

UNIVERSITY OF TWENTE.

**A Qualitative Study into the Theoretical and Practical Side of  
the SWOT-analysis and Scenario Planning:**

An overview of the differences and similarities regarding  
the techniques and outcomes of both methods.

Master Thesis Business Administration

Track: *Entrepreneurship, Innovation and Strategy*

October 30<sup>th</sup>, 2018

Author: K.M. Hofman (s1877240)

Supervisors: Dr. Ir. E. Hofman / Dr. A.G. Sigurðardóttir



## Preface

This research is executed as final project of the master Business Administration at the University of Twente. It has been written in order to fulfill the graduation requirements. I have worked on this research for the past several months, with this document as result.

I would like to thank a few people, because I would not have been able to conduct this research without their cooperation. First, I would like to thank my supervisor Dr. Ir. Erwin Hofman, who gave me the opportunity to write my Master Thesis in his research domain. Also, I would like to thank him for his support during the whole process. Second, I would like to thank my supervisor Dr. Aldis Sigurðardóttir for her feedback during the last few weeks of my Master Thesis. Third, I would like to thank Ir. Remco Siebelink, PDEng, for his feedback, excellent guidance and support that he provided during the entire research process. Fourth, I would like to thank my cousins, roommate and sister for their time, effort, feedback and interesting insights. Last, but not least, I would like my whole family for their unconditional support during my studies the last few years.

Enschede, 30<sup>th</sup> of October, 2018

Kristie Hofman

## Abstract

**Purpose** – The goal of this research is to create an overview of the differences and similarities of the methods SWOT-analysis and scenario planning, from a theoretical as well as practical perspective, hereby is the focus on the techniques and outcomes. This research is of interest, because there is little information available in the literature on the comparison between the methods, while the methods are most commonly used in practice. The main research question is: *“What are the differences and similarities between the SWOT-analysis and scenario planning regarding their techniques and outcomes?”*

**Methodology** – This research has used a qualitative approach. A theoretical framework is written in order to research the existing literature on the SWOT-analysis and scenario planning. An interview protocol is built on the existing literature. Nine interviews are conducted in this research. They have answered questions about their procedure regarding the two methods (from a practical perspective).

**Findings** – The results show three differences (focus, purpose and ‘unexpected opportunities’) and three similarities (features, strategic option development and shared understanding) from a theoretical point of view and two differences (focus and purpose) and three similarities (subjectivity, teamwork and real option approach) from a practical point of view.

**Conclusion/Discussion** – Despite the fact that the methods share four similarities, there are three important differences, namely the focus of the methods (1), purpose of the methods (2), and the opportunity to take advantage of unexpected opportunities (3). From here, three managerial implications are formulated, whereby the managers are encouraged to choose the right method in terms of techniques and outcomes. Limitations and recommendations for future research are stated.

**Keywords** – strategy development, SWOT-analysis, scenario planning, techniques, outcomes, comparison methods

## Table of contents

|  |    |
|--|----|
| 1. Introduction .....                                    | 1  |
| 1.1 Research goal and research questions .....           | 2  |
| 1.2 Research outline .....                               | 3  |
| 2. Methodology .....                                     | 4  |
| 2.1 Desk research .....                                  | 4  |
| 2.2 Interviews .....                                     | 4  |
| 3. Theoretical findings.....                             | 6  |
| 3.1 Method 1: SWOT-analysis.....                         | 6  |
| 3.1.1 Definition SWOT-analysis .....                     | 6  |
| 3.1.2 Technique SWOT-analysis.....                       | 9  |
| 3.1.3 Outcomes SWOT-analysis .....                       | 11 |
| 3.2 Method 2: Scenario planning.....                     | 12 |
| 3.2.1 Definition scenario (planning).....                | 12 |
| 3.2.2 Technique scenario planning .....                  | 15 |
| 3.2.3 Outcomes scenario planning.....                    | 18 |
| 3.3 Comparison SWOT-analysis and scenario planning ..... | 19 |
| 3.3.1 Comparison techniques .....                        | 19 |
| 3.3.2 Comparison outcomes .....                          | 20 |
| 3.3.3 Overview comparisons .....                         | 21 |
| 4. Practical findings.....                               | 22 |
| 4.1 Sample .....   | 22 |
| 4.2 Findings SWOT-analysis .....                         | 22 |
| 4.2.1 Technique SWOT-analysis.....                       | 23 |
| 4.2.2 Outcomes SWOT-analysis .....                       | 24 |
| 4.3 Findings scenario planning.....                      | 25 |
| 4.3.1 Technique scenario planning .....                  | 25 |
| 4.3.2 Outcomes scenario planning.....                    | 26 |

|  |    |
|--|----|
| 4.4 Comparison SWOT-analysis and scenario planning ..... | 28 |
| 4.4.1 Comparison techniques .....                        | 28 |
| 4.4.2 Comparison outcomes .....                          | 28 |
| 4.4.3 Overview comparisons .....                         | 29 |
| 5. Discussion and conclusion .....                       | 30 |
| 5.1 Discussion .....                                     | 30 |
| 5.1.1 Managerial implications .....                      | 32 |
| 5.1.2 Theoretical contributions .....                    | 33 |
| 5.1.3 Limitations .....                                  | 33 |
| 5.1.4 Recommendations for future research .....          | 34 |
| 5.2 Conclusion .....                                     | 35 |
| References .....   | 37 |
| Appendix I Interview protocol SWOT-team .....            | 42 |
| Appendix II Interview protocol Scenario-team .....       | 45 |

## List of figures and tables

### Figures

|  |    |
|--|----|
| Figure 1 Research model.....                               | 3  |
| Figure 2 Visualization theoretical chapter.....            | 6  |
| Figure 3 Visualization SWOT-analysis (own creation) .....  | 8  |
| Figure 4 Difference inductive and deductive scenarios..... | 15 |

### Tables

|  |    |
|--|----|
| Table 1 Data collection methods (* derived from Bryman & Bell, 2011) ..... | 4  |
| Table 2 Steps SWOT-analysis.....   | 10 |
| Table 3 Steps scenario planning.....                                       | 17 |
| Table 4 Overview differences and similarities theoretical .....            | 21 |
| Table 5 Overview interviews .....  | 22 |
| Table 6 Overview differences and similarities practical .....              | 29 |
| Table 7 Complete overview differences and similarities .....               | 32 |

## List of abbreviations

|                  |  |
|------------------|--|
| <b>BA</b>        | Business Administration                          |
| <b>CE</b>        | Chemical Engineering                             |
| <b>CEM</b>       | Civil Engineering Management                     |
| <b>IEM</b>       | Industrial Engineering and Management            |
| <b>STM&amp;I</b> | Strategic Technology Management and Innovation   |
| <b>SWOT</b>      | Strengths, Weaknesses, Opportunities and Threats |

## List of definitions

|                          |  |
|--------------------------|--|
| <b>Outcome</b>           | the way a thing turns out; a consequence (Oxford Dictionary, 2018).  |
| <b>Scenario</b>          | ‘A scenario is a description about possible future worlds that highlight key strategic decision points in the present and direct attention towards how underlying causal structures might evolve.’ (e.g. MacKay & Tambeau, 2013)                   |
| <b>Scenario planning</b> | ‘Scenario planning is a systematic method for thinking creatively about possible complex and uncertain external futures, by understanding the past and the future in the present.’ (e.g. Peterson, Cumming, & Carpenter, 2003)                     |
| <b>SWOT-analysis</b>     | ‘SWOT-analysis is a method for formulating a strategy and long-term planning, by analyzing historical data on the external environment (opportunities and threats) and internal qualities (strengths and weaknesses).’ (e.g. Hay & Castilla, 2006) |
| <b>Technique</b>         | is the way of carrying out a particular task (Oxford Dictionary, 2018).  |

## 1. Introduction

Nowadays, managers/decision-makers (from now on: managers) have to deal with strategic questions about the interests of their firm. Limited time, complex issues, and existing and potential competitors contribute to the complexity of these strategic questions (Bodin, Chermack, & Coons, 2016). Every firm will be at least once confronted with a variety of internal and/or external forces, be it stimulants or limitations (Van Wijngaarden, Scholten, & Van Wijk, 2012). These forces positively or negatively disturb a firm's objectives (Houben, Lenie, & Vanhoof, 1999). To overcome this confrontation, firms should formulate a strategic plan, from which it can distract concrete actions to turn possible limitations into stimulants, and build further on existing stimulants (Van Wijngaarden et al., 2012).

This strategic plan is often referred to as strategy. A strategy is *“an integrated overarching concept of how the business will achieve its objectives”* (Hambrick & Fredrickson, 2005, p.51). A strategy provides a plan for interacting with the environment to achieve organizational goals (Daft, Murphy, & Willmott, 2014). Thus, a strategic plan is the articulation and elaboration of a strategy or vision (Mintzberg, 1994), and should be formulated in order to survive and grow (Burt & Van der Heijden, 2003; Van der Heijden, 1996).

Regarding the process of the formulation of a strategic plan, firms need to consider three stages. The three stages are strategy analysis and formulation (gathering information)(1), strategic choice (exploring alternatives)(2), and strategy implementation (understanding the future implications of present decisions)(3) (Bodin et al., 2016; Houben et al., 1999; Jarzabkowski & Giuliatti, 2007). Scholars recommend to keep moving through the stages and go over and over them again, because a strategy is a never ending concept (Bowman & Hurry, 1993; Daft et al., 2014).

The importance of a strategic plan is described in a nutshell. It can be said that every firm should (re-)consider the three stages in order to survive and grow. Scholars have identified numerous techniques and methods to do this. Research has shown that the SWOT-analysis (SWOT: strengths, weaknesses, opportunities and threats) (32%) and scenario planning (14%) are the most frequently used methods for formulating a (new) strategic plan (Clark, 1997; Jarzabkowski & Giuliatti, 2007).

The methods SWOT-analysis and scenario planning share differences and similarities. For example, a similarity is that both methods are qualitative in nature (Al-Araki, 2013; Popper, 2008). Conversely, the organizational environment, the environment in which firms operate, is a difference between the methods. The SWOT-analysis benefits of a stable environment (Bonn & Rundle-Thiele, 2007; Dent, 1999), whilst scenario planning is profitable in an unstable environment (Amer, Daim, & Jetter, 2013; MacKay & Tambeau, 2013).

Despite the fact that both methods are extensively described in the literature and commonly used, surprisingly little is written about the differences and similarities between the two most frequently used methods. Also, there is not much known about the practical side of the methods, the procedures and experiences of the practitioners with the methods. Since there is little written about the differences and similarities, it is of interest to conduct a research with as aim to create an overview of the differences and similarities between the two methods from two perspectives, theoretical and practical. The scope is narrowed to the techniques and outcomes of both methods. With the overview, the contribution is two-fold. First, the overview is filling the gap in the literature on the differences and similarities between the two methods. Second, managers could take advantage with this overview to choose the right method in terms of strategy development. It could be that one methods is in favor of the other method under certain circumstances.

### 1.1 Research goal and research questions

The purpose of this research is to gain more insights into the techniques and outcomes of the SWOT-analysis and scenario planning, and ultimately providing an overview. Therefore, the following main research question is formulated: *“What are the differences and similarities between the SWOT-analysis and scenario planning regarding their techniques and outcomes?”*

Four sub-questions are formulated in order to respond to the main research question: two from a theoretical point of view and two from a practical point of view. On the one hand, the questions from a theoretical point of view are descriptive. It provides information on the differences and similarities between the two methods and it contributes to the main research question by an extensive description of the available literature on the techniques and outcomes of both methods.

