of view, the methodology users should focus more on questions like how regular their steering group meetings are for this strategy, what army KPIS at which time, etc. Interviewees E and F graded this criterion with one and zero, but they did not mention any specific reason for their choices.

Compatibility: Interviewee B mentioned that they typically have a steer call meeting once every two weeks for the strategy where the stakeholders come together, and they look at the product KPIs and see what they have realized and what they still have to realize; therefore, he thought that this element is not compatible with his current way of working and he graded it with -2. Interviewee C graded this criterion with zero, and she mentioned that from her point of view,

good information considered in this matrix, but she thought that looking day-to-day and how busy people are, they are probably not going to prioritize it, and it is just going to end up on the back burner probably. Interviewee E graded this criterion with two, and he recommended not to do it once per quarter; instead, from his point of view, this matrix should be used more often. Interviewee F graded this element with -1, and he mentioned that this matrix was designed very high level.

Subjective norm: Interviewee C thought that although it would be helpful to communicate this information between team members, using it is not easy; therefore, she graded it with two. Interviewee E also thought that the other people in his organizations would accept to use this element, and he graded it with two. Interviewee F thought that this element is client-dependent. Therefore, he graded it with -1. Due to the reasons discussed in the compatibility, interviewee B felt that this matrix is incompatible with his current work style. Therefore, others in his organizations would not accept that as the same as him. Therefore, he graded it with the lowest grade.

Usefulness: Interviewee B thought some information in the matrix could guide him when stakeholders understand the framework, but he thought it would be hard to understand this element correctly. Therefore, he graded this criterion with -1. Interviewee C mentioned that using this element will not impact her day-to-day work but will help communicate where she is, what she is running into, and the barriers. Therefore, she graded it with one. Interviewee E thought that this element would affect his effectiveness, and he graded it with two, but he recommended doing this matrix more often. Interviewee F graded this criterion with -1, and he did not mention his reasons for his choice, nor did he mention any recommendations for improving it.

Intention: Interviewee B did not intend to use this matrix because he thought it is complicated and a long time is required to understand it; therefore, he graded it with the lowest grade. Interviewee C saw this matrix as a bit complicated, but she also saw the advantages; therefore, she graded the intention as one. Interviewee E was interested in the element, and he thought the matrix was designed clearly and graded it with two. Interviewee F preferred to be neutral about this criterion and graded this criterion with zero.

5.13 Evaluation: Methodology as a whole

The following table gives an overview of how our interviewees perceive the methodology as a whole in terms of the defined criteria.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	2	1	1	2
C	2	2	3	2	3
E	2	0	1	1	1
F	-1	2	-1	0	0

Table 33) Assessment results of the methodology as a whole

Ease of use: In general, three of our interviewees thought this methodology is easy to use and would not take too much time for users to use it. Therefore, they graded it with two. Interviewee F was the only person who did not see this methodology as easy to use and graded it with -1.

Compatibility: Three interviewees thought this methodology is compatible with their current way of working. Therefore, they graded this criterion with two. Interviewee E graded this criterion with zero, and that is because of the time scale we considered for our methodology.

Subjective norm: Interviewee B graded subjectiveness with one because he believed those factors defined in the ambition table would not apply to digital strategies. Therefore, from his point of view, we might lose people at the beginning of the methodology. Lack of agility and the time period discussed in different steps impacted the grade of interviewee E, and therefore he graded this criterion with one. Interviewee F felt that the methodology is not very detailed and designed at a high level; therefore, he graded it with -1. Interviewee C felt that others in her organizations would also accept to use this methodology. Therefore, she graded it with three.

Usefulness: Interviewee B mentioned that this methodology is practical, and lots of parts are also typical in practice and are common in place nowadays. Therefore, he graded it with one. Interviewee C mentioned that using this methodology would affect her job performance; therefore, she graded it with two because she thought methodology has a good foundation, but implementing it might be challenging. Interviewee F graded this criterion with zero because he thought that although this methodology has logical steps, It is not ready to pick off the shelf and be used.

Intention: In general, interviewee B liked the middle part of the methodology, and he mentioned that it was created in a structured way and looked like something that they regularly use; therefore, he graded it with two. Interviewee C graded this criterion with the highest grade because she believed that this methodology created a good solid foundation in what they are trying to resolve. Furthermore, from her point of view, the methodology broke the foundation down into actionable steps. Interviewee E mentioned that the methodology tries to bring everyone on the same page and has come on the reference to understand how the project is going but, he thought the methodology should become more adjustable. In addition, he mentioned that it is tricky to find a balance to have an overall view of how the project is going but be adjustable and flexible. Therefore, he graded it with one. Interviewee F graded this criterion with zero because he believed that the methodology is not proven at the moment; therefore, he would not use it one-on-one.

5.14 Evaluation: Stakeholder analysis

The following table gives an overview of how our interviewees perceive stakeholder analysis in terms of the defined criteria. We defined stakeholder analysis in the appendix; therefore, we showed it to the interviewees at the end of the interviews. Furthermore, this element was not assessed by interview F and only evaluated by three interviewees due to the time limit.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	2	-3	-3	-3	1
C	2	2	3	2	3
E	3	3	2	3	2

Table 34) Assessment results of the stakeholder analysis

Ease of use: Three interviewees thought that using this element would be easy and would not need much effort, and they graded it with two and three. Interviewee E recommended adding another column to show each stakeholder with each goal or design move related. In addition,

he recommended considering another column to distinguish future stakeholders from current ones.

Compatibility: Interviewees C and E mentioned that this element is compatible with their current work style; therefore, they graded it with two and three. Interviewee B graded this element with the lowest grade because he thought users would define the resistance level of the stakeholders in this element. Due to this, this element should not be included in the deliverables and should not be in the methodology.

Subjective norm: Due to the reasons discussed in the compatibility, interviewee B graded this element with -3. In contrast, interviewees C and E thought that people in their organizations would accept to use this element. Therefore, they graded it with two and three.

Usefulness: Due to the reasons discussed in the compatibility, interviewee B graded this criterion with -3. In contrast, interviewees C and E thought using this element would increase their effectiveness; therefore, they graded the usefulness two and three. In addition, interviewee C recommended adding another column in the element to show the way of communication with each stakeholder.
Intention: Due to the reasons discussed above, interviewee B did not intend to use this element and graded it with zero. However, he thought it could be helpful to use it. In that case, he pointed out that this element should be shared with the person the user has got this assignment from. Interviewees C and E graded this criterion with three and two, and they were interested in using this element.

5.15 Evaluation: SWOT and TOWS

The following table gives an overview of how our interviewees perceive SWOT and TOWS matrixes in terms of the defined criteria. We also defined these matrixes in the appendix and showed them to the interviewees at the end of the interviews. Furthermore, due to the time limit, these elements were also not evaluated by interview F.

Interviewee	Ease of use	Compatibility	Subjective norm	Usefulness	Intention
B	3	3	3	3	3
C	3	2	2	1	2
E	3	2	2	1	3

Table 35) Assessment results of SWOT and TOWS

Ease of use: Three interviewees thought that using these elements would be easy and would not need much effort. Therefore, they graded it with three.

Compatibility: Interviewee B mentioned that these elements are compatible with his current work style, and he graded it with three. Interviewees C and E did not see TOWS before, and they graded this criterion with two.

Subjective norm: Since these tools look compatible with our interviewees' current way of working, they thought that other people in their organizations would also accept using these matrixes. Therefore, they graded them with three and two.

Usefulness: Interviewee B graded this criterion with three because he used these elements in his work, and he mentioned that these are beneficial tools. Interviewee C graded this criterion

with one, and she mentioned that SWOT analysis is an excellent brainstorm tool used for brainstorm sessions where people get their topics. From her point of view, after these sessions, people forget about the things mentioned during these sessions. She did not see TOWS before, but after becoming familiar with TOWS, she felt that combining these tools would be a good option and make the SWOT more actionable. Interviewee E graded this element with one, and he mentioned that although it can be a helpful tool, it has to be adjusted to be used in the IT context.

Intention: SWOT and TOWS looked attractive to all the three interviewees, and they graded this criterion with two and three.

5.16 Summary of the evaluation phase

This section provides a visual overview of the results of the evaluation interviews. This section drew bar charts based on the five criteria we used during the evaluation interviews to create a visualization. The horizontal axis in the bar charts shows all the elements of the methodology. The vertical axis shows the average of the grades collected from the interviewees about each element for that specific criterion.

5.16.1 Ease of use

The following graph shows all the elements of the methodology and the average of grades collected from the interviewees for ease of use criterion.

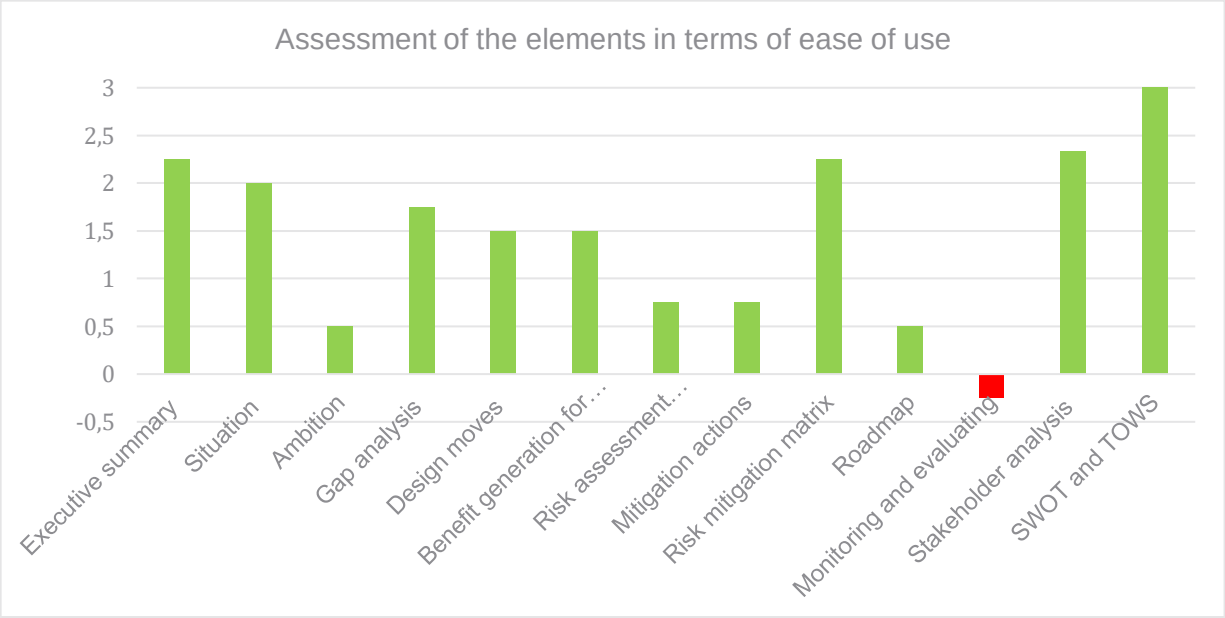


Figure 7) Assessment of the elements in terms of ease of use

As it is apparent in the above graph, SWOT and TOWS elements achieved the highest grade in terms of ease of use. In addition to SWOT and TOWS, our interviewees perceived the stakeholder analysis, risk mitigation matrix, and the executive summary as easy to use. A factor for having higher grades on these elements perhaps would be that these elements are not the “core” of the evolution plan but rather the elements that connect the core to the context. Such “context” elements naturally are easier to comprehend and use and more recognizable to people than the “core” elements. The monitoring and evaluation matrix is the most complicated element for interviewees because they need more time to understand it compared to other elements.