1. What are the differences between the SWOT-analysis and scenario planning regarding their techniques and outcomes? (theoretical)
2. What are the similarities between the SWOT-analysis and scenario planning regarding their techniques and outcomes? (theoretical)

On the other hand, the questions from a practical point of view are rather explorative, as there is not much known about the differences and similarities between the two methods in the literature. The questions contribute to the main research question by giving the differences and similarities regarding the techniques and outcomes, based on interviews. The interviews are conducted after both methods are applied by the subjects. Overall aiming at a better understanding.

3. How do subjects evaluate the differences between the SWOT-analysis and scenario planning in context of the techniques and outcomes? (practical)

4. How do subjects evaluate the similarities between the SWOT-analysis and scenario planning in context of the techniques and outcomes? (practical)

## 1.2 Research outline

This research proceeds as follows. The second chapter describes the methodology of this research. The third chapter provides the theoretical framework on the definitions, techniques and outcomes of both methods. The fourth chapter describes the results of the interviews, and elaborates on the procedure of the respondents with the SWOT-analysis and scenario planning. The fifth chapter combines the results from previous chapters to create a complete overview of the differences and similarities. The sixth and last chapter provides the discussion of this research. Here, the conclusion, theoretical contribution and managerial implications are given, as well as the limitations and recommendations for future research.

Figure 1 shows the model of this research. The black boxes in the figure mirror the chapters of this research, even as the numbers in the boxes. Important to notice is that chapter two is the methodology of this research, which is not included in the figure.

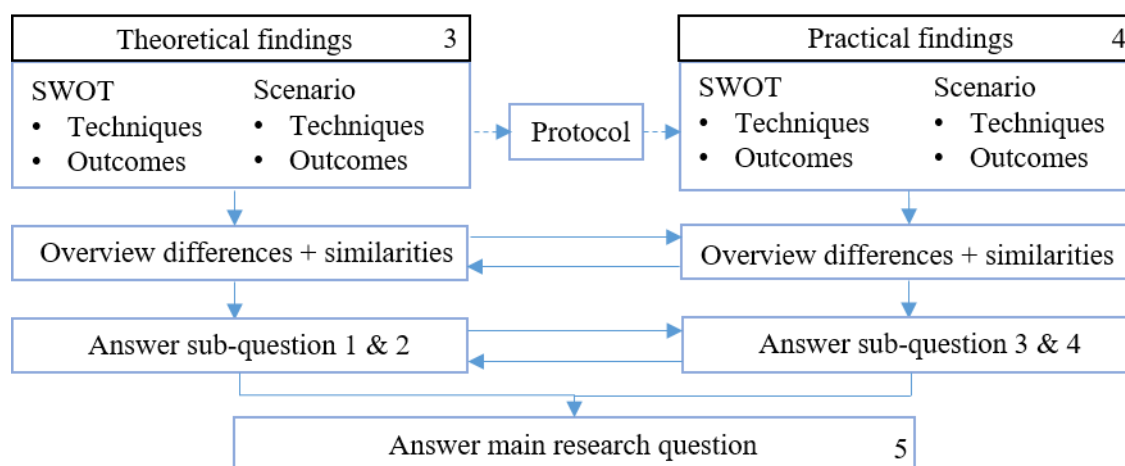


Figure 1 Research model

## 2. Methodology

This chapter defines the methodology of this research. Table 1 shows the first four sub-questions, sorted by focus, with the corresponding method, strategy and data collection.

*Table 1 Data collection methods (\* derived from Bryman & Bell, 2011)*

| Focus       | Core sub-question   | Method*     | Strategy*     | Data collection* |
|-------------|---|-------------|---------------|------------------|
| Theoretical | 1. Similarities between methods<br>2. Differences between methods | Descriptive | Desk research | Literature       |
| Practical   | 3. Similarities between methods<br>4. Differences between methods | Exploratory | Case study    | Interviews       |

### 2.1 Desk research

Desk research is the strategy that is applied to answer the first and second sub-question. The purpose of this strategy is to write a theoretical chapter in order to get more insights in the existing theories of the SWOT-analysis and scenario planning. To ensure high quality literature, the databases of Google Scholar, Scopus and Web of Science have been used for finding articles and books. Also, journals as ‘Technological Forecasting and Social Change’ and ‘Journal of Management’ are used to gain more insights into the specific topics. Search words as ‘SWOT-analysis’ and ‘scenario planning’ have been used to assure articles within the scope of this research. The term SWOT-analysis is also written down as ‘strengths, weaknesses, opportunities, threats’. Scenario planning is also replaced by the terms ‘scenarios’, and ‘scenario analysis’. Furthermore, the so-called snowball-effect is applied in order to reach for more relevant articles. The literature is criticized by the researcher in order to verify the quality of the articles/books. As the methods are discussed for years, literature from the eighties is also included.

### 2.2 Interviews

#### **Data collection**

The third and fourth sub-question are rather explorative, because there is not much known about the practical side of the two methods. An explorative study creates a better understanding and more feasibility to the topic (Babbie, 2007). This research has tried to aim for a better understanding of the methods by asking subjects about their procedure, while applying the methods SWOT-analysis and scenario planning. A qualitative research is chosen, because it rather emphasizes words than quantifications in the collection and data analysis (Bryman & Bell, 2011). Therefore, semi-structured interviews are designated as the collection method. In general, semi-structured interviews make use of an overall form of an interview protocol, with topics and general questions (Bryman & Bell, 2011). This type of interview gives the researcher the flexibility to go into more detail if deemed necessary or interesting, but also to deviate from the interview protocol to some extent (Baarda, 2009).

The interview protocol was mainly formulated based on the theoretical chapter. The protocol had three general topics. The first topic was the background of the interviewees, combined with their experiences on the application. The second topic was the method or were the methods that the subjects had worked with. The third topic were the outcomes of the method(s), as applied by the subjects.

A pre-test has been conducted to see whether questions should be changed or deleted from the protocol. A pre-test should never be skipped, because it provides valuable insights and feedback on the chosen method (Babbie, 2007). The pre-test of this research showed that small adjustments had to be made in order to develop the best working protocol. Appendices I and II show the final interview protocols, which have served as guidelines during the interviews. To have all information given during the interviews, the interviewees have been asked if they agreed on recording.

### **Sampling frame and method**

The sample frame for the interviews consisted of 68 students of the master course Strategic Technology Management and Innovation (STM&I) of the University of Twente. The students were part of an experiment, focused on the practical side of the SWOT-analysis and scenario planning. The interviewees have answered questions about the experiment, based on their procedure with one or two methods. A probability sample was taken, to ensure that every student had the same chance to be invited for an interview. Per group of four students, one student is asked to join the interviews. In total, nine students were part of the interviews.

### **Data analysis**

Qualitative data analysis is the process whereby the qualitative data moves to some form of explanation, understanding or interpretation of the people (who we investigate) (Taylor & Gibbs, 2018). In order to analyze the results from the interviews, coding is used. Coding *“entails reviewing transcripts and/or field notes and giving labels (names) to component parts that seem to be of potential theoretical significance”* (Bryman & Bell, 2011, p.578). With this process, the data is grouped together in order to look for relationships in the end. First, a transcript of every interview was made, all interviewees agreed on recording the interviews. So, the transcription is made by writing down the information as ongoing story, which means that only the information of the interviewees is taken into consideration and not the questions and sayings of the researcher. Second, axial codes were selected. Axial coding can be seen as the process for grouping together the data. It creates categories by looking at codes which belong together and how they can be arranged (Bryman & Bell, 2011; Verhoeven, 2014). The categories are similar to the questions from the interview protocols. Third, the method of selective coding is used. This step has included structuring the data, which means that all fragments of all interviewees with the same axial code are put together. From this, relationships between the codes are made.

### 3. Theoretical findings

This chapter provides the results from desk research. The methods SWOT-analysis and scenario planning are described regarding their definition, techniques and outcomes. Figure 2 provides a visualization on how this chapter is divided into three different paragraphs.

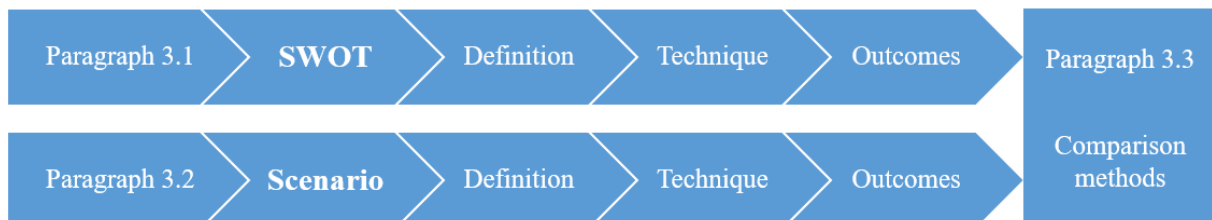


Figure 2 Visualization theoretical chapter

#### 3.1 Method 1: SWOT-analysis

This paragraph elaborates on the definition, techniques and outcomes of the SWOT-analysis.

##### 3.1.1 Definition SWOT-analysis

The SWOT-analysis has become an important method in the field of strategic analysis. It is one of the most frequently used qualitative methods in strategic analysis (Al-Araki, 2013; Jarzabkowski & Giullietti, 2007). The SWOT-analysis is an useful method *“for addressing the complex strategic situations by reducing the quantity of information to improve decision-making”* (Helms & Nixon, 2010, p.216). The history of this method goes back to the sixties (Dyson, 2004; Ghazinoory, Esmail Zadeh, & Memariani, 2007). The Harvard Business School and other American business schools were the pioneers in this field, especially Keith Andrews has been of great influence (Hill & Westbrook, 1997).

The SWOT-analysis deals with the internal strengths and weaknesses, and external opportunities and threats. Agreement is found on the working of the SWOT-analysis. The SWOT-analysis is concerned with the analysis of the strengths and weaknesses of a firm and the opportunities and threats in a stable external environment (Bonn & Rundle-Thiele, 2007; Dent, 1999; Dyson, 2004; Hay & Castilla, 2006; Hill & Westbrook, 1997; Houben et al., 1999; Panagiotou, 2003). The recognition of these factors results in a simple framework (Dyson, Bryant, Morecroft, & O’Brien, 2007), or often referred to as two-by-two matrix (Chermack & Kasshanna, 2007) (see figure 3).

The distinction of the internal qualities and external environment should be clear. On the one hand, the internal valuation is based on a broad variety of aspects of the firm, for example, personnel, facilities, products and services, and location (Dyson, 2004). Another distinction could be image, structure, capacity and efficiency, and financial resources (Helms & Nixon, 2010).

On the other hand, the external valuation scans the political, economic, social, technological and competitive environment, in order to identify possible opportunities and threats (Dyson, 2004). Helms and Nixon (2010) expand these scans to also include, for example, customers, trends in the market, and economic, political and regulatory issues.

The SWOT-analysis works best in a stable environment. A stable environment is characterized by slow decision-making and a comprehensive decision-making process (Bonn & Rundle-Thiele, 2007), because managers in this environment have time to achieve well-defined goals in the most effective and efficient way (Peterson, Cumming, & Carpenter, 2003). The information for this process is available, which means that there is less pressure on the collection of the data, plus the data is reliable (Khatri & Ng, 2000).

With the SWOT-analysis, the contribution of the managers is two-fold. On the one hand, managers are capable of bringing forth a good strategy. Here, the SWOT-analysis can be seen as underlying tool that tries to formalize the strategy making process (Helms & Nixon, 2010; Hill & Westbrook, 1997; Houben et al., 1999; Pickton & Wright, 1998). Additionally, to connect internal and external factors, new strategies can be developed (Dyson, 2004). The main benefit of the combination of the internal and external factors is that managers are able to formulate appropriate objectives for their firms (Zarkos, Morgan, & Kouropalatis, 2007). On the other hand, managers are able to create a long-range or strategic planning in order to enhance the planning process (Helms & Nixon, 2010; Houben et al. 1999; Panagiotou, 2003). So, the SWOT-analysis can be seen as an essential starting point for any strategic planning process (Helms & Nixon, 2010; Houben et al, 1999).

Information is key to perform the SWOT-analysis. According to Houben et al. (1999), firms should focus on historical data. This data is available within the firms, as a result, it does not require much time to track down this information (Khatri & Ng, 2000). The data provides insights on the strategy that is previously implemented, as well as the successes the firm has achieved in the past. Here, it is important that firms focus on the reasons behind the successes. However, firms should be aware that there is no guarantee for new successes (Makridakis & Gaba, 1998). The information should be extended with a description of the current situation. Firms must go beyond the extrapolation of the past, because *“the model that best fits historical data is not necessarily the most accurate one”* (Makridakis & Gaba, 1998, p.7). So, in addition to historical data, new data is also required.

The SWOT-analysis offers five practical advantages. First, the analysis is relatively simple and practical in use (Pickton & Wright, 1998). Second, the analysis allows managers to evaluate risks with only little qualitative information (Paja, Maté, Woo, & Mylopoulos, 2016) and allows managers to focus only on the key issues, which affect business development and growth (Pickton & Wright, 1998). Third, the SWOT-analysis is a helpful technique to see if and why the firm's strategy is working (Chermack & Kasshanna, 2007). Fourth, the SWOT-analysis creates a list which includes which strength should be used, which weakness should be eliminated, which opportunity should be exploited and which threat should be defended (Barney, 1995; Dyson, 2004; Hay & Castilla, 2006).

Fifth advantage of the SWOT-analysis is improved team spirit. Teamwork is relatively important while creating the SWOT-analysis. Hill and Westbrook (1997) mention that the outcomes of the SWOT-analysis should be gained from a meeting or meetings with managers. This meeting may be facilitated by a consultant. Or, as Dyson et al. (2007) suggest, preferably within a structured group process. Also, teamwork is important, because it promotes the creative thinking and expands the vision of managers (Balamuralikrishna & Dugger, 1995; Chermack & Kasshanna, 2007; Panagiotou, 2003).

Conversely, the SWOT-analysis itself also has two weaknesses. Firstly, Helms and Nixon (2010) argue that the biggest weakness is that the analysis faces the internal and external factors, but it gives poor results and should therefore not be used in isolation. The SWOT-analysis should be extended with, for example McKinsey's 7-structure or Porters 5-forces (Chermack & Kasshanna, 2007; Helms & Nixon, 2010), or with the real option approach (Zarkos et al., 2007).

Secondly, the distinction of the four quadrants of the SWOT-analysis is imprecise. Grant (in Van Wijngaarden et al., 2012) argues that strengths, weaknesses, opportunities and threats, in general, are impossible to typify, because all aspects of the SWOT-analysis are classically based on a manager's point of view. Also, Holweg and Van Donk (in Helms & Nixon, 2010) argue that the criteria to designate a factor to one of the four quadrants is not clarified. A factor can be identified as strength, but someone else can argue this as a weakness, or vice versa. As a consequence, the SWOT-analysis becomes relatively subjective. Therefore, Grant (in Van Wijngaarden et al., 2012) supports a confrontation of only external and internal factors, without making the further distinction.

To summarize, the SWOT-analysis is a widely known method for analyzing internal qualities and external environment, which is mostly based on historical data. The analysis is often chosen because of its simplicity. Managers are able to formulate a strategy and create a strategic planning with this method. The definition of the SWOT-analysis for this research is as follows:

*'SWOT-analysis is a method for formulating a strategy and long-term planning, by analyzing historical data on the external environment (opportunities and threats) and internal qualities (strengths and weaknesses).'*

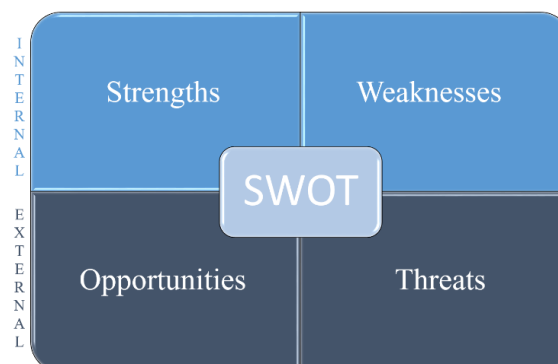


Figure 3 Visualization SWOT-analysis (own creation)

### 3.1.2 Technique SWOT-analysis

This paragraph starts with the description of the existing techniques of the SWOT-analysis, followed by a suggestion for a generic technique.

#### **Existing techniques**

Table 2 shows three different techniques of the SWOT-analysis. This paragraph gives a comparison of the techniques on the process as well as the features. To start with this latter aspect. The number of steps differs ranging from four to eight (Chermack & Kasshanna, 2007; Kramer, 2001; Sevkli et al., 2012; Van Wijngaarden et al., 2012). Nevertheless, it can be said that the steps of Kramer (2001), Van Wijngaarden et al. (2012), and Sevkli et al. (2012) are similar. Though, Sevkli et al. (2012) consider the strengths, weaknesses, opportunities and threats as single items, whereas Kramer (2001) and Van Wijngaarden et al. (2012) group the items together.

To continue with the process of the techniques. There are three major differences. First, before the analysis of the internal and external factors, Chermack and Kasshanna (2007) argue that the scope of the exercise should be defined, followed by an explanation to all participants. The other two techniques do not include these two steps. Also, the technique of Chermack and Kasshanna (2007) is the only one which describes the group process. The other two techniques do not mention this. Earlier in this research, teamwork is already explained as important, because it promotes creative thinking, and it expands the vision of the managers.

Second, there is more evidence that the process of the SWOT-analysis is not uniform. Sevkli et al. (2012) argue that the match of, for example, internal strengths with external opportunities results in a 'SO strategy'. The technique suggests four confrontations. The techniques of Kramer (2001) and Van Wijngaarden et al. (2012) also confront the factors with each other, but this does not automatically create a strategy. The creation of a strategy is the last step of their techniques. Chermack and Kasshanna (2007) do not explicitly mention the confrontation of the items, but only discuss the dialogue as confrontation.

Third, another factor of discordance is the end-state of the techniques. Sevkli et al. (2012) argue that their four strategies give enough insights on how to proceed. Alternatively, Chermack and Kasshanna (2007), Kramer (2001) and Van Wijngaarden et al. (2012) argue that the results of the SWOT-analysis should be used in order to formulate strategic/specific options. In their opinion, the confrontation of the factors is not sufficient for strategy development.

To summarize, the three techniques show several steps and activities, but there is not one technique that is the best. It is recommended to use a combination of the three techniques in order to create the best SWOT-framework. The following section gives the generic SWOT-technique, which should be taken into consideration by managers.

Table 2 Steps SWOT-analysis

| Chermack & Kasshanna (2007) (p.388)   | Kramer (2001) (p.244) & Van Wijngaarden et al. (2012) (p.39)  | Sevkli et al. (2012) (p.15)   |
|---|---|---|
| <ol style="list-style-type: none"> <li>1. Define the objective of the SWOT-analysis;</li> <li>2. Provide an explanation of SWOT-analysis procedures to participants;</li> <li>3. Ask individuals to consider their organization and list its strengths, weaknesses, opportunities and threats on a two-by-two matrix worksheet;</li> <li>4. Combine the individual worksheets into a single worksheet;</li> <li>5. Engage the group in dialogue and debate about the classification of each item;</li> <li>6. Develop specific actions moving forward.</li> </ol> | <ol style="list-style-type: none"> <li>1. Formulate external developments as opportunities or threats;</li> <li>2. Formulate internal means and capabilities as strengths or weaknesses;</li> <li>3. Confront strengths and weaknesses with opportunities and threats;</li> <li>4. Use the results to formulate strategic options.</li> </ol> | <ol style="list-style-type: none"> <li>1. List the firm's key external opportunities;</li> <li>2. List the firm's key external threats;</li> <li>3. List the firm's key internal strengths;</li> <li>4. List the firm's key internal weaknesses;</li> <li>5. Match internal strengths with external opportunities and record the resultant SO strategies;</li> <li>6. Match internal weaknesses with external opportunities and record the resultant WO strategies;</li> <li>7. Match internal strengths with external threats and record the resultant ST strategies;</li> <li>8. Match internal weaknesses with external threats and record the resultant WT strategies.</li> </ol> |

### Generic SWOT-technique

1. Define the objective of the SWOT-analysis;
2. Provide an explanation of the SWOT-analysis procedures to participants;
3. Formulate external developments (opportunities and threats) as a team;
4. Formulate internal factors (strengths and weaknesses) as a team;
5. Create a 2\*2 framework with the factors of step 3 and 4;
6. Confront the factors with each other as a team;
7. Use the results of step 6 to develop specific actions moving forward.

The above mentioned technique is a proposal for the generic SWOT-technique. This technique is a combination of the techniques identified by scholars as Chermack and Kasshanna (2007), Kramer (2001), Sevkli et al. (2012), and Van Wijngaarden et al. (2012). The managers, who are working with the methods, should make a start with defining the objectives and the scope of the SWOT-analysis (step 1). The result of this step is at the same time the announcement to the participants of the SWOT-workshop (step 2). It also includes the data for follow-up meetings and the deviation of the participants into different groups. This should be done beforehand, because the follow-up steps should be done in teams. The teams need to come up with first the external factors, the opportunities and threats (step 3), followed by the internal factors, strengths and weaknesses (step 4). The amount of items per factor should be equal to five, because this amount is manageable (Kramer, 2001). Eventually, the factors should be grouped together in a SWOT-framework (step 5). This is a visualization of individual items. There will be twenty items as maximum. The twenty factors should be confronted with each other. This could be done with the symbols plus and minus. For example, if the two factors are positively influencing each other, it should get a plus or plus-plus. It is important to have a debate on this with all members of the team from the organizational point of view (step 6). In the end, team members are able to analyze all the factors based on the symbols. Firms should work with their plus-plus and plus and should take care of the minus and especially the minus-minus. However, negative results are by definition not failures, and positive items do not directly facilitate a better organizational performance (Kramer, 2001). The results of this analysis guide the managers to develop specific actions towards the future (step 7).

### 3.1.3 Outcomes SWOT-analysis

The outcomes contribute to the achievement of two intended goals of the SWOT-analysis. First, the long-term goal is to have a solid framework for strategic purposes, be it planning or formation (Ghazinoory et al., 2007; Houben et al., 1999). When the SWOT-analysis is applied in an effective way, the outcome of the analysis is a solid framework (Balamuralikrishna & Dugger, 1995; Hill & Westbrook, 1997; Houben et al., 1999), with which managers are able to *“build on the strengths, eliminate the weaknesses, exploit the opportunities or counter the threats”* (Dyson, 2004, p.632). Moreover, the framework creates an understanding of external factors coupled with internal factors (Kahraman, Demirel, & Demirel, 2007; Kurttila, Pesonen, Kangas, & Kajanus, 2000), or in other words: *“the investigation of the internal environment will accordingly result in an overview of all weaknesses and strengths of the company, while the investigation of the external environment will result in an overview of all opportunities and threats”* (Houben et al., 1999, p.126).

However, it can be argued that the framework is not sufficient. Although, it provides a checklist of internal and external factors, including which strength should be used, which weakness should be eliminated, which opportunity should be exploited and which treat should be defended (Barney, 1995; Dyson, 2004; Hay & Castilla, 2006), it lacks directions towards the future (Zarkos et al., 2007).