Followed by monitoring and evaluation matrix, roadmap and ambition were evaluated with low grades, and use of them looks challenging to the interviews. The time-period that has been considered in the methodology (12-18 months) affected the grades of roadmap and ambition. Our interviewees thought that it would be hard to define these elements for this time-period, and flexibility and agility are limited in these elements.

5.16.2 Compatibility

The following graph shows all the elements of the methodology and the average of grades collected from the interviewees for compatibility criterion.

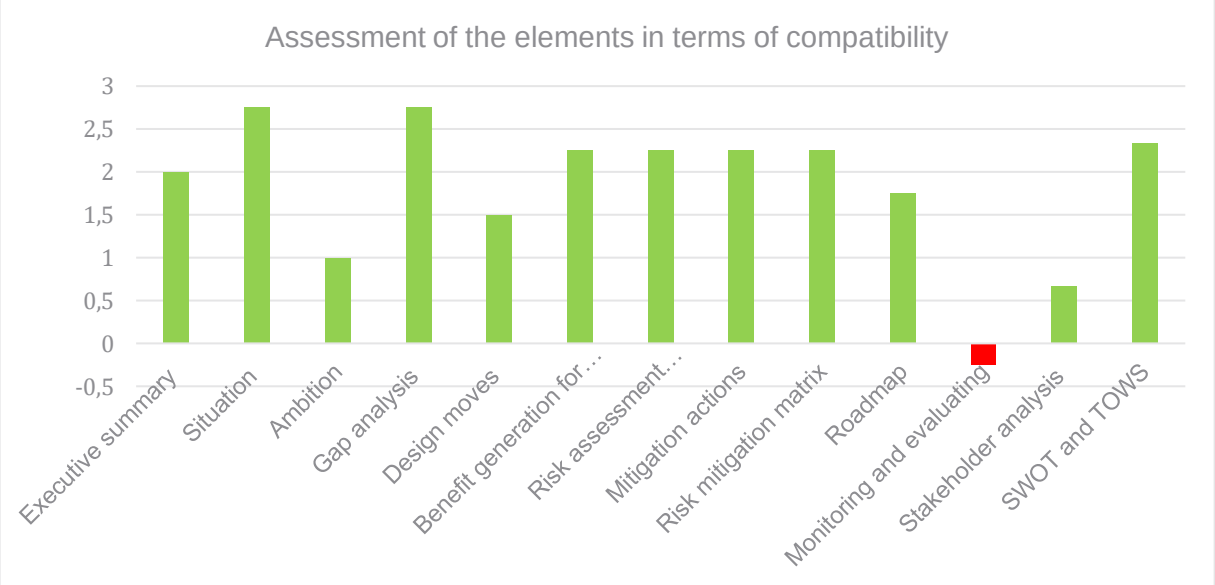


Figure 8) Assessment of the elements in terms of compatibility

The bar chart shows that most of the elements are compatible with our interviewees' current working styles. Situation and gap analysis elements achieved the highest score while monitoring and evaluation matrix graded with the lowest score. The stakeholder analysis element was also assessed with a low grade, and that is because of the strong opposition of interviewee B. He believed that this element should not be included in the deliverables since it contains the information of resistance stakeholders. Due to this, he graded it with the lowest grade (-3) and affected the final average score.

Furthermore, the ambition element was less compatible with two of our interviewees (interviewee E and F), which resulted in the average grade; The only thing that affected interviewee E's assessment was the time-period we defined in the ambition table. Apart from the time-period, he was interested in the element, and he felt that the ambition element was compatible with his way of working. Interviewee F graded this element with a low grade, but no specific reason was mentioned about his choice.

5.16.3 Subjective norm

The following graph shows all the elements of the methodology and the average of grades collected from the interviewees for subjective norm criterion.

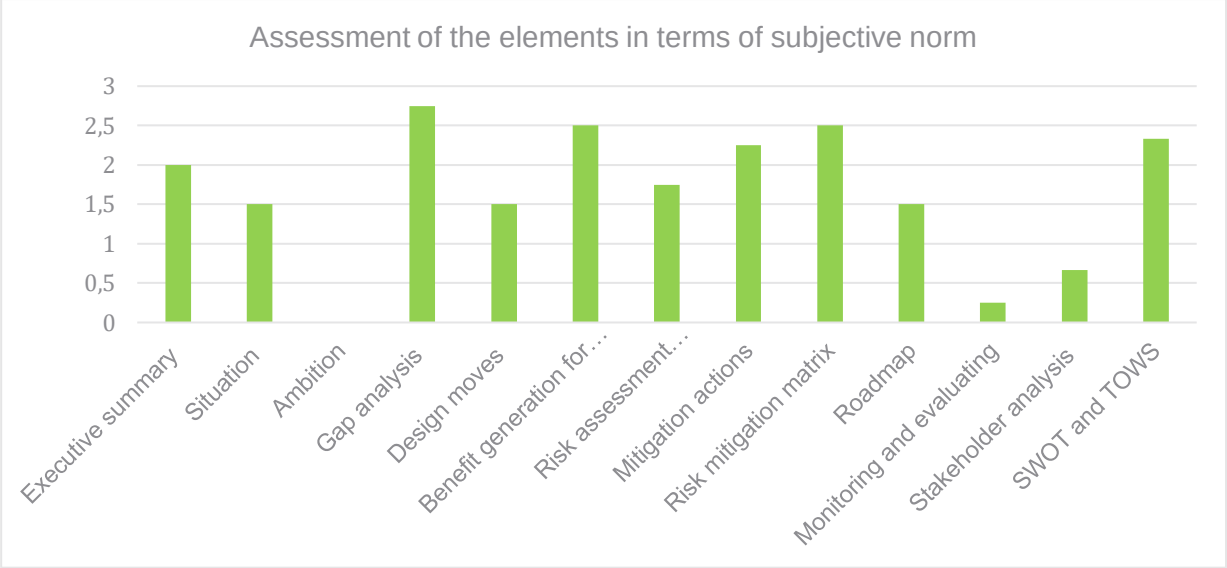


Figure 9) Assessment of the elements in terms of subjective norm

As evident in the bar chart, the gap analysis element achieved the highest score in terms of the subjective norm. In addition to the gap analysis, the benefit generation element, SWOT and TOWS, and the risk mitigation matrix were compatible with our interviewees' current working methods. Due to this, they thought that other people in their organizations would also accept using these elements. According to the graph, ambition is graded with zero, which means that some interviewees graded this element with negative scores and the others graded it with positive scores. In general, our interviewees thought that the ambition element would not be accepted in their organizations. This thought might be because ambition is just a bit too confronting in corporate environments. Stating an ambition in a very concise and high-level manner means taking a risk that not all people in the organization (want to) sign up to that ambition. Therefore, a tactic by employees or consultants in corporate environments is to “lay low” and not state the ambitions quite as unitary, but rather state multiple goals such that multiple stakeholders can recognize their own ambition in the list.

The monitoring and evaluating matrix is also graded with a low score, and it means that the level of the subjective norm for this element is low in interviewee's organizations. The opposition interviewee B on the stakeholder analysis element has also affected this criterion.

5.16.4 Usefulness

The following graph shows all the elements of the methodology and the average of grades collected from the interviewees for the usefulness criterion.

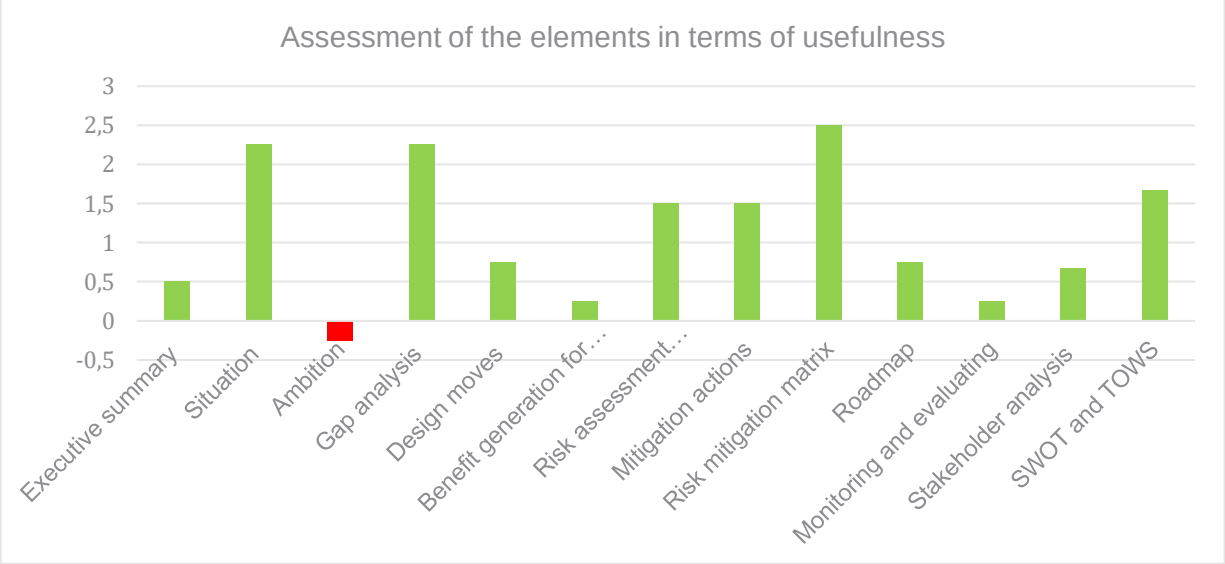


Figure 10) Assessment of the elements in terms of usefulness

The bar chart shows that using some elements such as situation, gap analysis, and risk mitigation matrix directly would affect the effectiveness level of our interviewees. In contrast, it was thought by our interviewees that some elements such as ambition, benefit generation for stakeholders, and monitoring and evaluating matrix could not improve their performance; therefore, they graded them with low scores. Benefit generation graded with low grades to the personal tastes. For instance, interviewee C preferred to see this element with the design moves element. Or interviewee B thought that immediate benefit should not be included in this element since design moves will not have an immediate benefit from his point of view.

5.16.5 Intention

The following graph shows all the elements of the methodology and the average of grades collected from the interviewees for the intention criterion.