Therefore, it is suggested to combine the outcomes of the SWOT-analysis with the real option approach (Chermack & Kasshanna, 2007; Dyson et al., 2007; Lu, 2010; Van Wijngaarden et al., 2012). Eventually, the contribution of the real option approach is two-fold. On the one hand, real options produce more flexible strategic plans, whereby firms are capable of utilizing its strengths and by confronting its weaknesses (Zarkos et al., 2007). On the other hand, the development of real options lead to the identification of a feasible strategy (Franco, Meadows, & Armstrong, 2013).

Second, the goal of the SWOT-analysis is to create a better understanding of the firm and its factors affecting the performance. The SWOT-analysis is part of the dynamics of the management process (Balamuralikrishna & Dugger, 1995; Pickton & Wright, 1998). As a result, the creation of the framework facilitates opportunities for management development. Also, the aim of the SWOT-analysis is to create a better understanding among stakeholders. The understanding of both, firm and stakeholders, eventually leads to a better performance of the firm (Van Wijngaarden et al., 2012).

To summarize, the outcomes of the SWOT-analysis contribute to the achievement of two goals. First, the solid framework (the outcomes of the confrontation of internal and external factors) for strategic planning/formation, which eventually leads to the real option approach, in order to formulate actions towards the future. Second, the better understanding of the firm and its factors, but also the shared understanding among managers will lead to a higher performance.

### 3.2 Method 2: Scenario planning

This paragraph elaborates on the definition, techniques and outcomes of scenario planning.

#### 3.2.1 Definition scenario (planning)

This sub-paragraph starts with a description of a scenario before diving into the theory of scenario planning.

##### **Definition scenario**

The current situation of doing business is concerned with high uncertainty due to changes in the field of, for example, technology, legislation, environment et cetera. For managers, it is best to be aware of these developments, in order to anticipate and act promptly when necessary (Masini & Vasquez, 2000). For this, information is key as it will lead to understanding. Development of scenarios can be useful in order to get a better understanding of this context (Van der Heijden, 2000). Van der Heijden (1996) defines scenarios as *“a set of reasonably plausible, but structurally different futures”* (p.29). Furthermore, Burt, Wright, Bradfield, Cairns, and Van der Heijden (2006) argue that a scenario is not a predication, or a description of good and bad futures, but rather *“a description of a future end state in a horizon year”*, *“an interpretation of current events and their propagation into the future”*, and *“an internally consistent account of how a future world unfolds”* (p.61).

In addition, MacKay and Tambeau (2013) argue that scenarios are “*alternative views about possible future worlds that highlight key strategic decision points in the present and direct attention towards how underlying causal structures might evolve*” (p.674). Likewise, Wilson (2000) describes a scenario as “*a management tool to improve the quality of executive decision making*” and “*a learning tool to explore general areas of risks and opportunities*” (p.24). Thus, a scenario is often referred to as a description of possible alternative futures, with as aim to improve the quality of decision making.

However, the emphasis of scenarios should not be on the development of the scenarios. Scholars agree that scenario planning affects the strategic decision making process (Postma & Liebl, 2005; Wilson, 2000), because it provides managers more understandable, feasible and internally consistent scenarios (Postma & Liebl, 2005). However, this effect has thus far not been included in any definition. Therefore, the following definition is formulated for this research.

*‘A scenario is a description about possible future worlds that highlight key strategic decision points in the present and direct attention towards how underlying causal structures might evolve.’*

### **Definition Scenario Planning**

Scenario planning is a commonly used method in strategic formation. The origin of scenario planning goes back to the seventies, where Royal Dutch/Shell was a pioneer in this field (Schoemaker, 1995; Van der Heijden, 1996). Even back then, the urge of strategic planning was recognized. Scenario planning is a process that combines the descriptions of plausible futures with the practical means of adapting to these possible futures today (Docherty & McKiernan, 2008). In addition, the contribution of this process is to enable firms to think about complexity and uncertainty in external and unstable context.

The unstable environment is important for scenario planning. Scenario planning is ultimately suitable for the dynamic and complex environment (Amer et al., 2013; MacKay & Tambeau, 2013). The unstable environment is characterized by fast decision-making and a simplified decision-making process (Bonn & Rundle-Thiele, 2007). The information that is needed in this context is to some extent unreliable and limited in quantity. Therefore, managers should make use of intuition, which is key in developing an understanding of the situation (Khatri & Ng, 2000).

So, the importance of the complex and uncertain future is clarified. Peterson et al. (2003) also argue this phenomenon, but include creativity in their definition. Scenario planning is “*a systematic method for thinking creatively about possible complex and uncertain futures*” (Peterson et al., 2003, p.359). Also, Bodwell and Chermack (2010) argue that scenario planning has to deal with creativity. Their definition of scenario planning is as follows: “*scenario planning involves intuition, creativity, the ability to wonder about the environment and its possibilities, as well as a deep understanding of industry trends, competitor actions and global forces that drive economic, social, and political systems*” (p.198). Apparently, creativity is an important factor for scenario planning.

Furthermore, scenarios can be divided into four categories. Davis (2002) argues four ways in which scenarios can be build; inductive, deductive, incremental and normative. Although, in general, scholars only discuss the inductive and deductive approach, because the other two are more for firms who are not familiar with strategic planning in general (Van der Heijden, 1996) (see figure 4). The inductive approach does not have an overall framework, but the story lines grow from the step-by-step data (Van der Heijden, 1996). Contrarily, the deductive approach includes a framework. Here, the information is inserted into four different quadrants, resulting in four different scenarios (Bowman, MacKay, Masrani, & McKiernan, 2013).

The contribution of scenario planning is two-fold. On the one hand, projects and decisions are more robust under a variety of alternative futures when working with scenario planning (O'Brien, 2004). So, the robustness of the alternatives appear to increase by the development of an understanding of the uncertainties. Thus, managers are better at making decisions regarding the strategy formation (Postma & Liebl, 2005). While, on the other hand, scenario planning provides a better thinking about the future by an enhanced understanding of the possible futures (Van der Heijden, 1996; Wright, Bradfield, & Cairns, 2013). Especially when managers have to deal with the medium and long-term future (Rickards, Wiseman, Edwards, & Biggs, 2014).

Scenario planning has two advantages. Firstly, scenario planning gives firms the ability to learn faster than the competitors (Burt & Van der Heijden, 2003). Royal Dutch/Shell is a good example. The firm was able to adapt quickly to changes in the external environment. With as result, the firm took advantage of its competitors (O'Brien, 2004; Peterson et al., 2003). Secondly, scenario planning offers managers more than one possible scenario. In most cases, three to five alternatives will be developed (O'Brien, 2004; Richards et al., 2014; Schnaars, 1987). *"A greater number tends to be confusing (and unworkable), and less than two (one) is a point-estimate forecast"* (Schnaars, 1987, p.112).

Scenario planning has two major weaknesses. First, the focus of scenario planning is imprecise. A majority of scholars argue for the focus on the external environment when creating scenarios (Derbyshire & Wright, 2017; Dyson, 2004; Postma & Liebl, 2005; Schoemaker, 1995). However, Fink and Schlake (2000) argue for an internal as well as an external focus. Where firms are able to only influence the internal scenarios. Both focusses are useful, but the choice for the focus is depending on the requirements of the firm. Nonetheless, scenarios are about the uncertain and unpredictable future (Peterson et al., 2003; Serrat, 2017), so, the scenarios are more associated with the external environment. Second, there is a possibility that the created scenarios turn out as useless. If the scenarios lack logical consistency, the scenarios are nothing more than some speculations (Miller & Waller, 2003).

To summarize, scenario planning is a method which requires creativity and works with the unstable and uncertain external environment. With scenario planning, managers are able to make robust decisions towards the future and able to create a better understanding of the future. Both aspects contribute to the strategy formation. The definition of scenario planning is the following:

*‘Scenario planning is a systematic method for **thinking** creatively about possible complex and uncertain external futures, by understanding the past and the future in the present.’*

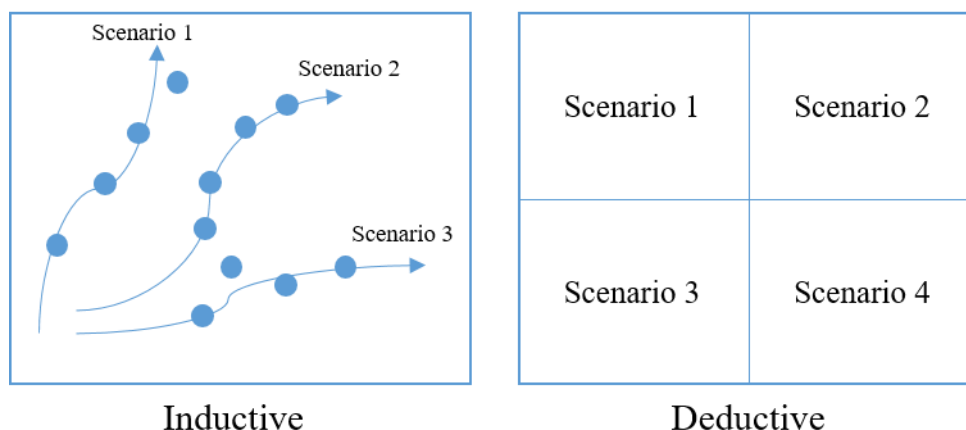


Figure 4 Difference inductive and deductive scenarios

### 3.2.2 Technique scenario planning

This paragraph starts with the description of the existing techniques of scenario planning, followed by a suggestion for a generic technique.

#### Existing techniques

Table 3 shows five different techniques of scenario planning. This paragraph gives the comparison between the techniques on the process as well as the features. To start with this latter aspect. The number of steps differs ranging from eight to ten steps (Godet, 2000; Postma & Liebl, 2005; Schoemaker, 1995; Tapinos, 2012; Wright et al., 2013). However, the technique of Tapinos (2012) is divided into two parts. The first six steps belong to scenario development and the last two steps to strategy development.

Four similarities can be found in the development of multiple scenarios. First, there should always be more than one scenario, commonly between three and five (O'Brien, 2004; Rickards et al., 2014; Schnaars, 1987). Second, all five techniques use deductive scenarios. For example, Schoemaker (1995) calls them scenario themes, which is relatable to the deductive approach, while Wright et al. (2013) describe them as cluster outcomes. Third, Godet (2000) mentions the internal variables in step three. Earlier in this research, it is agreed that scenario planning is based on external changes and opportunities (Derbyshire & Wright, 2017; Dyson, 2004; Postma & Liebl, 2005; Schoemaker, 1995). So, this technique does not seem very useful. Fourth, the importance of teamwork is also a common factor. O'Brien (2004) discusses that a certain level of participation is recommended for the development of the scenarios. Otherwise, personal life experiences can put constraints on the scenario process. Therefore, at least two persons should be involved in the process. Moreover, active participation in the scenario process enhances learning and application (Wright et al., 2013).

However, only the technique of Wright et al. (2013) mention explicitly teamwork. The other four techniques describe this group process in their research papers.

Five differences are found in the different steps of each technique. Overall, all techniques start with defining the scope. Second, the techniques continue with the determination of the key forces in the external environment. Later on, only the techniques of Postma and Liebl (2005), Tapinos (2012) and Wright et al. (2013) discuss the rank of importance for these forces. It seems rather important, because firms are normally only interested in the two/three most important ones, which will have the highest impact (Wright et al., 2013). Third, it seems that scenario planning continues with the development of scenario themes. The techniques are all quite similar on this topic. Fourth, the scenarios will be checked for (internal) consistency in the techniques of Schoemaker (1995) and Tapinos (2012). Other techniques do not mention this. Fifth, the techniques are infrequent when it comes to the end goal of the technique. The techniques of Godet (2000), Postma and Liebl (2005) and Tapinos (2012) explicitly mention strategic options as outcome. Firms could write a plan of action, in combination with the options, based on the scenarios (Tapinos, 2012). Nevertheless, Schoemaker (1995) only mentions that firms should evolve toward the scenarios, but he does not provide a plan on how firms should work on that. Similarly, the technique of Wright et al. (2013) stops after the development of the scenarios and does not elaborate on further activities.

To summarize, the five techniques show several steps and activities, but there is not one technique that is the best. It is recommended to use a combination of the five techniques in order to write the best working description of the future. The following section (after the table) gives the generic scenario planning technique, which should be taken into consideration by managers.

*Table 3 Steps scenario planning*

| Schoemaker (1995)<br>(p.28-30)             | Godet (2000)<br>(p.10)                              | Postma and Liebl (2005)<br>(p.164)                | Tapinos (2012)<br>(p.340)                    | Wright, Bradfield and Cairns (2013) (p.5) |
|--|---|---|--|---|
| 1. Define the scope;                       | 1. The problem formulated;                          | 1. Identify focal issue or                        | 1. Define the scope of the                   | 1. Setting the agenda;                    |
| 2. Identify the major stakeholders;        | 2. Diagnoses of firm;                               | decision;   | exercise;                                    | 2. Determining the driving forces;        |
| 3. Identify basic trends;                  | 3. Key variables internal-external;                 | 2. Key forces in the local environment;           | 2. Identify factors of external uncertainty; | 3. Clustering the driving forces;         |
| 4. Identify key uncertainties;             | 4. Dynamics of firm in relation to its environment; | 3. Driving forces;                                | 3. Reduce or cluster the uncertainties;      | 4. Defining the cluster outcomes;         |
| 5. Construct initial scenario themes;      | 5. Environment scenarios;                           | 4. Rank by importance and uncertainty;            | 4. Develop initial scenario themes;          | 5. Impact/uncertainty matrix;             |
| 6. Check for consistency and plausibility; | 6. From identity to visions and projects;           | 5. Selecting the scenario logics;                 | 5. Check for internal consistency;           | 6. Framing the scenarios;                 |
| 7. Develop learning scenarios;             | 7. Evaluation of strategic options;                 | 6. Fleshing out the scenarios;                    | 6. Express scenarios in narratives;          | 7. Scoping the scenarios;                 |
| 8. Identify research needs;                | 8. From project to strategic choices;               | 7. Implications for strategy;                     | 7. Assess the impact of scenarios;           | 8. Developing the scenarios.              |
| 9. Develop quantitative models;            | 9. Plan of action and implementation.               | 8. Selection of leading indicators and signposts; | 8. Develop and select potential strategies.  |   |
| 10. Evolve toward decision scenarios.      |   | 9. Feed the scenarios back to those consulted;    |  |   |
|  |   | 10. Discuss the strategic options;                |  |   |
|  |   | 11. Agree the implementation plan;                |  |   |
|  |   | 12. Publicize the scenarios.                      |  |   |

### Generic scenario planning technique

1. Define the scope of the exercise and providing the procedures to the participants;
2. Determine the driving forces in the external environment;
3. Rank the driving forces by importance and uncertainty;
4. Develop initial scenario themes (four);
5. Check for internal consistency and plausibility;
6. Express scenarios in narratives;
7. Use the results of step 6 to formulate actions towards the future.

The above mentioned technique is the proposal for the generic scenario planning technique. This technique is a combination of techniques identified by scholars as Godet (2000), Postma and Liebl (2005), Schoemaker (1995), Tapinos (2012), and Wright et al. (2013). The managers should make a start with defining the scope of the exercise (step 1). Scenario planning should be done in teams, as explained by O'Brien (2004), so step 1 should also include the deviation of the members. Also, it should include the data for follow-up meetings. Each team should determine the driving forces in the external environment (step 2). The driving forces should be ranked by importance and uncertainty (step 3). It is recommended to reduce the driving forces to a more manageable number of construct, like two or three (Postma & Liebl, 2005). With this in mind, the initial scenario themes could be developed by the teams, and could function as handle for the four themes (step 4). Four, because of the agreement on the deductive approach. The driving forces, in combination with the scenario themes, lead to the check for internal consistency and plausibility (step 5). This could be done by judging the driving forces on a low/middle/high impact for each scenario. This results in a fingerprint, or table, with all four scenarios with corresponding impact. The narratives, arising from the driving forces, should be written after the completion of this check (step 6). Each team member should write a narrative about their specific theme. Four members mirrors four scenarios. In the end, each team should have different scenarios, based on the same driving forces (but with other impacts). The results should be used to formulate actions towards the future (step 7).

### 3.2.3 Outcomes scenario planning

The outcomes contribute to the achievement of three intended goals of scenario planning. First, scenario planning aims to improve the quality of the strategic conversation in firms (Burt & Van der Heijden, 2003; O'Brien & Meadows, 2013). According to Van der Heijden (1996), scenario planning is a method which is highly recommended in terms of having a strategic conversation. The method, which is developed for the debate on the future, should facilitate a strategic conversation on what is happening now and may happen in the world around us (Masini & Vasquez, 2000). Also, to become aware of new trends in the external environment, ahead of the competitors (Burt & Van der Heijden, 2003; O'Brien, 2004; Peterson et al., 2003).

Also, Docherty and McKiernan (2008) state that the outcome of scenario planning is *“its active engagement of actors in its process and its power to enable them to think about complexity and uncertainty in external contexts, and then how they might shape the external environment to contribute to their own strategic ends”* (p.10). So, the active engagement of actors should eventually contribute to the strategic conversation within firms.

Second, the goal of scenario planning is to cope with the uncertain environment. Scenario planning aims to take advantage of unexpected opportunities (Chermack, 2011; O’Brien & Meadows, 2013; Schoemaker, 1995). Also, Peterson et al. (2003) state that a successful scenario should enhance the ability of people to cope with and take advantage of future changes. The outcome of scenario planning benefits the firm on two levels: on the short term, the adaptability of the firm will increase, as the business environment is more explicitly observed, and on the long term, a more robust organizational system can be developed, which can prevent firms from crashes (O’Brien, 2004; Van der Heijden, 1996).

Third, another goal of scenario planning is to make effective decisions. Scenario planning aims to make strategic choices (O’Brien & Meadows, 2013). However, scenario planning provides only a perspective on the future or shared understanding among managers, but it does not give directions on how to act on this (Miller & Waller, 2003). It is up to managers on how to proceed towards the future. Therefore, managers should consider to create strategic options by using the real option approach. Research has shown that ‘scenario planning’ and the ‘real option approach’ complement each other (Miller & Waller, 2003; Van Reedt Dortland, Voordijk, & Dewulf, 2014). The scenarios offer a structure and guidance, real options commit to that by actual actions (Boisot & MacMillan, 2004; Ram & Montibeller, 2013).

To summarize, the outcomes of scenario planning contribute to the achievement of three goals. First, the strategic conversation within the firm, which eventually leads to a better understanding of the future. Second, the adaptability on the short term could be increased, as well as the robustness of the organizational system on the long term. Third, the firm could actually act on the scenarios by using the real option approach to create actual actions towards the future.

### 3.3 Comparison SWOT-analysis and scenario planning

This paragraph provides a comparison between the two methods from a theoretical point of view. It aims for an understanding of the similarities and differences of the methods. It elaborates on the techniques and outcomes.

#### 3.3.1 Comparison techniques

The comparison of the techniques is based on the features as well as the process. Before considering the details, it should be noted that the generic techniques of the methods are used to compare the methods. To start with the features. Both techniques mention teamwork as being important.

Both techniques should be applied in groups in order to enhance creative thinking (e.g. Balamuralikrishna & Dugger, 1995), and learning and application (Wright et al., 2013). Even though the SWOT-analysis creates a list with internal strengths and weaknesses, and the external opportunities and threats, and scenario planning creates a description of how the external environment might turn out, the outcomes are the same. Both techniques have the strategic option development as last step, this is not explicitly mentioned for scenario planning. Nevertheless, it is a similarity between the two techniques. Conversely, when considering other features, it becomes clear that the SWOT-analysis focuses on both internal and external factors, whereas scenario planning only focus on the external environment. Scenario planning does not take their internal organization into consideration, which is only done by the SWOT-analysis.

Moreover, the process of the techniques shows differences and similarities. Both techniques start with defining the scope and providing an explanation to the participants. The tasks after this are different. For example, the SWOT-analysis considers four factors and creates a SWOT-framework, while scenario planning dives into the key uncertainties in the external environment in order to determine the impact and discuss how these uncertainties might turn out in the future. Eventually, to write an internally consistent story based on that discussion. However, the end-state is similar. Both techniques formulate specific actions towards the future.

To summarize, the focus of the two methods is different (internal + external vs. external). Also, the purpose of the techniques is different. The SWOT-analysis creates a solid framework, while scenario planning creates a narrative. However, there are four features which are similar: teamwork, scope, explanation to participants, and outcomes.

### 3.3.2 Comparison outcomes

This sub-paragraph starts with a short re-cap of the results. On the one hand, the SWOT-analysis considers two outcomes. First, the SWOT-analysis tries to create a solid framework for strategic purposes (Ghazinoory et al., 2007; Houben et al., 1999), which should be complemented by the real option approach. This combination provides more flexible strategic plans, and a flexible strategy (Franco et al., 2013; Zarkos et al., 2007). Second, the SWOT-analysis aims to create a better understanding of the firm and the factors which affect the performance (Pickton & Wright, 1998).

On the other hand, scenario planning reflects three outcomes. First, scenario planning aims to improve the quality of a strategic conversation in firms (Burt & Van der Heijden, 2003). Second, it attempts to take advantage of unexpected opportunities (O'Brien & Meadows, 2013; Schoemaker, 1995). Third, scenario planning seeks for making strategic choices (O'Brien & Meadows, 2013). This should be done with the real option approach (Miller & Waller, 2003), because this approach commit to the scenario by giving the firm actual actions (Boisot & MacMillan, 2004; Ram & Montibeller, 2013).

The methods share the outcome of the strategic option development. However, the input for the strategic option development is different, because the SWOT-analysis creates a framework with strengths, weaknesses, opportunities and threats, whereas scenarios creates narratives about how the future might turn out. Also, the shared understanding is comparable. Although, the SWOT-analysis is dealing with the organization, while scenario planning is focusing on the future. The difference between the methods is that scenario planning argues for a third outcome, namely ‘to take advantage of unexpected opportunities’. This outcome is positively correlated with the unstable and complex environment (O’Brien & Meadows, 2013). Scenario planning deals with this environment. The SWOT-analysis does not, which implies that this outcome is (less) applicable.

To summarize, the methods share two outcomes. The strategic option development (1) and the better understanding (2). However, it should be noted that the input of the real options and the area of the understanding is different: organization vs. future. Scenario planning has another outcome, the advantage of unexpected opportunities, which is less applicable to the SWOT-analysis. This is a difference between the two methods.

### 3.3.3 Overview comparisons

Table 4 shows the differences and similarities between the SWOT-analysis and scenario planning, explained by findings from the literature (desk research). Hereby, the first and second sub-question are answered.

*Table 4 Overview differences and similarities theoretical*

| Differences  | Similarities  |
|--|---|
| Techniques   | Techniques  |
| <b>Focus</b> – Internal and external factors (SWOT) vs. only external factors (scenario planning).                                 | <b>Features</b> – Four features are similar: teamwork, scope, explanation to participants, and outcomes.                    |
| <b>Purpose</b> – Solid framework (SWOT) vs. consistent narrative (scenario planning).  |   |
| Outcomes   | Outcomes  |
| <b>Unexpected opportunities</b> – Favorable in an unstable environment (scenario planning), not for the stable environment (SWOT). | <b>Strategic option development</b> – Both methods could take advantage of this.  |
|  | <b>Shared understanding</b> – Understanding of the organization (SWOT) and understanding of the future (scenario planning). |

## 4. Practical findings

This chapter shows the results of the interviews. The interviews are explorative in nature, which means that the results from the interviews are used to explore the differences and similarities between the two methods from a practical point of view. This chapter starts with a description of the actual sample and continues with the results of the interviews, sorted by SWOT-analysis and scenario planning.