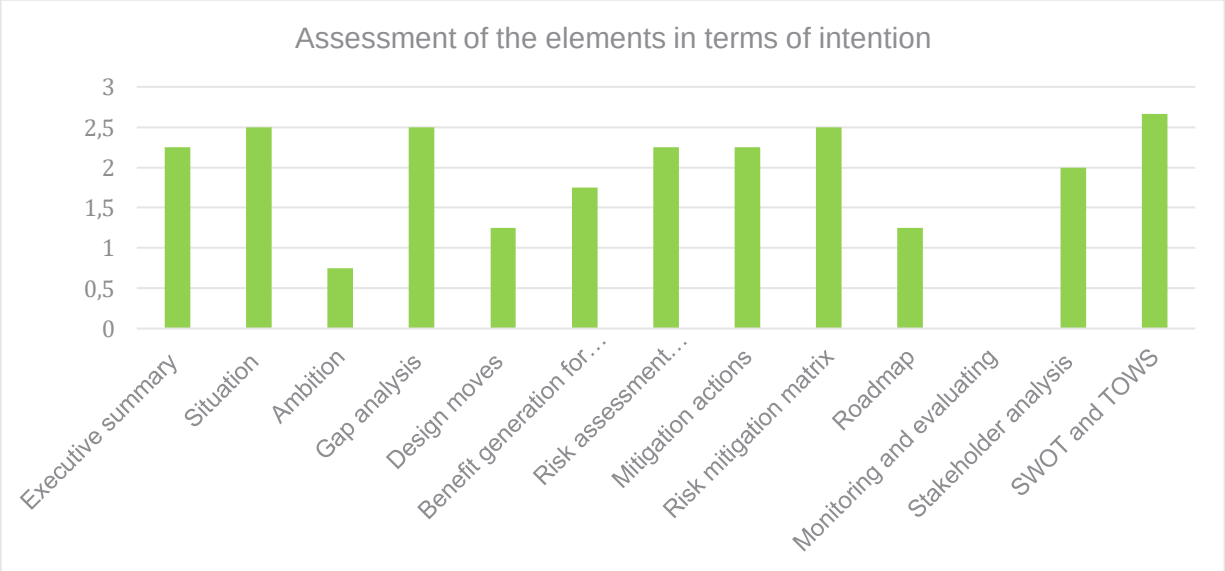


Figure 11) Assessment of the elements in terms of intention

The bar chart shows that our interviewees were interested in most methodology elements, especially SWOT and TOWS, gap analysis, situation, and risk mitigation matrix. The monitoring and evaluation matrix achieved the lowest grade, which means that this element was not

attractive to our interviews. The monitoring and evaluating matrix is one of the elements in the methodology that need much time to understand. Since it was designed at the end of the methodology, the interviewees were not energetic enough, and it was hard for them to understand it correctly, which impacted their grades.

The ambition element was also not attractive to the interviewees, and they thought some new changes should be considered to improve this element. Increasing flexibility was one of the main things that interviewees like to consider in this element. Moreover, they thought that this could be done by limiting the time duration.

6 Discussion

This chapter discusses the results and methodology used in this master thesis research. Specifically, this chapter discusses the potential threats to the validity and limitations of our study, the general lessons we have drawn from our research, our work's relevance, and its potential impact.

6.1 Threats and limitations

This subsection discusses a number of potential threats to the validity and limitations of our study.

6.1.1 Keeping challenges confidential

We tried to find problems and challenges regarding business and IT integration within the firms during the exploratory interviews. When we were doing interviews, we noticed that it was hard for some interviewees to talk about the challenges and problems in their organizations. In contrast, these interviewees were more comfortable when they were talking about their client organizations. From our point of view, this behavior could be related to their level of commitment to their organizations that encourage them to keep the problems confidential and show a positive overview of their organization.

6.1.2 Effect of worked-out example on grades

We noticed that some respondents were having trouble making sure their grades were about the methodology, not the worked-out example during the evaluation interviews. The worked-out example we used during the interviews was created as a synthetic case for testing the methodology and supporting materials. Although we reminded the interviewees to assess the methodology itself and not assess the worked-out example, the worked-out example impacted their assessment in some elements.

6.1.3 Time limitation

We have to validate thirteen elements with our interviewees during the evaluation interviews. Moreover, in each round, we had to introduce the element itself and the worked-out example. After presenting each element of the methodology and the worked-out example, we had to ask interviewees to assess the element based on five criteria. Doing this instruction was quite hard in just one hour. Moreover, some elements in our methodology need more time than others to become understandable for the people. Unfortunately, there was not too much room to discuss the details of those elements, and we thought that our interviewees did not sufficiently understand some elements. For instance, the monitoring and evaluating matrix is one of those elements that needed much time to understand. Since it was designed at the end of the methodology, the interviewees were not energetic enough, and it was hard for them to understand it correctly, which impacted their grades.

6.1.4 The limited number of interviewees

Although we collected valuable feedback during these four evaluation interviews, we believed that more interviews could be conducted to ensure the validity of the methodology.

6.1.5 Limitation in the role of interviewees

This methodology is a multi-stakeholder document; therefore, different roles that would work with this methodology should see and validate it. During these interviews, we tried to keep diversity as much as possible. However, to ensure the validity of the methodology, it would be better to test the methodology with different types of stakeholders.

6.1.6 Use of worked-out example

We created a worked-out example for the evaluation interviews to make the methodology more understandable to the interviewees. The example that we used during these interviews was not about a real case study. Due to this, it contained some limitations. This is the left out problem in our work and transport to the future of this research. In order to validate the methodology properly and receive more valuable grades, real case studies should be chosen based on the background of the interviewees' organizations.

6.1.7 Interview method limitation

The evaluation interviews were conducted online, and it was hard for us to keep the interviewees focused and on track to completion. At the end of the interviews, two interviewees were distracted, and we felt that distraction impacted their assessment since they did not understand some elements properly. Maybe an in-person interview is a better option to keep respondents focused, but from our point of view, working through a small case study with the respondents and having interactions during the completion of the evolution plan will be the best option for evaluating. Thus, workshops can be conducted within firms, and methodology could be tested during the workshops.

6.2 Reflection

This section discusses the general lessons we have drawn from the research and the relevance and its potential impact.

6.2.1 Lessons learned

The evaluation phase was one of the main phases of this research. During the evaluation phase, we had to understand the level of effectiveness and efficiency of our methodology. As discussed in the evaluation chapter for implementing this step, we did confirmatory interviews with experts. Before scheduling interviews, we tried to predict the challenges that might happen during the interviews and overcome them as much as possible. Although we were successful in controlling most of them, some challenges were beyond our control. These challenges provided good experiences for us that could be taken into account in our future work. The following paragraphs discuss the challenges that we faced.

6.2.1.1 Challenge 1: Interview bias

Interview bias is one of the main challenges that might happen during interviews. We needed to prevent this challenge as much as possible during exploratory interviews. Moreover, we should not have allowed interviewees' judgment on a particular aspect to influence interviewees' perceptions in other aspects. Since unstructured interviews are prone to bias, we structured our

interviews by a set of questions to avoid bias. However, we considered a space to ask additional questions if new interesting information arises during the interviews.

6.2.1.2 Challenge 2: Poor planning

Planning was one of the significant challenges that we faced during confirmatory interviews. We had limited time introducing our methodology and its elements properly to interviewees and collecting their feedback. And poor planning could have led to not having collected the right and valuable information. Moreover, this could prevent us from not achieving what we were looking for. To solve this challenge, we tried to distinguish more essential methodology elements from less important ones. And this resulted in moving three less essential elements from the main methodology document to the appendix. By implementing this thought, we prepared peace of mind to evaluate the main elements properly and evaluate the less important ones if time allowed.

6.2.1.3 Challenge 3: Ineffective approaches

We needed a proper methodology for data collection to have a practical evaluation experience. Due to this, we had to find the best approach to introduce the method and its elements properly. We used a worked-out example during the evaluation interviews. Using a worked-out example provided an opportunity for our interviewees to understand the output and outcome of implementing our methodology. Although creating a worked-out example was an excellent idea for making methodology more understandable for interviewees, it caused new challenges. We had to create a synthetic case study by ourselves. And building it was challenging. However, it had a significant advantage and helped us test the methodology step by step and found limitations and strengths by ourselves. In other words, creating a synthetic case helped us see the methodology from the template users' perspectives and helped us find limitations and strengths.

6.2.1.4 Challenge 4: Unclear questions

We needed the right questions for evaluating the methodology properly. Otherwise, asking the wrong questions might have derailed our interviews. We thought we should not ask unclear, jargon, and biased questions. To consider these considerations, we used five criteria discussed in the evaluation chapter. These criteria were easy to understand for our interviewees and were not biased in any way, and structured our interviews very well. In addition, since we used these criteria for all the elements of the methodology after using them for the first elements, our interviewees quickly got to use them.

6.2.1.5 Challenge 5: Everyone will not follow your ideas

Different people have different perspectives about the same topics, and it is usually expected that everyone does not agree and think the same as others about the same topics. Therefore, it was evident that some people might not be interested in some elements of the methodology or methodology as a whole. During the interviews, we faced some disagreements, even strong opposition to some elements of the methodology or some features within the elements. Receiving feedback was valuable for us because it could help us improve the method, and it helps our primary goal. Because ultimately, we want to make our methodology usable in practice. Apart from these disagreements discussed during interviews, we faced a biased interviewee about the whole method and its elements. For some of the elements, he even did

not mention any reasons for his low grades. The only thing that we tried to consider during this interview was to interact with him and ask him to give us reasons as much as possible.

This challenge might happen in different research projects. Researchers should consider that some people resist accepting new ideas even if they are true. From our point of view, the researcher should try to build interactions with these people and attract them to overcome this challenge. In our research, we thought choosing a case study related to the interviewees' background would be a good option for attracting interviewees and increasing the level of interaction.

6.2.2 Potential impact

Many organizations are doing digital transformation these days to make their businesses digital. Although there is a significant enthusiasm to implement a digital transformation, many organizations are still fuzzy on understanding its meaning and implementation. That is because recognizing the digital transformation is different from doing the digital transformation. By doing this master thesis research, we tried to help organizations take actionable steps to do digital transformation. The following paragraphs discuss how our methodology is expected to enable organizations to understand the meaning of digital transformation and implement it.

To do digital transformation, organizations need the support of both C-level people and employees. Employees need to learn to do tasks in new ways, while C-level people should lead and communicate what needs to be achieved. Our methodology is a multistakeholder document that can bring all the stakeholders together. Therefore, we expected that use of our methodology could bring stakeholders together and make the implementation easier. In addition, to benefit most from digital transformation, organizations need to understand their digital assets and services' current situation and identify strategic areas for improvement. Our methodology and its elements can help organizations identify strategic needs by situation understanding and help them define required actions for solving these needs by design moves. Furthermore, time is changing, and this change affects the implementation of digital transformation as well. We expected that our monitoring and evaluation element in our methodology could help organizations check their progress over time and make methodology users aware of the new changes.

In summary, we expect that our methodology and its elements can bring stakeholders together to understand the meaning of digital transformation, understand the organization's digital assets and services, and ways to transform and monitor the transformation.

7 Conclusion

This chapter discusses the answers to the research questions defined at the beginning of the thesis, contributions that we have achieved during the thesis, and future work that can be done to continue this research.

7.1 Answers to the research questions

Research question 1: What discrepancies can be observed between IT and business in the case of continually adapting modern digital businesses?

Due to the improvement of information technology (IT), the world and market are changing rapidly. To be sustainable in market competition and stay competitive and relevant organizations need to adjust their strategies constantly. Adjusting strategies means that firms need to use their IT capabilities efficiently and effectively for supporting business processes and strategies. During this research, after conducting seven exploratory interviews, we noticed that although some organizations have taken reasonable steps to align business and IT capabilities within firms, some problems and challenges still remain.

Through interviews with seven experts in the field of business and IT, we identified eleven major discrepancy areas that persist to occur frequently, among which: Failure to implement the defined strategy successfully, problems regarding IT autonomous teams, problems regarding the domination of business teams within firms, lack of an appropriate conversation between business and IT teams, diversity of stakeholders and lack of awareness about new digital technologies within organizations.

Research question 2: What ingredients should be used to create a strategy design model to help organizations remove discrepancies between IT and business?

Our methodology and its elements try to solve six of the problems defined in research question 1. The following paragraphs discuss how these elements help organizations to remove discrepancies.

Lack of an appropriate conversation between business and IT teams: We believe that our methodology could make an agreement between IT and business teams before implementing new features and functionalities. With design moves and benefits generation elements, new features and functionalities could be prioritized based on their level of functionality and necessity. Furthermore, using the monitoring and evaluating matrix could bring business and IT teams together in regular meetings. This matrix could provide a comprehensive overview of the logic of a project, and it can be used as a means of communication among stakeholders.

Diversity of stakeholders: We designed a stakeholder analysis table to address different stakeholders in our methodology. This element tries to help the methodology users clarify the stakeholders, stakeholder groups, reasons for resistance or support, and the required actions for addressing each group of stakeholders. Therefore, the use of this element will help organizations to manage their stakeholders' expectations.

Lack of an appropriate analysis of the organization's current situation: Our methodology considered stakeholder analysis, SWOT, and TOWS to help organizations analyze their current situations. Moreover, we believed that using these elements could help methodology users minimize risks as much as possible and create transparency in their project.

Limitations of the existing frameworks and tools: We tried to create the methodology as simple as possible. Moreover, for implementing our methodology, structural changes are not required. Therefore, organizations can easily use our methodology without making any significant changes.

Problems in defining a clear, focused, shared goal: Our benefit generation for stakeholders element could help IT, and business teams define their goals based on the added value which is going to be generated for stakeholders. In other words, we believe that by using this element, defining goals will be more manageable for the teams, and teams can prioritize goals based on their added value.

Problems in strategy formulation: From our point of view, situation understanding is a necessary step before implementing new organizational changes. Our methodology tried to help organizations analyze their situation by situation element, stakeholder analysis, SWOT, and TOWS. As a result of a good situation understanding organizations will become more capable of strategy formulation.

Research question 3: Is the future model for strategy design deemed usable by the relevant people to achieve the desired market position?

For answering this research question, we contacted our interviewees who participated in the exploratory interviews. And we scheduled confirmatory interviews with four of them. Four interviewees validated the new version of the methodology (SEPv2) during confirmatory interviews. In general, three of the interviewees were inspired by the methodology and thought it creates a good solid foundation in the context of what they are currently trying to resolve. They believed that this methodology could help organizations to take actionable steps. Only one interviewee was not interested in the entire methodology, although some of the elements inspired him. Like other interviewees, he believed that the methodology has logical steps, but he felt that the methodology is not ready to be used. All the interviewees mentioned some recommendations to make some of the elements of the methodology more practical. These recommendations will discuss in the future work section and could be done as future work.

7.2 Contributions

This section lists the contributions that we have achieved during this research. The following bullet points show each of the contributions.

- We created an inventory of sixty-five challenges and problems regarding business and IT integration during exploratory interviews. The sample overview of the problems and challenges in interviewees' organizations was provided in table 5. The complete overview of sixty-five problems can be found in Appendix I.
- We created an inventory of thirty-seven solutions for overcoming mentioned challenges and problems discussed during the exploratory interviews. The sample overview of the solutions and tactics in interviewees' organizations or their clients' organizations to overcome business and IT integration challenges was provided in table 6. The complete overview of thirty-seven solutions can also be found in appendix II.
- Based on the results of the exploratory interviews, we defined eleven categories for grouping sixty-five problems. Although most identified problems have been categorized in these eleven categories, sixteen problems have not been classified. These groups can be found in table 7.

- We classified possible solutions for eleven categories that we defined as a result of grouping interview results. This information can be found in table 8.
- We identified limitations in SEPv1 and sample evolution plans created by students.
- We designed SEPv2 by extending SEPv1. We extended the pre-existing methodology in six major areas (i.e., we added a step for stakeholder and user analysis, we added a step for linking the situation analysis and ambition, we added a step for clarifying the benefits which are going to be generated by each design move, we added a step for defining risks and helping users have more control over implementing their design moves, we added a step to define the required actions to eliminate or reduce risks, we added a risk mitigation matrix to give a good overview of the risk and the impact of the mitigation actions on the risks to the users and we added a step that can be used as a means of communication among stakeholders for monitoring and evaluating the plan during the execution) and four minor areas (i.e., we added “outcome” and “output” besides “strategic intent” and “criteria of done” terms to increase understandability in design moves element, we added TOWS matrix to help users use the SWOT analysis in an actionable way, and we added actors to the roadmap to indicate accountable actors for implementing actions). Table 9 shows SEPv2 with its new elements. These changes are written in red to give an overview to the reader to understand new elements. Details about each element of the methodology are discussed in chapter 4.
- We created a synthetic case for testing the evolution planning methodology and supporting materials. An overview of the worked-out case study is considered in Appendix V. We used the created synthetic case study during the evaluation interviews to make the methodology more understandable to the interviewees.
- We validated the added elements in addition to the initial methodology that Visser created (SEPv1). Chapter 5 discussed the evaluation results. Each section in this chapter showed the evaluation results of each element of the methodology.
- We identified threats to the validity and limitations of our study in the threats and limitations subsection in chapter 6.
- We identified the general lessons that we have drawn from our research, our work's relevance and its potential impact in the reflection subsection in chapter 6.
- We identified the remaining weaknesses and possible extensions of SEPv2. The following section in the current chapter discusses future work that can be done to improve and develop this methodology and this research project as a whole.

7.3 Future work

This section discusses the future work that can be done to improve and develop this methodology and this research project as a whole.

7.3.1 Gap analysis types

This research referred to an article (Peterson, 2019) for categorizing the areas of the gaps in the gap analysis element. However, the categories used in this section cover most areas, but other gap areas could also be identified and added to these categories. Identifying new gap areas can be done as future work.

7.3.2 Visualizing gap analysis element

Two of our interviewees mentioned that they usually use different colors or numbers to visualize the gaps between current and ambition states. To make the gap analysis element more visual, they proposed using different colors to show how far methodology users are from their ambition stage. However, it should be considered that using numbers will make this element more complicated for template users. Therefore, further research is required to find what would be the best option for visualizing this element.

7.3.3 Risk categorization

The risk assessment element in our methodology is designed to help users to define risks and help users control the implementation of their design moves. In other words, we tried to help methodology users to have risks upfront. In addition to the risk assessment element, the mitigation actions element is considered in the methodology to clarify the mitigation actions needed for controlling risks. We did not categorize risks in these two elements and did not clarify which risk has the most priority.

Many agile organizations use the ROAM risk management approach (Peterson,2020) to ensure that potential risks are being dealt with appropriately in their organizations. ROAM stands for Resolve, Own, Accept, and Mitigate and helps organizations define which of four potential actions can be used to handle risks. In organizations that use this approach after risk identification, risks are categorized in these four categories and help organizations decide which risks are worth working on. The following paragraphs discuss these four categorize in more detail (*Managing Risks with ROAM in Agile - Planview Blog*, 2021).

Resolved: This category is used when the risk is not determined as a threat. Therefore, no further action is required.

Owned: This category is used when the risk can not be resolved during the meeting. Therefore, one of the team members is selected to own the risk, and he/she has the responsibility to manage the risk appropriately.

Accepted: This category is used when a risk can not be resolved and should be accepted as it is. These types of risks will be dealt with when it is necessary.

Mitigated: This category is used when a plan is required for eliminating the threat of risk.

As future work, the ROAM approach can be considered in the methodology to help organizations categorize their risks.

7.3.4 Prioritize a list of design moves

The design moves element is considered in our methodology to compose the gap analysis into a complete solution. In other words, we designed this element to help methodology users define the required actions needed to remove the gaps between their current and ambition states. We have not considered any feature in the design moves element to help methodology users prioritize design moves. There is a tool used in Scaled Agile Framework (SAFe) that helps teams prioritize their initiatives. This tool is named Weighted Shortest Job First (WSJF). For each initiative, the team calculates the cost of delay divided by the job's size or duration. Based on the results, they prioritize initiatives. Those items that have the highest grades compared to the others will be selected to be done first (*WSJF - Scaled Agile Framework*, 2021). Further research could be conducted to see how we can consider prioritization in our design moves element.

7.3.5 Lack of comparison between possible solution directions

The gap analysis element is considered in our methodology to measure the distance between the current and ambition stages, help organizations see how far they are from their ambitious state, and show the possible solutions to remove these gaps. In addition, the design moves element is designed in our methodology to compose the gap analysis into a complete solution. Our methodology has not considered any element to help methodology users compare possible solution directions defined in the gaps table. Therefore, another element should be added to the methodology between gap analysis and design moves that help methodology users to compare different solutions for removing gaps. In future research, necessary features that are needed for creating this element should be identified.

7.3.6 Change the terminology "design moves"

Design moves is a terminology that was introduced in a paper which (Woodard et al., 2013) wrote. This terminology is not easy to understand for all people. We described this terminology verbally during the evaluation interviews, but this word could be changed to practical words such as "initiatives" to make this element more understandable.

7.3.7 Way of communication to each stakeholder

Satisfied stakeholders can have a significant impact on the progress and the performance of the projects and ultimately contribute to the success of the projects. Due to this, we designed a stakeholder analysis element in our methodology to help users clarify the reasons for resistance or support of each stakeholder group and the required actions for addressing each group of stakeholders. We did not mention the best way of communicating for each stakeholder in SEPv2. As future work, another column can be added to our stakeholders' element to show the best way of communication.

7.3.8 Design move catalog

As discussed in the methodology, the design moves element will help organizations bridge the gaps between their current and ambitious states. Since some design moves repeat from one plan to another and exist in different plans, we thought it would be nice to create a catalog that collects design moves from multiple plans. As a result of implementing this thought, a catalog (set of archetypal moves) will be created and shared with people to check before defining the evolution plan's design moves. In addition, people will have a chance to specialize the design moves discussed in the catalog for their situation. The following table shows how the catalog structure could look like.

Title of the design move: Brief description of the design move	
Description	**Strategic intent**
Detailed information on the design move should be discussed in this part.	This part discusses the overarching purpose of the design move.
Risks	
This part contains information about the risks that might happen during the implementation of the design move. This information will help users of the catalog to see the risks upfront.	
Cost	
This part contains information about the cost that should be spent on implementing the design move.	
Impact (Actual outcomes)	
This part contains information about the intended results of the design move, which will be generated after implementation.	
Read more	
This section has been considered since complete information on each design move cannot be entered in the design move catalog. Users of the catalog can find more links in this part for finding more materials.	
Related design move	
This part should be completed if another design move in the catalog relates to this design move. For instance, if there is a design move in the catalog which is opposite to this design move.	

Table 36) Design move catalog structure

In order to enter design moves to the catalog, design moves need to be validated. Due to the time limitation, it was not possible to create a complete catalog during this research. Therefore, completion of this catalog is something that can be done in the future. In addition, after entering design moves samples to the catalog, the catalog can be shared as an open catalog with people, and people can be invited to contribute to expanding it.