### 4.1 Sample

One student per group is asked to join the interviews. This has resulted in nine respondents. Table 5 shows an overview of the interviews that have been conducted. Information is provided on gender, study, language, date, team, and duration of the interview(ee). The contribution of the interviewees is processed anonymously. When applicable, the quotations of the interviewees are given.

Table 5 Overview interviews

| Interviewee | Gender | Study | Language | Date                     | Team*    | Duration   |
|-------------|--------|-------|----------|--------------------------|----------|------------|
| 1.          | M      | IEM   | Dutch    | 14 <sup>th</sup> of June | Scenario | 31 minutes |
| 2.          | M      | CE    | English  | 19 <sup>th</sup> of June | Scenario | 13 minutes |
| 3.          | M      | IEM   | English  | 19 <sup>th</sup> of June | SWOT     | 37 minutes |
| 4.          | F      | BA    | Dutch    | 29 <sup>th</sup> of June | SWOT     | 32 minutes |
| 5.          | F      | CE    | English  | 2 <sup>nd</sup> of July  | Scenario | 17 minutes |
| 6.          | M      | IEM   | English  | 3 <sup>rd</sup> of July  | SWOT     | 37 minutes |
| 7.          | F      | IEM   | Dutch    | 3 <sup>rd</sup> of July  | Scenario | 15 minutes |
| 8.          | M      | CEM   | Dutch    | 4 <sup>th</sup> of July  | SWOT     | 46 minutes |
| 9.          | M      | BA    | Dutch    | 13 <sup>th</sup> of July | SWOT     | 35 minutes |

\* Before the experiment started, the students were divided into two teams. This was either the SWOT-team or the scenario-team. The students of each team had to fulfill certain tasks regarding their specific method, for example: creating a SWOT-framework (SWOT-team) or writing narratives (scenario-team).

### 4.2 Findings SWOT-analysis

Interviewees have argued that the SWOT-analysis is developed to look with more details into a specific company and its environment. The SWOT-analysis is about a fixed future, because it does not discuss different futures. The SWOT-analysis is ultimately suitable, when a company needs to re-organize their internal structure or when the company wants to change/improve internally.

*‘SWOT-analysis is suitable when a company wants to improve their internal organization.’ (student 9)*

#### 4.2.1 Technique SWOT-analysis

This sub-paragraph elaborates on the procedures of the SWOT-analysis, as applied by the interviewees during the experiment, in order to track down their experiences with the method.

The SWOT-analysis is performed as a team by analyzing the external factors of the environment, the opportunities and threats first. Then, the analysis of the internal factors of the company is carried out. Overall, teams have done this by compiling a list with first the favorable and unfavorable items of the external environment, followed by strong and weak factors of the company. After that, the items were divided into the four quadrants of the SWOT-analysis.

When looking at the internal factors, the teams have looked into the strengths and weaknesses of the company. These were sometimes difficult to find, as students had no experiences with the company, nor do businesses normally provide their weaknesses on a platter. In that case, teams had to look for further information and look with more detail into the company. The website of the company and the provided documents gave input for that.

*'We first made a list of opportunities and threats. We extended the list by the strengths and weaknesses.'* (student 8)

This challenge was expected. Therefore, students had to prepare themselves. A list of twelve driving forces was compiled by the company and students had to study the current status of these forces prior to the experiment. The list was very useful for the analysis of the strengths and weaknesses, but also for the analysis of the external environment, and therefore very useful for the analysis of the opportunities and threats. Most of the teams made use of this list while creating their SWOT-framework.

The SWOT-analysis consists of four quadrants. It can be argued that two of the four quadrants, weaknesses and threats, are more attractive for the company to get familiar with than the other two, opportunities and strengths. The company should turn their weaknesses into strengths and should protect themselves against possible threats.

*'We were only looking at the weaknesses and threats of the company.'* (student 6)

The interviewees indicated some difficulty with the placing of certain aspects in the quadrant. Depending on the argumentation, someone could argue a factor as a strength, while someone else could argue the same factor as a weakness, or vice versa. Thus, the distinction between the four quadrants is not clear. It is in most cases subjective.

*'You could see it as a strength, but at the same time as a weakness.  
You could argue it from both sides.'* (student 4)

Furthermore, the SWOT-analysis is a process of teamwork. The analysis required some time, because firms need to analyze their internal and external environment. Interviewees divided the workload between the four students. The analysis of the internal and external factors did happen with all four students. The elaboration of the factors is done by smaller teams, in most cases two separated groups.

*'We looked into the SWOT-analysis with the four of us. We have done the practical realization with smaller teams, with two persons.'* (student 9)

#### 4.2.2 Outcomes SWOT-analysis

This sub-paragraph elaborates on the outcomes of the SWOT-analysis, as indicated by the interviewees.

The interviewees argued that the framework was the outcome of the SWOT-analysis. But, at the same time, the framework served as a handle for the creation of the real options, which was the method that the interviewees had applied afterwards.

The options for the SWOT-analysis were based on the strengths, weaknesses, opportunities and threats. First, students looked into the opportunities, asking themselves the following question: 'How can the company improve?' Second, the students combined the opportunities with the collected strengths, to see whether the company could handle it or not, based on the current situation. Third, the students repeated the process for the weaknesses. They looked into the weaknesses and combined them with the strengths. The input for the options was the information of the SWOT-analysis as well as own imagination.

*'We checked if the company had the strengths to do it.'* (student 3)

*'This is a strength, this is the threat we try to avoid, this is an opportunity, let's go for it!'* (student 6)

Moreover, the process of option creation was not straightforward. It was found to be difficult due to unfamiliarity with the industry and company, which caused a lack of imagination. That resulted in a lot of the same ideas. Also, students were restrained by the perceived impact of the options, often thinking it had too big of an impact. Therefore, not being a good option. The ideas should be feasible, but this was sometimes difficult to manage. Because someone was not sure about the consequences of his/her ideas. In addition, the options required creativity, which was for some students a difficult task.

*'The creation of real options is difficult, because you need creativity for it.'* (student 4)

### 4.3 Findings scenario planning

According to the interviewees, the focus of scenario planning is on the future of the external environment. The development of scenarios can be very useful for companies, because scenarios give you a better understanding of the future. However, it requires a lot of time to actually write the scenarios. But, with the scenarios, you have at least thought about it once. It is beneficial to think about how things are and how they could develop.

*'You can be really prepared for something unexpected'* (student 3)

#### 4.3.1 Technique scenario planning

This sub-paragraph elaborates on the procedures of scenario planning, as applied by the interviewees during the experiment, in order to track down their experiences with the method.

Fingerprints were the start for the scenario-teams. A fingerprint is a table with driving forces on the left side and 'low, middle and high impact' on the top of the table. Teams had to fill in this table for all four scenarios, based on two fixed driving forces. These were different for each team. Discussion on the impact of the driving forces often lead to healthy dialogue, but also confusion. Besides, subjectivity is a big factor within the completion of the table. Someone could argue it as a strong factor, while someone else could see it as a weak factor. It is totally dependent on the debate within the team.

*'The middle option was difficult to define, compared to the really extreme or nothing.'* (student 3)

*'Directly from the start, we had some disagreements about the driving forces. It is totally dependent on your debate within the team how you are going to deal with it.'* (student 8)

Interviewees indicated that some scenarios were harder to understand than other scenarios. In one team, for example, their scenario 'top left' was not a probable scenario. The two at the bottom scored average, the 'top right' was most probable and similar to current and real life situation. It was difficult to believe in the 'top left' scenario and difficult to imagine how this scenario should move towards the future. Disbelief in the scenarios makes it more tough to write a story.

*'It was really difficult to make a consistent story with most of the scenarios. Because these are less straightforward and less probable'.* (student 8)

Furthermore, the teams had to divide the four scenarios among their team members. Each member needed to write a narrative based on the twelve driving forces. For each narrative, it was found to be useful to make a flowchart first. This flowchart was made as a team.

The flowchart provided the starting point (current times) and the end-state of the scenario fifteen years later. From here, the effects of the scenarios were determined, for example, what is the effect of X on Y and how does it affect Z? The driving forces were used as chain reaction in the flowchart. Here, the most important driving forces, the ones with the highest impact, were taken into consideration at first, followed by the other driving forces.

Ultimately, leading to a sheet with arrows indicating the different directions and/or relations between the different driving forces. This process was relatively easy to complete, because the items were already discussed before. Although, members of the teams have often experienced disagreements within the scenarios, because there were more possibilities, so more opinions and thus more variety. After finishing the flowcharts, the teams were not working together anymore, but had to complete the task individually. As a result, each team had four different narratives, based on the flowcharts.

*‘We made a flowchart first, to see where we need to end the scenario, but also to see from where we need to start.’ (student 1)*

The interviewees indicated that, due to the fixed driving forces, the four scenarios hardly showed any differences. Consequently, the scenarios were not completely different in the end. Moreover, there were two reasons why scenario planning was constrained in this setting. First, it was tough to write a probable narrative, because everything is unforeseeable. Second, the narratives are based on your imagination. Interviewees explained that they were not likely to think out of the box. Therefore, they argued that they were not capable of writing a good narrative. Also, the division of the narratives ensured a faster writing process, but at the same time, it failed consistent narratives. In addition, the teams did not have a complete balanced and consistent scenario framework. All scenarios were written individually, whereby the scenarios show similarities, obviously.

*‘The scenarios were supposed to be different, but in the end they were kind of the same. It was difficult to see how a small changing factor could affect the others.’ (student 3)*

*‘You are only trying to fit the different factors into a consistent story. Here, the usefulness of the scenario is in all probability negligible.’ (student 8)*

#### 4.3.2 Outcomes scenario planning

This sub-paragraph elaborates on the outcomes of the SWOT-analysis, as indicated by the interviewees.

The interviewees argued that the narratives were the outcomes of the scenario planning process. But, at the same time, the narratives were designated as the input for the creation of the real options, which was the method that the interviewees had applied afterwards.

In general, students only made use of their own scenario, and did not look at the other three, which caused a narrow-minded thinking. In most cases, the starting point was either the starting point or the end-state of the narratives. The question that students asked themselves was; ‘How can the company improve, with as prospective the intended end-state?’. Along the way, the options were extended by students interest, experiences and knowledge. For example, options were more based on finance, logistics or management.

*‘I did not make use of the narratives. I only used my own background and study experiences.’ (student 5)*

Also, it was difficult to create options for the scenarios. It is not for sure that your idea and your scenario will happen in the future. The options that the interviewees have created were more like an always good option. This options is: no matter what is the case, which scenario will happen, the option should be implemented by the company. Or, the options could be practicable, but only with a different mindset. As a consequence, the company should change their mindset in order to perceive the reality.

*‘The options were good for just one scenario’ and ‘The options were general, so applicable to all scenarios.’ (student 3)*

*‘You are not sure that the scenario will happen. You are more like; suppose that this scenario will happen, what do we need to do to keep up?’ (student 3)*

Furthermore, students did experience some difficulties: running out of ideas, impact requirements, similarities between the options, and creating general options. Most importantly, it was tough for the students to fit the company into the narratives. The fingerprints and narratives were based on the external environment and were not specified to the company. While creating the options, it was difficult to come up with relevant options for the company. Also, the students argued that they did not have enough information to actually judge the options for the company, to see whether the company was already trying to do something with this option or not.