8 Bibliography

Ahmed, A., & Amornsawadwatana, S. (2007). A review of techniques for risk management in projects. *Article in Benchmarking An International Journal*. https://doi.org/10.1108/14635770710730919

Bharadwaj A, El Sawy OA, Pavlou PA, Venkatraman N (2013) Digital business strategy: toward a next generation of insights. *MIS Q 37(2):471–482* https://misq.org/misq/downloads/download/editorial/581/

Brigitte Smit. (2002). Atlas . ti for qualitative data analysis. *Perspectives in Education*, *20*(September), 65–76. http://ol.up.ac.za/upspace/bitstream/2263/4813/1/Smit_Atlas(2002).pdf

Bisandu, D. B. (2016). Design Science Research Methodology in Computer Science and Information Systems. *International Journal of Information Technology*, *November 2016*, 1–7. https://www.researchgate.net/publication/330041719_Design_science_research_methodology_in_Computer_Science_and_Information_Systems

Correani, A., De Massis, A., Frattini, F., Petruzzelli, A. M., & Natalicchio, A. (2020). Implementing a Digital Strategy: Learning from the Experience of Three Digital Transformation Projects. *California Management Review*, *62*(4), 37–56. https://doi.org/10.1177/0008125620934864

*Di*gital Strategy - The Evolving Business Strategy | Liferay. (2021). Retrieved November 11, 2021*, from https://www.liferay.com/resources/l/digital-strategy*

Foundation for Advanced Studies on International Development Beyond Logframe; Using Systems Concepts in Evaluation. (2010). http://www.fasid.or.jp

Fox, N. (2009). Using interviews in a research project. *The NIHR RDS for the East Midlands/Yorkshire & the Humber*, *26*.

Gap Analysis: How to Bridge the Gap Between Performance and Potential | Process Street | Checklist, Workflow and SOP Software. (2019). Retrieved October 4, 2021, from https://www.process.st/gap-analysis/

Gengler, C. E., Rossi, M., Hui, W., & Bragge, J. (2006). the Design Science Research Process : a Model for Producing and Presenting Information System Research. *In Proceedings of the First International Conference on Design Science Research in Information Systems and Technology*, *May 2014*, 83–106.

Goddard, W., & Melville, S. (2001). Research methodology : an introduction. 148.

Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: leveraging information technology for transforming organizations. *IBM Systems Journal*, *32*(1), 4–16. https://doi.org/10.1147/SJ.382.0472

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly: Management Information Systems*, *28*(1), 75–105. https://doi.org/10.2307/25148625

Hevner Alan, R. (2007). A Three Cycle View of Design Science Research. *Scandinavian Journal of Information Systems*, *19*(2), 87–92. https://www.researchgate.net/publication/254804390_A_Three_Cycle_View_of_Design_Science_Research

Holmström, J., Ketokivi, M., & Hameri, A.-P. (2009). Bridging Practice and Theory: A Design Science Approach. *Decision Sciences*, *40*(1), 65–87. https://doi.org/10.1111/J.1540-5915.2008.00221.X

How to Create an Effective Monitoring and Evaluation Framework | by Atlan | Humans of Data | Medium. (n.d.). Retrieved October 5, 2021, from https://medium.com/humans-of-data/how-to-create-an-effective-monitoring-and-evaluation-framework-a39454f651dd

How To Find Your Stakeholders. Use a Stakeholder Map to better manage… | by Christiaan Verwijs | The Liberators | Medium. (n.d.). Retrieved October 4, 2021, from https://medium.com/the-liberators/how-to-find-your-stakeholders-e6d96fa2e5a8

Hunter, M. G. (2014). Qualitative Interview Techniques. *ResearchGate*, *January 2006*, 1–13. https://www.researchgate.net/publication/22846930

IMA: Research Methods for Information Research: 2.1 Research interviews: forms of interview. (n.d.). Retrieved September 13, 2021, from https://www.informat.org/researchmethods/researchmethods-2-00.html

Karl, K. A., Peluchette, J. V., & Aghakhani, N. (2021). Virtual Work Meetings During the COVID-19 Pandemic: The Good, Bad, and Ugly. *Small Group Research*. https://doi.org/10.1177/10464964211015286

Kennon, N., Howden, P., & Hartley, M. (2009). Who really matters? A stakeholder analysis tool. *Extension Farming Systems Journal*, *5*(2), 9–17. http://www.csu.edu.au/__data/assets/pdf_file/0018/109602/EFS_Journal_vol_5_no_2_02_Kennon_et_al.pdf

Kniberg, H., & Ivarsson, A. (2012). Scaling Agile @ Spotify. 14. http://blog.beule.fr/contenus/2013/02/SpotifyScaling.pdf

Managing Risks with ROAM in Agile - Planview Blog. (n.d.). Retrieved November 6, 2021, from https://blog.planview.com/managing-risks-with-roam-in-agile/

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business and Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

Mclaren, T., & Buijs, P. (2011). *A DESIGN SCIENCE APPROACH FOR DEVELOPING INFORMATION SYSTEMS RESEARCH INSTRUMENTS*.

Murray, J. (2000). *A G AP ANALYSIS PROCESS TO IMPROVE IT MANAGEMENT The Gap Analysis Process; Practical Example; Process Goals and Hurdles; Process Mechanics*.

Nehls, K., Smith, B. D., & Schneider, H. A. (2014). Video-conferencing interviews in qualitative research. Enhancing Qualitative and Mixed Methods Research with Technology, March, 140–157. https://doi.org/10.4018/978-1-4666-6493-7.ch00

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2008). A design science research methodology for information systems research. *Journal of Management Information Systems*, *24*(3), 45–77. https://doi.org/10.2753/MIS0742-1222240302

Project Roadmap: Role, Importance, and Features | by Vera Mirzoyan | The Cypress | Medium. (n.d.). Retrieved October 5, 2021, from https://medium.com/the-cypress/project-roadmap-role-importance-and-features-2c0dc90ca091

Ready, D. A., & Truelove, E. (2011). The power of collective ambition., from https://hbr.org/2011/12/the-power-of-collective-ambition

Riemenschneider, C. K., Hardgrave, B. C., & Davis, F. D. (2002). Explaining software developer acceptance of methodologies: A comparison of five theoretical models. IEEE Transactions on Software Engineering, 28(12), 1135–1145. https://doi.org/10.1109/TSE.2002.1158287

Managing Risks with ROAM in Agile - Planview Blog. (2020). Retrieved November 6, 2021, from https://blog.planview.com/managing-risks-with-roam-in-agile/

Ross, J. W., Sebastian, I. M., & Beath, C. M. (2016). WINTER 2017 ISS*UE How to Develop a Great Digital Strategy* (Vol. 58, Issue 2). http://mitsmr.com/2fAqNTk

Schallmo, D., Williams, CA, & Lohse, J. (2019). Digital Strategy — Integrated Approach And Generic Options. *International Journal of Innovation Management* , *23* (08), 1940005. https://www.researchgate.net/publication/333759058

Silvius, A. J., De Waal, B., & Smit, J. (2009). Business and IT alignment; answers and remaining questions. Pacis 2009 Proceedings, 44. https://www.researchgate.net/publication/221228942_Business_and_IT_Alignment_Answers_and_Remaining_Questions

Smaczny, T. (2001). Is an alignment between business and information technology the appropriate paradigm to manage IT in today's organisations? *Management Decision*, *39*(10), 797–802. https://doi.org/10.1108/EUM0000000006521

Strategic Planning to Actionable Items: From SWOT to TOWS Analysis | by Warren Lynch | Medium. (n.d.). Retrieved October 4, 2021, from https://warren2lynch.medium.com/from-swot-to-tows-analysis-55ac394064b7

Strategy Implementation | Encyclopedia.com. (2021). Retrieved October 20, 2021, from https://www.encyclopedia.com/management/encyclopedias-almanacs-transcripts-and-maps/strategy-implementation

UNDERSTANDING VALUE CREATION. (2020). https://www.ifac.org/system/files/publications/files/Understanding-Value-Creation_0.pdf

Visser, J. (2019). The world is eating your software. *Cutter Business Technology Journal*, *32*(7), 10–14. https://repository.ubn.ru.nl/handle/2066/209244

vom Brocke, J., Hevner, A., & Maedche, A. (2020). *Introduction to Design Science Research*. *September*, 1–13. https://doi.org/10.1007/978-3-030-46781-4_1

Weihrich, H. (1982). The TOWS matrix—A tool for situational analysis. *Long range planning*, *15*(2), 54-66.

Wen, J., Rathnam, R. G., Johnsen, J., & Wen, H. J. (2005). *Alignment between business and information technology strategies : a case study of a large mid-western financial services company / ALIGNMENT OF BUSINESS STRATEGY AND IT STRATEGY: A CASE STUDY OF A FORTUNE 50 FINANCIAL SERVICES COMPANY*. https://www.researchgate.net/publication/34244401

Westerman, G. (2018). *Your company doesn't need a digital strategy. MIT Sloan Management Review*, *59*(3), 1-5. http://mitsmr.com/2Gk4a0h

What is ATLAS.ti | ATLAS.ti. (2021). Retrieved September 13, 2021, from https://atlasti.com/product/what-is-atlas-ti/

What's swot in strategic analysis? - Pickton - 1998 - Strategic Change - Wiley Online Library. (n.d.). Retrieved October 4, 2021, from https://onlinelibrary.wiley.com/doi/pdf/10.1002/%28SICI%291099-1697%28199803/04%297%3A2%3C101%3A%3AAID-JSC332%3E3.0.CO%3B2-6?casa_token=jKR9wPDQHtUAAAAA:Eq2S_7qp3_-v-uI4KIHn1zZk0zN8s3oUKBSeNuv9yRkDzqpHkRiSYcvyR1b8sxR9J0xIoMsxe4bi-siG

Why Microsoft Teams Gained Incredible Popularity During the Pandemic. (2021). Retrieved September 13, 2021, from https://www.voipswami.com/blog/why-teams-gained-popularity-during-pandemic

Wieringa, R. J. (2014). *Design science methodology for information systems and software engineering*. Springer.