*‘It was really confusing that we had to create options for the company, because the scenarios were focusing on the whole external environment.’ (student 4)*

*‘The scenarios were dealing with the external environment, while the options needed to be focused on the company. This was really confusing.’ (student 7)*

#### 4.4 Comparison SWOT-analysis and scenario planning

This paragraph provides a comparison between the two methods from a practical point of view. It aims for an understanding of the similarities and differences of the methods. It elaborates on the techniques and outcomes.

##### 4.4.1 Comparison techniques

The teams had other tasks to fulfill during the two days. The SWOT-teams had to create a framework with strengths, weaknesses, opportunities and threats. To do this, the teams had to analyze the internal factors as well as external factors. Whilst the scenario-teams had to fill in the fingerprints with the key uncertainties in the external environment. Eventually, this lead to a narrative on how the future might turn out. So, the purpose of the methods is different.

Two similarities are indicated by the teams of both methods. First, subjectivity is a shared factor of the methods. While performing the SWOT-analysis, the teams have identified factors which could often be seen as a strength, but also as a weakness, or vice versa. For scenario planning, when completing the fingerprints, the identification per driving force was based on own opinions and agreements. The teams have argued that the factors or items are dependent on the debate within the team. Second, both teams made the start together as a team. The identification of the strengths, weaknesses, opportunities and threats was done within the team (SWOT), even as the completion of the table of fingerprints (scenario). Eventually, the teams have split themselves up into two groups (SWOT) or individually (scenario). The SWOT-teams argued that the elaboration of the framework is done in smaller groups. For the scenarios, each member had to write the narrative individually.

To summarize, the comparison on the techniques is rather small. Due to the different focus (internal + external vs. external) and purpose. The SWOT-team had to create a framework, while the scenario-team had to create a narrative. As a result, the tasks the teams had to fulfill were different. Although, the comparison has identified two similarities between the two methods: subjectivity and teamwork.

##### 4.4.2 Comparison outcomes

The interviewees of both teams have argued the real option approach as outcome. This is a similarity between the two methods. Though, the input for the outcomes was different. On the one hand, the SWOT-team has collected strengths and weaknesses about the firm, and opportunities and threats in the external environment, which has resulted in a SWOT-framework. These teams started with the opportunities and weaknesses in order to develop relevant real options. On the other hand, the scenario-team has used the narratives as input for the options. In most cases, to write relevant options, the starting point and end-state of the narratives are used to define the options.

To summarize, despite the fact that the input for the real options approach is different, the shared factor between the two methods is the outcome of the methods: the real option approach.

#### 4.4.3 Overview comparisons

Table 6 gives an overview of the differences and similarities of the SWOT-analysis and scenario planning explained by findings from the interviews, so, findings from a practical point of view. Hereby, the third and fourth sub-question are answered.

*Table 6 Overview differences and similarities practical*

| Differences  | Similarities  |
|--|---|
| Techniques   | Techniques  |
| <b>Focus</b> – Internal and external factors (SWOT) vs. only external factors (scenario planning). | <b>Subjectivity</b> – Subjectivity is an important factor to look at while applying the methods.                                    |
| <b>Purpose</b> – Framework (SWOT) vs. narrative (scenario planning).                               | <b>Teamwork</b> – The start of the methods is with teams. Elaboration in smaller teams (SWOT) vs. individually (scenario planning). |
| Outcomes   | Outcomes  |
|  | <b>Real option approach</b> – Both methods could take advantage of this approach.   |

## 5. Discussion and conclusion

This chapter provides the discussion and the conclusion of this research. It starts with a discussion on the results, and continues with the managerial implications, theoretical contribution, limitations and recommendations for future research.

### 5.1 Discussion

On the one hand, the results from desk research show two differences and one similarity regarding the techniques. The first difference is related to the focus of the methods. While the SWOT-analysis is focusing on the internal qualities and external environment (Dyson, 2004; Hay & Castilla, 2006; Houben et al., 1999; Panagiotou, 2003), scenario planning focusses only on the external environment (Docherty & McKiernan, 2008; Peterson et al., 2003). This distinction is also confirmed by the interviewees, who argued that they had to focus mainly on the firm for the SWOT-analysis and only on the external environment for scenario planning.

The second difference is the purpose of the methods. The SWOT-analysis provides a framework with the strengths and weaknesses of the company, and opportunities and threats of the environment (Barney, 1995; Dyson, 2004; Hay & Castilla, 2006), while scenario planning provides a narrative about how the future might turn out (MacKay & Tambeau, 2013; Tapinos, 2012). This distinction is also mentioned by the interviewees. The SWOT-team discussed that they had to come up with factors for the four quadrants. The scenario-team argued that, after the discussion and the completion of the fingerprints, they had to express the results into a narrative.

The first similarity are the features of the techniques. Based on the two generic approaches, four similarities are identified: teamwork, scope, explanation to participants and outcomes. The interviewees also argued teamwork and outcomes as similarities. Teamwork, because they have worked together during the application. After some time, the teams divided themselves into smaller teams, or continued individually. The generic approaches do not mention this deviation, but rather suggest teams to work together during the whole application in order to have the best framework or narratives. Admittedly, the teams did not argue the scope and explanation as similarities, which is, according to the generic approaches, relatively important. The fact that the interviewees did not argue this, could be blamed to the setting of the experiment, or the lack of experience of the students with the two methods.

Furthermore, the interviewees have argued two differences and two similarities on the techniques. Three of them are already covered by previous parts. A noteworthy similarity, which is thus not confirmed by the generic approaches, is subjectivity. Interviewees argued that the placing of the factors for the SWOT-analysis was imprecise. It was totally dependent on their argumentation. This was also the case for the completion of the fingerprints. However, scholars argue that subjectivity is indeed an important factor to take into consideration, because, for example for the SWOT-analysis, all the aspects are based on a manager's point of view (Grant, in Van Wijngaarden et al., 2012).

Hereby, the distinction between the four quadrants is imprecise (Grant, in Van Wijngaarden et al., 2012; Holweg & Van Donk, in Helms & Nixon, 2010). For scenario planning, the table of fingerprints can be seen as subjective, because the identification of factors is totally based on their own agreements. Thus, subjectivity seems an issue for both methods. To reduce the level of subjectivity, teamwork is required (O'Brien, 2004), as it decreases the level of individual arguments.

On the other hand, the results from the literature show one difference and two similarities on the outcomes of the two methods. The first similarity is related to strategic option development. Scholars argue that the SWOT-framework as well as the narratives give insufficient guidance to firms (Miller & Waller, 2003; Zarkos et al., 2007). Therefore, managers should consider the real option approach (Boisot & MacMillan, 2004; Ram & Montibeller, 2013). The interviewees argued that they have applied the real option approach after the completion of the different tasks for the SWOT-analysis as well as scenario planning. The framework and narratives are used in order to develop the real options.

The second similarity is the shared understanding. Despite the fact that both methods create a shared understanding, the focus of this understanding is different. The SWOT-analysis creates an understanding of factors which affect the firm and its performance (Balamuralikrishna & Dugger, 1995; Pickton & Wright, 1998). Whilst scenario planning creates an understanding of the future, how it might turn out (Burt & Van der Heijden, 2003; Masini & Vasquez, 2000; O'Brien & Meadows, 2013). Unfortunately, the shared understanding is only confirmed by the scenario-teams. This could be blamed to the lack of experience of the students with the two methods, but also the setting of the experiment.

The difference is the intended goal 'unexpected opportunities', which is only applicable for the unstable environment. Scenario planning is familiar with the unstable environment (Amer et al., 2013; MacKay & Tambeau, 2013; O'Brien & Meadows, 2013; Schoemaker, 1995), the SWOT-analysis is not (Bonn & Rundle-Thiele, 2007; Dent, 1999). As a result, this goal is only relevant for scenario planning. The interviewees did not mention this goal at all. Again, this could be blamed to the lack of experience of the students with the methods, or the setting of the experiment.

To summarize, the results on the techniques, from both perspectives, show two differences and two similarities. The differences are the focus and the purpose of the methods. Conversely, the similarities are the features of the techniques (teamwork and outcomes) and subjectivity. The results on the outcomes, from both perspectives, show one difference and two similarities. The difference is the goal of 'unexpected opportunities', and the similarities are the real option approach and the shared understanding. Table 7 shows the complete overview of the differences and similarities.

Table 7 Complete overview differences and similarities

| Differences  | Similarities  |
|--|---|
| Techniques   | Techniques  |
| <b>Focus</b> – Internal and external factors (SWOT) vs. external factors (scenario planning).                                      | <b>Features techniques</b> – Both methods share teamwork and outcomes.                                  |
| <b>Purpose</b> – Solid framework (SWOT) vs. consistent narratives (scenario planning).   | <b>Subjectivity</b> – Subjectivity is a shared factor between the methods.                              |
| Outcomes   | Outcomes  |
| <b>Unexpected opportunities</b> – Favorable in an unstable environment (scenario planning), not for the stable environment (SWOT). | <b>Shared understanding</b> – An understanding of the firm (SWOT) or of the future (scenario planning). |
|  | <b>Real option approach</b> – Both methods could take advantage of this approach.                       |

From the results, it can be concluded that the methods are different to a certain extent. Despite the fact that both methods share two goals, the focus and purpose are different. This causes differences in the application of the methods. More importantly, this will lead to different results. So, managers should be aware of this fact before choosing one method in favor of the other one. The next sub-paragraph gives more details on the choices.

### 5.1.1 Managerial implications

It is agreed that both methods are appropriate in terms of strategy development. So, this is not a factor to take into consideration. A general recommendation is to make use of the generic approaches, which are formulated in the theoretical chapter. While using these approaches, managers are assured of the most important aspects of the techniques. For example, the defining of the scope, explanation to the participants and teamwork. This latter is important for reducing the subjectivity, but also to enhance creativity and learning. This research reveals three additional meaningful insights for managers.

First, firms should think about the focus of the methods as the focus of the methods is different. The SWOT-analysis considers the internal as well as the external environment, where scenario planning only focusses on the external environment. This distinction should be carefully looked into. It is recommended to choose the SWOT-analysis if firms are interested in the exploration of their internal organization, or when firms want to change their internal organization. Alternatively, firms should choose scenario planning when it is of interest to explore the external environment. When the future is uncertain and firms do not know which direction to go to.

Second, firms should carefully consider the purpose of the two methods. If firms want to raise awareness concerning the possible directions of the future, it should definitely choose scenario planning. This method gives firms four different scenarios, so, four different descriptions on how the future might turn out, with as advantage that firms at least have thought about it. Alternatively, the SWOT-analysis creates a framework with limited future opportunities. The framework provides more or less a fixed future, which means that there is no vision of different futures. This could be relevant if firms are less interested in the future.

Third, if firms are interested in the opportunity to take advantage of unexpected opportunities, or to go ahead of their competitors, it is recommended to use scenario planning. This method is relevant, because the narratives of the four different futures give firms the chance to go beyond current times, which makes it appropriate to be one step ahead of the competitors. The SWOT-analysis does not look to different futures, and therefore, this method is not sufficient to use for this purpose.

### 5.1.2 Theoretical contributions

This research offers three contribution to the literature. Firstly, a comparative study on the SWOT-analysis and scenario planning, with as aim to create an overview of the differences and similarities between the two methods on the techniques and outcomes, is never done before. This research is a well-considered attempt to close the gap, because it has provided an overview. Secondly, most literature is built on theory and does not look at the practical sides of the two methods; the inner workings of the methods. So, this research gave insights into the experiences of the interviewees with the methods. Thirdly, the theoretical chapter has provided two generic approaches, one for each method. This attempt, to replace the existing techniques, is the first in this league. Future research should be conducted to whether these approaches are appropriate in practice.