Woodard, C. J., Ramasubbu, N., Tschang, F. T., & Sambamurthy, V. (2013). Design capital and design moves: The logic of digital business strategy. *MIS Quarterly: Management Information Systems*, *37*(2), 537–564. https://doi.org/10.25300/MISQ/2013/37.2.10

WSJF - Scaled Agile Framework. (n.d.). Retrieved November 6, 2021, from https://www.scaledagileframework.com/wsjf/

Young, J. C., Rose, D. C., Mumby, H. S., Benitez-Capistros, F., Derrick, C. J., Finch, T., Garcia, C., Home, C., Marwaha, E., Morgans, C., Parkinson, S., Shah, J., Wilson, K. A., & Mukherjee, N. (2018). A methodological guide to using and reporting on interviews in conservation science research. *Methods in Ecology and Evolution*, *9*(1), 10–19. https://doi.org/10.1111/2041-210X.12828

9 Appendix

9.1 Appendix I: Problems in integrating business and IT strategies

What challenges do you have regarding business and IT alignment when you are on a path of digital transformation?							
Challenges	A	B	C	D	E	F	G
A long time is required for digital strategy formulation.	×						
Strategy implementation takes much time, especially in big organizations. During the implementation phase, due to the failures, you might come back and update the strategy.	×		×	×	×	×	×
There are different ways of interpreting strategies. People do not know what strategy means for them because it is described at a very high level.	×	×	×				
Implementation of the strategy is challenging. The strategy makes many straightforward rules. But in reality, it is not so simple to implement strategies.	×			×	×	×	×
Different levels of understanding between IT and business teams cause problems, and if people do not understand the strategy very well, they will do their work far from the strategy.	×	×	×	×	×		
Finding ways that comply with the strategy of the organization is challenging.	×	×	×				
Reminding people of what they should do and how to execute strategy is challenging.	×	×		×	×	×	×
Translating the needs of clients to the situation of the company is challenging.	×	×	×		×	×	

It is tough to get incentives right in strategy implementation.	×	×					×
One to one conversation between an employee and the manager is a slow process.	×	×			×		
Some companies have bigger chunks of projects that go to IT teams, and they organize them autonomously. As a result, it is hard for the management to keep the ship under control when IT teams work autonomously.	×						
Sometimes there is not enough neutrality in the meetings between different stakeholders of the projects. Moreover, the business team is dominant in the conversation between business and IT.	×		×	×			×
Product owners always ask about functionality.	×				×		
Business teams want features for making money, and they are constantly pushing and asking IT people to implement features. And their demands will result in a fragmented IT landscape.	×	×	×	×	×	×	
Imperfect and slow systems are the result of overruling the words of IT people.	×	×	×	×	×	×	×
Companies need to be careful about giving IT much money. Otherwise, IT is going to build very nice and awesome features without considering the users.	×	×				×	
There are medium-sized companies that do not do strategy, and they just do operations.		×				×	
Non-IT companies use IT as a supporting function and use bullet points for defining IT		×				×	

strategies.							
The use of the bottom-up approach in strategy formulation creates conflicts within the organizations.		×					
Poor conversation between IT and business results in over expensive or over quality tools.	×	×	×	×	×	×	×
Failures happen when business and IT are shouting from a distance. There are some organizations in which IT and business teams do not have regular meetings with each other.	×	×		×		×	
Business people do not know what IT people are doing and what IT people can deliver. And IT people do not have ideas about business needs.		×	×	×		×	
There are some organizations in which IT lives too far from the product owner of the organization in terms of geographical distance or culture of the department.		×					
In some organizations, there is no procedure for prioritizing which projects go true and which are not.		×			×		
Differences in the personality of people cause challenges. Business people understand the commercial elements and lead the sessions, while IT people do not want to know what needs to be executed but as a whole around it. And these personality differences will result in clashes.		×	×				
There is usually a little training and coaching budget to train people to communicate and be extraverted.		×					

Restructuring teams have its downsides. It will be helpful for you to achieve your objectives. On the other hand, it will lead to inefficiencies in other processes.		×					
Lack of analysis of the current situation of the organizations will result in expensive tools which cannot do what the organizations need. And this will result in failure.	×	×	×	×			
IT and business teams both have their agendas and criteria. And talk in different languages. Sometimes this will cause conflicts between IT and business teams.	×	×	×		×	×	×
Although IT and business teams have the same goal, they are working from different angles.	×	×	×		×		
Conflicts happen when clear communication does not exist between IT and business teams.	×	×	×		×		
One of the pitfalls is dealing with power balance between teams. IT people were never invited to the table in some organizations, so they do not know anything happening until the solution is designed.	×	×	×	×	×		
Some product owners are not professional enough to build the alignment between business and IT teams.		×	×		×		
Different stakeholders at companies have different languages and cannot understand the language of each other.		×	×				×
Lack of involvement of people within organizations will cause failure in transformation. The majority of people should	×	×	×	×			

connect to the strategy and comply with you. For this, people need to believe your solutions, and this takes time.							
Some organizations are not aware of potential digital strategies that could help them.				×			
Organizations overestimate the change that they are asking of people.				×			
It is hard for people to give up something that they are very used to doing in a certain way.				×		×	×
Digital strategy is defined with a big horizon, but re-evaluation is required due to the fast digital world.				×			
Many organizations overestimate their capabilities. And business demands a lot of IT. And often they develop staff themselves instead of looking at and seeing what is out there in the market.				×			
People who want functionalities create what they need based on what they see without realizing what they need and want.				×			
Lack of outside-in perspective in IT teams will cause failure due to the demands of business teams.				×			
Lack of a central coordinating point will result in risks in the future.				×		×	×
The market puts pressure on companies to implement new features. In addition, there are many initiatives that organizations do not know how to work with. Therefore, the strategy needs to be re-evaluated due to the fast rapid environment.				×			×

Top-down and bottom-up approaches have their advantages and disadvantages. With a top-down approach, you will have more control, and you are faster, while a bottom-up approach encourages innovation.		×		×	×	×	×
It is harder to translate IT goals to added values compared to business goals.					×		
It is not possible to do all of the goals defined by business and IT teams.	×				×		×
The level of support of your supervisor is essential in the demands of business people.					×		
The level of maturity has an impact on the level of business and IT alignment within firms. And different factors define the level of maturity.		×			×	×	
The overall performance of a company can cause misalignment between business and IT teams.		×			×	×	
Sometimes in some organizations, IT strategy is seen as a utility rather than a business opportunity.		×				×	
There are quite a lot of people that do not see the added value of IT or technology.						×	
Although some tools and frameworks like SAFe and Spotify are used to organize IT delivery, most companies still work in silos.						×	×
It is not easy to use tools and frameworks because different things need to be considered before moving to them. If the company has worked in a certain way for many years, it is				×		×	

hard to reshape its organization completely.							
Most organizations use a scale agile framework for running IT rather than a framework for an entire organization.						×	
All frameworks are working fine in theory, and, of course, there is some truth behind it. No organization works with a particular framework and applies it to one to one basis.						×	
People invest in marketing campaigns rather than IT systems.						×	
Archimate has been used to model the business requirements and align them with IT, but it is challenging to use that and constantly keep it up to date.							×
It takes too long to fill the project start architecture (PSA) template. And you cannot start the project when the PSA is not ready.							×
It is challenging to use IT architecture in an agile way when projects have different stakeholders.							×
The agile methodology works for systems that do not have too much relation with external systems.							×
Misinformation exists at higher levels. And higher levels do not know how laws have to be applied.							×
Negotiation takes much time when you have different stakeholders within the project.	×						×

Sometimes the overall goals of the organizations are too broad to concrete and do projects.							×
Feedback processes are complicated in projects that do not have direct interactions with users.							×

Table 37) Full table of problems in integrating business and IT strategies

9.2 Appendix II: Solutions for integrating business and IT strategies

What are your organization's tactics to overcome challenges regarding business and IT alignment?							
Solutions	A	B	C	D	E	F	G
Setting central KPIs and incentives help people to act in the right way.	×	×	×				
They are explaining to employees why we want things and how things work by training. IT people should be trained for what needs to happen for future progress. And business people should be trained on things like digital advances that are happening.	×	×	×		×		
One to one conversation between employees and the manager in organizations with a limited number of employees can work as a solution.	×	×			×		
They offer bonuses and set target scores every quarter or monthly with the people to get them to move in the same direction.	×	×					
A healthier relationship is to put business people to say the final words, but IT should have a decisive role and teach businesses how to do IT right. In addition, it should be considered that business should not overrule everything IT says.	×						
The strategy should be translated into tactics to help people to make decisions.	×						
Business people and IT people should listen to each other. And IT people should be invited from the beginning in the decision-making process. Involvement of both groups is required for strategy creation and to keep change going.	×	×	×	×	×	×	×
Restructuring teams is one of the solutions to bring IT and business people together.		×			×	×	
DevOps can be used as a solution for innovative products.		×			×	×	

To better align IT strategy and corporate strategy in technological companies' IT strategy should be integrated into the company's strategy. It should not be two separate processes because IT or technology is your product.		×					
Corporate strategy should be an input for IT to better align business and IT in non-technological companies.		×					
CIO can act as a communicator to bridge the gap and should listen to both parties. But it really should be a co-creation effort. And he/she should behave equally.		×	×	×			
To be successful in defining corporate strategy, IT people should do the feasibility check.		×			×		×
Companies need to start looking at their processes. And standardize them before building the IT solution to enable those processes because standard systems create a balance between business and IT teams.			×	×			
Product owners can act as communicators between business and IT teams.	×		×		×		
Visibility in agendas and receiving feedback from both groups can be used as a solution.			×		×		
Give the work of the IT team as much weight as the business team. That is where the conversation happens. Otherwise, you will have business people that go to the IT people for demanding certain things.			×				
Managers should walk and talk among employees to check their progress.			×				
Digital strategy is how you are going to use digital to change the business. So, it can be used as a solution to bridge the gap between business and IT.	×	×		×			
Use of inside-out and outside-in perspectives is required for understanding the current situation of the organization.			×	×	×		×

One central coordinating point is helpful for digital strategy transformation and shaping strategy. In addition, having a central role creates more progress in a shorter amount of time. And these people should be in charge of projects to control.				×		×	×
Starting with inspiring projects that may have a less widespread impact but that can showcase the digital power and help you gain trust. (Start with small projects and then scale it up)				×		×	
They create roles within organizations to bridge the gap between business and IT and make people part of the team.				×			
Nine plane model is one of the models helpful in creating collaboration and conversation between business and IT teams.				×			
The information manager should act as a leader of the conversation between business and IT teams. The information manager role is as a product owner role.				×			
They are creating IT-business portfolio management for prioritizing projects and frequent discussions.				×			
Creating success stories is one of the best ways to involve also more decentralized people or the organization.				×			
Use of agile methodology for developments that can be done in a short period.				×			×
The mix of both bottom-up and top-down approaches will help organizations in integrating business and IT strategies.				×		×	×
Business and IT teams have their own goals and targets. These goals need to be prioritized based on their added value.	×				×	×	×
For the success of the projects, goals should be defined by all stakeholders of the organization. In addition, target translation is essential. Targets need to be translated into clear steps.	×	×	×	×	×	×	×

The organization matrix can be used as a solution to create communication between business and IT teams.					×		
Performance should be checked during the implementation to fix the problems. Quarter meetings can be used as a solution to check the performance of the group.	×				×		
Product owners should take inputs from both IT and business teams and the people at the top level. C-level people have to say the last words. They have to say what needs to be done. But the architecture board advises the C-level people to decide.			×		×		×
Use of famous frameworks such as SAFe and Spotify to remove the gaps between business and IT teams. But Organizational issues in your old organizational framework need to be resolved before using new tools or frameworks.						×	
Archimate can be used as a tool to align business and IT teams for internal use.							×
They start with an initiation phase where IT project architects have to describe how the solution or the projects fit into the IT strategy. The architecture principles also should be added in the project start architecture. In addition, you have to define what is needed to be discussed in the architecture board.							×

Table 38) Full table of solutions for integrating business and IT strategies

9.3 Appendix III: Pre-existing methodology (SEPv1)

DRAFT

Evolution plan for SYSTEM NAME

Student name | Student number | Date

Universiteit Leiden
The Netherlands

This evolution plan was created as an assignment for the course Managing Software Evolution

1

Executive Summary

Summary of evolution plan

- Must fit on a single slide
- Must be understandable to general audience without context
- States current state of the software system, ambition for the future, main steps to achieve that ambition

2

Situation

Brief description of the current state of the system

- Identify the system, describe its main functionality, its main stakeholders
- Describe current state of the system, in terms of its volume, quality, technology
- Describe current strengths and weaknesses of the system

3

Ambition

Description of 1 or 2 strategic goals to achieve in 12-18 months

- The goals should be linked to interests of the system's main **stakeholders**
- Goals should not be strictly technical in nature, but serve a larger **purpose**
- Goals **may** be motivated from SWOT, i.e. use strengths to seize opportunities while mitigating threats and repairing weaknesses

4

Design moves

List of high-level design moves needed to achieve stated ambitions

- A design move has strategic intent (goal) and a measurable definition of success
- Each design move can be broken down into a sequence of actions
- A design move comes with costs and (controllable) risks
- Use multiple slides if needed

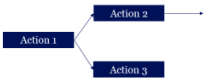
Design move	Goal	Impact	Actions	Costs	Risks

5

Roadmap

Put the actions on a rough timeline

- Indicate dependencies between actions



Months 1-3 | Months 16-18

6

9.4 Appendix IV: New version methodology (SEPv2)

A method for digital strategy planning - Validation by example

Sara Nodehi | Joost Visser | 2 November 2021

Universiteit Leiden
The Netherlands

1

Template

Executive Summary

Summary of evolution plan

- Must fit on a single slide
- Must be understandable to general audience without context
- States current state of the software system, ambition for the future, main steps to achieve that ambition

2

Template

Situation

Brief description of the current state of the system

- Identify the system, describe its main functionality, its main stakeholders. Stakeholders can be identified from the stakeholder analysis table, which is attached in the appendix
- Describe current state of the system, in terms of its volume, quality, technology
- Describe current strengths and weaknesses of the system. SWOT and TOWS analysis tables attached in the appendix can be used to define strengths and weaknesses.

3

Template

Ambition

Description of 1 or 2 strategic goals to achieve in 12-18 months

- The goals should be linked to the interests of the system's main **stakeholders**
- Goals should not be strictly technical in nature, but serve a larger **purpose**
- Goals **may** be motivated from SWOT, TOWS or other tools, i.e. use strengths to seize opportunities while mitigating threats and repairing weaknesses. Mentioned tools can be found in the appendix.

Ambition		
Goal	Stakeholder interest	Motivation
What to achieve in 12-18 months?	Who benefits and how?	Which strength is used to seize which opportunity? Which weakness is remediated to mitigate which threat?

4

Template

Gap analysis

Identify and describe the gaps where you give a short name to the gap and indicate its type. The following categories could be used to define types of gaps:

- Performance (or strategy) gap: Actual versus expected performance.
- Product (or market) gap: Actual versus budgeted sales.
- Profit gap: Actual versus target profit.
- Manpower gap: Actual number and quantified performance of workforce versus that which is required.

Gaps				
Gap	Type of the gap	Current state	Ambition state	Possible solution directions
What is the name of the gap?	What is the area of the gap?	What are you now?	What would you like to be?	What are the possible or alternative ways to solve the gaps?

5

Template

Design moves

List of high-level design moves needed to achieve stated ambitions

- A design move has strategic intent (goal) and a measurable definition of success (criteria of done)
- Each design move can be broken down into a sequence of actions
- A design move comes with costs and (controllable) risks

Design Moves					
Design move	Strategic intent [outcome]	Criteria of done [output]	Actions	Cost	Risks [What could go wrong?]
What is the name of the design move?	What benefit are you trying to achieve? What is the marked effect or influence of this design move?	What is the measure of success?	What changes need to be made to the software? What other actions need to be taken?	What are the costs, in terms of effort, required expertise, prerequisites that need to be fulfilled?	What risks need to be controlled to assure a successful outcome?

6

Template

Benefit generation for stakeholders

Benefits				
Action/ Design move	Responsible stakeholder	Benefiting stakeholder	Immediate benefit	Long term benefit
By which design moves or in which step in the roadmap the benefit gets created?	Which stakeholder is responsible for this benefit generation?	Which stakeholder is benefiting from the benefit generation?	What is the short term goal? What immediate benefit is?	What is the long term benefit?

7

Template

Risk assessment

Risks						
Risk ID	Risk	Related design move	Risk Description	Risk Impact	Risk Likelihood	Risk Level
What is the risk ID?	What is the name of the risk?	During which design move this risk might occur?	What is the description of the risk?	If a risk occurs and is not mitigated, what is the impact of the most likely problem that will occur?	What is the state of being probable or chance of a threat occurring?	What is the level of the risk?

8

Mitigation actions

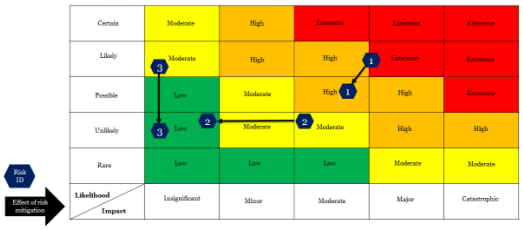
Template

Mitigation actions					
Risk ID	Risk	Mitigation Actions	Revised-Risk Impact	Revised-Risk Likelihood	Revised-Risk Level
Which risk ID?	What is the name of the risk?	What are the actions to reduce or eliminate the risk?	What is the risk impact after risk mitigation?	What is the risk likelihood after risk mitigation?	What is the risk level after risk mitigation?

9

Risk mitigation matrix

Template



10

Roadmap

Template

Put the actions on a rough timeline

- Indicate dependencies between actions
- Indicate accountable actors for actions

Months 1-3 | Months 16-18

11

Monitoring and evaluating the plan

Template

	Project Summary	Indicators	Dependent on
Goal/ Ambition state	What are you trying to achieve? Who are you working on this problem? What is your overall goal?	What are the key measures and targets that reflect the success/impact of the overall goal?	What are the external factors that are essential to the project's success in achieving it?
Outcomes	What is the effect or immediate development outcome at the end of the project?	Which indicators clearly show that the objective of the purpose has been achieved?	Which external factors and conditions are necessary to achieve project objective?
Outputs	What are the specifically delivertable results envisaged to achieve the specific objectives?	What are the indicators to measure whether and to what extent the action achieves the expected results?	What external conditions must be met to obtain the expected results on schedule?
Actions/ Design moves	What are the key actions to be carried out and in what sequence in order to produce the expected results?	What are the means required to implement these activities, e.g. personnel, equipment, supplies, etc.?	What pre-conditions are required before the action starts?

Use checkmarks to show the answer of following questions in the indicators column during the execution:

1) Have you achieved your overall goal and targets?
2) Which outcomes have already been achieved?
3) Which outputs have already been achieved?
4) Which actions have already been executed?

12

Appendices

Universiteit Leiden
The Netherlands

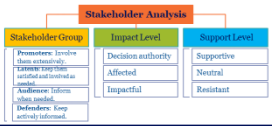
13

Stakeholder analysis

Template

Stakeholder analysis can be conducted in two phases;

- **Phase 1:** In the situation analysis, fill out the first column of the stakeholder's table to define the stakeholders and stakeholder groups. And try to be as complete as possible. Use the following diagram to categorize stakeholders based on stakeholders group, impact level, and support level.
- **Phase 2:** When you build your roadmap and do the benefit generation table, it makes sense to do the second phase of stakeholder analysis, which is to fill out the remaining columns.



14

Stakeholder analysis

Template

Stakeholders				
Stakeholders	Impact Level	Support Level	Reasons	Actions
Who are your stakeholders or stakeholder group?	What are the impacts of stakeholders on a business?	How supportive of the project objectives the stakeholder is?	What are the reasons for resistance or support?	What are the actions to address this stakeholder group?

15

SWOT analysis

Template

Strengths	Weaknesses
• What does the system do well? • What unique capabilities does the system have?	• What could be improved? • What capabilities are lacking?
Opportunities	**Threats**
• How else could the system be used? • What emerging demand could the system satisfy?	• How could the system fail? • What damage could the system do?

16

TOWS analysis

Template

	Weaknesses	Strengths
Threats	**Counter weaknesses and threats:** How can you minimize the system's weaknesses to avoid identified threats?	**Leverage strengths to minimize threats:** How can you use the system's strengths to minimize the identified threats?
Opportunities	**Counter weaknesses through exploiting opportunities:** What actions can you take to minimize the system's weaknesses using the identified opportunities ?	**Leverage strengths to maximize opportunities:** Which of the system's strengths can be used to maximize the identified opportunities ?

17

9.5 Appendix V: Worked-out example (Invest4All)

Evolution plan for Invest4All

Sara Nodehi | Joost Visser | 2 November 2021

Universiteit Leiden
The Netherlands

This evolution plan was created as an synthetic case for testing the evolution planning methodology and supporting materials.

1

Example

Executive Summary

Current state: Invest4All is an investment banking application for mid-income private individuals and families in The Netherlands, allowing lost-cost and low-risk investment into the AEX stock market. Invest4All currently has 4,000 users.

Invest4All is currently available as web application with support from all major browsers. On the server-side the system runs on a group of servers hosted in-house.

Invest4All is currently not profitable.

Opportunity: Low and even negative interest rates on savings accounts has increased interest among private individuals and families in investment banking. This rise in interest occurs in The Netherlands, but also in other European countries. Current (Dutch) users of Invest4All have strong interest in investing not only in the AEX, but in exchanges worldwide.

Ambition: Make Invest4All available to users across the European Union, allowing them to invest in all major European exchanges. Let the number of users grow from 4,000 now, to 100,000 in three years.

Steps: (1) Enable connection to more exchanges, (2) Increase scalability in terms of number of users and number of transaction, (3) Support internationalisation.

2

Example

Situation

Invest4All is an **investment banking application** for mid-income private individuals and families in The Netherlands, allowing lost-cost and low-risk investment in the **AEX stock market** and related funds.

Functionalities: Users can inspect the current status of their investments, make changes to specific investments, adapt their investment strategy, and obtain a multi-year projection of the value of their investments.

Users: Invest4All currently has **4,000 users**. About 65% of these users checks the status of their investments each month. About 10% of these users make a change to their investments or their investment strategy each month.

Software profile: Invest4All is currently available as web application with support from all major browsers. On the server-side the system runs on a group of servers hosted in-house. The client-side is programmed in Angular and the server-side is programmed in C#. The total code base has a rebuild value of **50 person-years**. The quality of the code base is above market average. The development team works according to Agile-Scrum, uses a modern development environment, and has **fully automated** integration, testing, and deployment.

Supervision: The application is regularly **audited**, and audit reports are shared with the Dutch and European national banks and the Dutch financial markets authority (AFM).

Problems: The system has experienced brief moments of **unavailability** as a result of peak loads occurring at the end of each working day.

Investment4All currently **runs at a loss**. Operation and maintenance of Invest4All is currently €65,000 per month. Revenue from subscriptions and transaction fees amounts to €60,000 per month.

3

Example

Ambition

Make Invest4All available to users across the European Union, allowing them to invest in all major European exchanges. Let the number of users grow from 4,000 now, to 100,000 in three years.

Ambition		
Goal	Stakeholder interest	Motivation
What to achieve in 12-18 months?	Who benefits and how?	Which strength is used to seize which opportunity? Which weakness is remediated to mitigate which threat?
Increase user based and associated revenue to achieve at least a 40% profit.	CFO	The current user base is restricted to the Dutch market but can be expanded to other European countries.
Ensure stability, also under high peak loads.	COO	Current in-house deployment is not scalable. High-quality code and development process allow re-deployment on cloud infrastructure.
Increase user satisfaction by widening investment possibilities.	Customers	Current limitation to Dutch exchange can be removed to give users access to broad investment possibilities.

4

Example

Gap analysis

Gaps				
Gap	Type of the gap	Current state	Ambition state	Possible solution directions
What is the name of the gap?	What is the area of the gap?	What are you now?	What would you like to be?	What are the possible or alternative ways to solve the gaps?
Lack of availability	Performance gap	Application is sometimes unavailable during peak load	100% availability, also under peak loads	Make the application scale better
Low number of users	Market gap	4,000 users	100,000 users	Roll out to more countries
Not profitable	Profit gap	€5,000 loss per month	at least €500,000 profit per month	Increase revenue (at least 10-fold) more than costs (at most 3-fold)

5

Example

Design moves

Design Moves					
Design move	Strategic intent outcome	Criteria of done output	Actions	Cost	Risks [What could go wrong?]
What is the name of the design move?	What benefit are you trying to achieve? What is the marked effect or influence of this design move?	What is the measure of success?	What changes need to be made to the software? What other actions need to be taken?	What are the costs, in terms of effort, required expertise, prerequisites that need to be fulfilled?	What risks need to be controlled to assure a successful outcome?
Cloud deployment	Ensure scalability	Automatic scaling under increased load	(1) Migrate server-side code to Azure, (2) Configure auto-scaling, (3) Test and audit	6 person-month initial effort, then cloud operation expense of €2 per user per month	Current dev team has no cloud experience
Extensible architecture	Allow fast connection of new exchanges	New exchange can be added without changing existing code	(1) Isolate AEX-specific code, (2) Create exhange configuration interface, (3) Support AEX through configuration, not code	6 person-months development effort	Errors may be introduced by code changes. Code base becomes more complex.
(Continued)					

6

Example

Design moves

Design Moves					
Design move	Strategic intent outcome	Criteria of done output	Actions	Cost	Risks [What could go wrong?]
What is the name of the design move?	What benefit are you trying to achieve? What is the marked effect or influence of this design move?	What is the measure of success?	What changes need to be made to the software? What other actions need to be taken?	What are the costs, in terms of effort, required expertise, prerequisites that need to be fulfilled?	What risks need to be controlled to assure a successful outcome?
Add exchanges	Add new exchanges for large markets	German, French, Italian, Spanish, Belgian exhanges are connected	(1) Configure each exchange (2) Take into operation	1 person-months configuration effort per exchange	APIs of various exchanges may not work as documented.
Internationalisation	Make the application accesible to non-Dutch users	Users from all EU countries are using the application.	(1) Support multiple languages, (2) Support multiple identification mechanisms	6 person-months development effort	Development team is not proficient in the supported languages

7

Example

Benefit generation for stakeholders

Benefits				
Action/ Design move	Responsible stakeholder	Benefiting stakeholder	Immediate benefit	Long term benefit
By which design moves or in which step in the roadmap the benefit gets created?	Which stakeholder is responsible for this benefit generation?	Which stakeholder is benefiting from the benefit generation?	What is the short term goal? What immediate benefit is?	What is the long term benefit?
Internationalisation	CTO, COO	CFO	None.	Invest4All will become profitable
Cloud deployment	CTO, COO	User	Always available	Always available
Add exchanges	CTO, COO	User	More investment possibilities	Better spread, better yield
...				

8

Example

Risk assessment

Risks

Risk ID	Risk	Related design move	Risk Description	Risk Impact	Risk Likelihood	Risk Level
What is the risk ID?	What is the name of the risk?	During which design move might this risk occur?	What is the description of the risk?	If a risk occurs and is not mitigated, what is the impact of the most likely problem that will occur?	What is the state of being probable or chance of a threat occurring?	What is the level of the risk?
1	Cloud skills	Cloud deployment	The current dev team has no cloud experience	Major	Likely	Extreme
2	New errors (Bugs)	Extensible architecture	Code changes may introduce errors.	Major	Possible	High
3	Code complexity	Extensible architecture	Code base becomes more complex by code changes.	Major	Possible	High
4	Poor API documentation	Add exchanges	APIs of various exchanges may not work as documented.	Major	Likely	Extreme
5	Lack of proficiency in supported languages	Internationalisation	The development team is not proficient in the supported languages	Moderate	Possible	High

9

Example

Mitigation actions

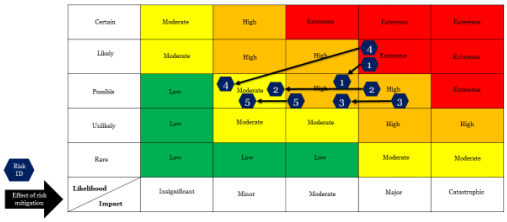
Mitigation actions

Risk ID	Risk	Mitigation Actions	Revised-Risk Impact	Revised-Risk Likelihood	Revised-Risk Level
Which risk ID?	What is the name of the risk?	What are the actions to reduce or eliminate the risk?	What is the risk impact after risk mitigation?	What is the risk likelihood after risk mitigation?	What is the risk level after risk mitigation?
1	Cloud skills	1) Use the support of a third-party certified by the target cloud provider to assess the required needs for pinpointing in-house skills gaps 2) Hire additional personnel to fill the identified gaps	Moderate	Possible	High
2	New errors (Bugs)	High code coverage (Make sure that code coverage is 100% or more)	Minor	Possible	Moderate
3	Code complexity	100% code coverage+ Use error prediction tooling such as Rollbar and CircleCI to identify which code changes caused errors automatically	Moderate	Possible	High
4	Poor API documentation	1) Reduce reliance on the documentation and test API beforehand 2) Use CloudRail and connect up to any cloud service or device while coding.	Minor	Possible	Moderate
5	Lack of proficiency in supported language	Put somebody in charge and get an external service such as TMS (Translation Management System) to check whether you are doing localization right or not.	Minor	Possible	Moderate

10

Example

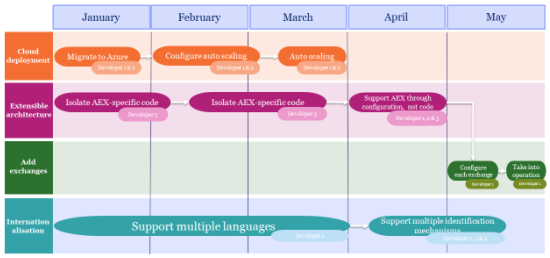
Risk mitigation matrix



11

Example

Mitigation actions



12

Example

Monitoring and evaluating the plan

	Project Summary	Indicators	Dependent on
Goal/ Ambition state	• Move the system from on-premise to cloud computing	• Reducing the hours that the system is unavailable • The system never gets overloaded	• Success in roadmaking • Review the progress • Good leadership • Workplace cooperation
Outcomes	• Ensure scalability • Fast connection of new exchanges	• Increase in customer and employee satisfaction • Time to bring new users • Time to bring new services to market	• Clear agenda • On schedule progress • Good leadership
Outputs	• Automatic scaling under increased load	• Decrease of mean time to repair or mean time between failures (time) • Increase in the speed and reliability of the service	• Clear agenda • Good leadership • Protection of expertise and assets
Actions/ Design moves	• Migrate server-side code to Azure • Configure auto-scaling • Test and audit	• Employ required staff • Approve the organizational cloud readiness • A created cloud roadmap	• Budget availability • Time availability • Employee availability • Infrastructures availability

Use checkmarks to show the answer of following questions in the indicators column during the execution:

1) Have you achieved your overall goal and targets?
2) Which outcomes have already been achieved?
3) Which outputs have already been achieved?
4) Which actions have already been executed?

13

Appendices

Universiteit Leiden
The Netherlands

14

Example

Stakeholder analysis

Stakeholders

Stakeholders	Impact Level	Support Level	Reasons	Actions
Who are your stakeholders or stakeholder group?	What are the impacts of stakeholders on a business?	How supportive of the project objectives the stakeholder is?	What are the reasons for resistance or support?	What are the actions to address this stakeholder group?
Customers (Audiences)	Affected	Supportive	To have access to broad investment possibilities.	Removing the current limitations in Dutch exchange.
Dutch European national bank (Promoter)	Impactful	Supportive	Increase the number of users and expand the market	Make the system available to the other European countries.
Dutch Authority for the Financial Markets (AFM) (Promoter)	Decision authority	Supportive	Increase the number of users and expand the market	Make the system available to the other European countries.
Chief Financial Officer (CFO)(Latent)	Decision authority	Resistant	The CFO wants to increase profitability while reducing costs. Implementing design moves will be costly initially, and therefore, it is hard for the CFO to make this change.	The IT team should work with the CFO to justify why they need to change the current situation of the application and what the result is in the long term.
Chief Operating Officer (COO) (Promoter)	Impactful	Supportive	The COO of the companie brings the right company cultures to the organizations. And help the companies run smoothly.	During the planning phase, the COO should be invited to advise and communicate the changes across the company and identify the required skills and training.
Chief Technical Officer (CTO) (Promoter)	Decision authority	Supportive	These people are aware of potential problems regarding the technology within the organization; they can guide the IT team to undertake necessary actions to implement new changes.	These people should be invited from the beginning to the planning sessions, and their opinions need to be collected.

15

Example

SWOT analysis

Strengths	Weaknesses
• What does the system do well? • What unique capabilities does the system have? • The quality of the code base is above the market average (High-quality code) • Audition of application is being done regularly. • The system uses a modern development environment that provides fully automated integration, testing, and deployment. • The strong interest of both Dutch and non-Dutch users to use the application.	• What could be improved? • What capabilities are lacking? • Unavailability of application as a result of peak loads occurring at the end of each working day. • Current in-house deployment is not scalable • Users only have access to Dutch exchange.
Opportunities	**Threats**
• How else could the system be used? • What emerging demand could the system satisfy? • Interest of Dutch users to invest in exchanges worldwide. • Interest of non-Dutch users to use the application	• How could the system fail? • What damage could the system do? • Investment4All currently runs at a loss • Users might use competitors' systems that provide accessibility to broad investment possibilities.

16

Example

TOWS analysis

	Weaknesses	Strengths
Threats	**Counter weaknesses and threats:** How can you minimize the system's weaknesses to avoid identified threats?	**Leverage strengths to minimize threats:** How can you use the system's strengths to minimize the identified threats?
	The current limitation to Dutch exchange can be removed to give users access to broad investment possibilities and prevent users from going to competitors.	Cloud deployment to ensure stability, also under high peak loads.
Opportunities	**Counter weaknesses through exploiting opportunities:** What actions can you take to minimize the system's weaknesses using the identified opportunities?	**Leverage strengths to maximize opportunities:** Which of the system's strengths can be used to maximize the identified opportunities?
	Make Invest4All available to users across the European Union to increase user-based and associated revenue to achieve at least a 40% profit.	Make Invest4All available to users across the European Union and give users access to broad investment possibilities to increase user satisfaction.

17