### 5.1.3 Limitations

This research is not without its limitations. The limitations are due to the context of this research, the experiment of the master course STM&I. The experiment has created the opportunity to conduct a research with the students of the course, and therefore, to explore the practical side of the two methods, but it also gave four limitations.

The first limitation is the time frame between the experiment (end of March) and the interviews (end of June). The time between these two periods is long. Students forgot a lot of details in between. As a result, the interviewees did not remember all the specifics from the two days. A recommendation for future research would be to conduct the interviews directly after the workshop days in order to get as much information as possible, and as complete as possible. Also, it is recommended to inform the interviewees beforehand of the necessity of the interviews.

The second limitation is that the sample frame of this research was limited to the students of the master course. The sample size narrowed by the choice to pick just one student out of each group. The sample size decreased from 68 to 17 students. Unfortunately, a lot of students did not respond to the invitation of the interviews, due to lack of time, bank holidays or internships somewhere else in the Netherlands. As a result, only nine students joined the interviews. With this small amount, it is difficult to generalize the findings to other settings. It is possible to generalize the findings, but the procedures should be clear (Van Zwieten & Willems, 2004). However, the procedures of this research are, regrettably, not described in detail. It is recommended to conduct future research with a larger sample size. Also, the procedures should be secured. Eventually, it will result in an increase of the validity.

The third limitation are the participants of this research; students. Students explained that they have never worked with one or both methods before. They might have heard about it, but never actually applied the methods on a real-life firm. Also, the students were not familiar with the industry in which the real-life firm operates. A recommendation for future research is to focus on another sample, for example managers (or employees) who are working or have worked with the methods. Hopefully, these people are more experienced and have more knowledge on the ins and outs of the methods, and their industry. It is probable that this research shows more results in detail regarding the differences and similarities, which makes the results more reliable.

The fourth limitation is the bias of this research. The interviews are conducted by one researcher. The same researcher also coded the interviews herself, which caused bias. Consequently, meaningful information might have been deleted while it could have been interesting, or vice versa (Verhoeven, 2014). Moreover, the researcher was also involved in the experiment. This is another factor that has caused bias. A recommendation for future research is to include at least one other researcher to conduct the interviews with, but also to include another researcher for the coding process. This probably results in a decrease of the bias and an increase of the external reliability.

#### 5.1.4 Recommendations for future research

A few recommendations for future research are already given in previous paragraph. However, there are three additional recommendations, which cannot be specified to one of the limitations. Firstly, despite the fact that this research has emerged an overview with the differences and similarities, and has stated three managerial implications, it should be noted that it is only concerning the techniques and outcomes. Other areas, for example the organizational environment, personality traits, decision-making style and current strategy, are not taken into consideration. It could be of interest to conduct new research to see whether these areas show more differences and similarities between the two methods. Also, to see whether one method is more in favor of the other one.

Secondly, it would be interesting to conduct a longitudinal quantitative research on this topic. It could be of value to see whether the methods show differences and similarities in the long-term. It is argued in the beginning that both methods are suitable for strategy development. Unfortunately, there is not much known about the differences and similarities between the methods on the effects in the long-term. Therefore, it is recommended to conduct a research with four different groups. Hopefully, the results will show the added value of each method regarding the strategy development. This is interesting to investigate when managers are about to choose for either the SWOT-analysis or scenario planning.

Thirdly, it is recommended to look into the creativity of both methods. It is mentioned from theoretical perspective as well as practical perspective that creativity is important while applying the methods. Interviewees have mentioned that this was crucial, but also difficult. It is questionable if every group member is able to apply the methods if creativity is required (Bodin et al., 2016). Future research should focus on a study, whereby the creativity of group members should be measured. Eventually, the study should reveal whether creative persons are better for working with the two methods.

## 5.2 Conclusion

The aim of this research was to create an overview of the differences and similarities between the SWOT-analysis and scenario planning regarding their techniques and outcomes, from a theoretical and practical perspective. Therefore, the following main research question was formulated: *“What are the differences and similarities between the SWOT-analysis and scenario planning regarding their techniques and outcomes?”* This examination is done by desk research and semi-structured interviews. First, a theoretical framework is written to research the existing literature on the SWOT-analysis and scenario planning regarding the techniques and outcomes. Second, based on the results of the literature, an interview protocol is built. Nine interviews are conducted to explore the differences and similarities between the SWOT-analysis and scenario planning from the practical side.

The results of the first and second sub-question were from a theoretical point of view and are collected via desk research. The results showed that the similarities between the methods were the features of the techniques, strategic option development and shared understanding. The differences were the focus, purpose and ‘unexpected opportunities’. The similarities from a practical point of view, distracted from nine semi-structured interviews, for the third and fourth sub-question, were subjectivity, teamwork and the real option approach. The differences were the focus and purpose.

After the discussion of the results, three differences and four similarities are identified. Hereby, the answer to the main research question is as follows. The differences are the focus, purpose, and the ‘unexpected opportunities’. The similarities are the features, subjectivity, teamwork, strategic option development and shared understanding. With this answer, and the overview in mind, it can be concluded that the goal of this research is achieved.



## References

- Al-Araki, M. (2013). SWOT analysis revisited through PEAK-framework. *Journal of Intelligent & Fuzzy Systems*, 25(3), 615-625. doi:10.3233/IFS-120668
- Amer, M., Daim, T. U., & Jetter, A. (2013). A review of scenario planning. *Futures*, 46, 23-40. doi:10.1016/j.futures.2012.10.003
- Baarda, D. B. (2009). *Dit is onderzoek!: Richtlijnen voor het opzetten, uitvoeren en evalueren van kwantitatief en kwalitatief onderzoek*. Groningen: Noordhoff Uitgevers.
- Babbie, E. R. (2007). *The practice of social research* (11<sup>th</sup> ed.). Belmont: Thomson Learning, Inc.
- Balamuralikrishna, R., & Dugger, J. C. (1995). SWOT analysis: A management tool for initiating new programs in vocational schools. *Journal of Vocational and Technical Education*, 12(1), 36-41. doi:10.21061/jcte.v12i1.498
- Barney, J. B. (1995). Looking inside for competitive advantage. *Academy of Management Perspectives*, 9(4), 49-61. doi:10.5465/ame.1995.9512032192
- Bodin, R., Chermack, T. J., & Coons, L. M. (2016). The effects of scenario planning on participant decision-making style: A quasi-experimental study of four companies. *Journal of Futures Studies*, 20(4), 21-40. doi:10.6531/JFS.2016.20(4).A21
- Bodwell, W., & Chermack, T. J. (2010). Organizational ambidexterity: Integrating deliberate and emergent strategy with scenario planning. *Technological Forecasting and Social Change*, 77(2), 193-202. doi:10.1016/j.techfore.2009.07.004
- Boisot, M., & MacMillan, I. C. (2004). Crossing epistemological boundaries: Managerial and entrepreneurial approaches to knowledge management. *Long Range Planning*, 37(6), 505-524. doi:10.1016/j.lrp.2004.09.002
- Bonn, I., & Rundle-Thiele, S. (2007). Do or die - strategic decision-making following a shock event. *Tourism Management*, 28(2), 615-620. doi:10.1016/j.tourman.2006.04.021
- Bowman, E. H., & Hurry, D. (1993). Strategy through the option lens: An integrated view of resource investments and the incremental-choice process. *Academy of Management Review*, 18(4), 760-782. doi:10.5465/amr.1993.9402210157
- Bowman, G., MacKay, R. B., Masrani, S., & McKiernan, P. (2013). Storytelling and the scenario process: Understanding success and failure. *Technological Forecasting and Social Change*, 80(4), 735-748. doi:10.1016/j.techfore.2012.04.009
- Bryman, A., & Bell, E. (2011). *Business research methods* (3<sup>rd</sup> ed.). Oxford: University Press.
- Burt, G., & Van der Heijden, K. (2003). First steps: Towards purposeful activities in scenario thinking and future studies. *Futures*, 35(10), 1011-1026. doi:10.1016/S0016-3287(03)00065-X

- Burt, G., Wright, G., Bradfield, R., Cairns, G., & Van der Heijden, K. (2006). The role of scenario planning in exploring the environment in view of the limitations of PEST and its derivatives. *International Studies of Management & Organization*, 36(3), 50-76. doi:10.2753/IMO0020-8825360303
- Chermack, T. J. (2011). *Scenario planning in organizations: How to create, use, and assess scenarios*. Oakland: Berrett-Koehler Publishers.
- Chermack, T. J., & Kasshanna, B. K. (2007). The use and misuse of SWOT analysis and implications for HRD professionals. *Human Resource Development International*, 10(4), 383-399. doi:10.1080/13678860701718760
- Clark, D. N. (1997). Strategic management tool usage: A comparative study. *Strategic Change*, 6(7), 417-427. doi:10.1002/(SICI)1099-1697(199711)6:7<417::AID-JSC281>3.0.CO;2-9
- Daft, R. L., Murphy, J., & Willmott, H. (2014). *Organization theory and design: An international perspective* (2<sup>nd</sup> ed.). Hampshire: Cengage learning EMEA.
- Davis, G. (2002). *Scenarios as a tool for the 21st century, presented at probing the future conference, Strathclyde University, 2002*. London: Group External Affairs.
- Dent, E. B. (1999). Complexity science: A worldview shift. *Emergence*, 1(4), 5-19. doi:10.1207/s15327000em0104\_2
- Derbyshire, J., & Wright, G. (2017). Augmenting the intuitive logics scenario planning method for a more comprehensive analysis of causation. *International Journal of Forecasting*, 33(1), 254-266. doi:10.1016/j.ijforecast.2016.01.004
- Docherty, I., & McKiernan, P. (2008). Scenario planning for the Edinburgh city region. *Environment and Planning C: Government and Policy*, 26(5), 982-997. doi:10.1068/c0665r
- Dyson, R. G. (2004). Strategic development and SWOT analysis at the University of Warwick. *European Journal of Operational Research*, 152(3), 631-640. doi:10.1016/S0377-2217(03)00062-6
- Dyson, R. G., Bryant, J., Morecroft, J., & O'Brien, F. (2007). The strategic development process. *Supporting strategy: Frameworks, methods and models*, 3-24.
- Fink, A., & Schlake, O. (2000). Scenario management—An approach for strategic foresight. *Competitive Intelligence Review*, 11(1), 37-45. doi:10.1002/(SICI)1520-6386(200031)11:1<37::AID-CIR6>3.0.CO;2-W
- Franco, L. A., Meadows, M., & Armstrong, S. J. (2013). Exploring individual differences in scenario planning workshops: A cognitive style framework. *Technological Forecasting and Social Change*, 80(4), 723-734. doi:10.1016/j.techfore.2012.02.008
- Ghazinoory, S., Esmail Zadeh, A., & Memariani, A. (2007). Fuzzy SWOT analysis. *Journal of Intelligent & Fuzzy Systems*, 18(1), 99-108. doi:10.1016/S0165-0114(98)00196-1
- Godet, M. (2000). The art of scenarios and strategic planning: Tools and pitfalls. *Technological Forecasting and Social Change*, 65(1), 3-22. doi:10.1016/S0040-1625(99)00120-1

- Hambrick, D. C., & Fredrickson, J. W. (2005). Are you sure you have a strategy? *Academy of Management Perspectives*, 19(4), 51-62. doi:10.5465/ame.2001.5897655
- Hay, G. J., & Castilla, G. (2006). Object-based image analysis: Strengths, weaknesses, opportunities and threats (SWOT), presented at the 1<sup>st</sup> International Conference of OBIA, Salzburg, 2006. Salzburg: Salzburg University.
- Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis—where are we now? A review of academic research from the last decade. *Journal of Strategy and Management*, 3(3), 215-251. doi:10.1108/17554251011064837
- Hill, T., & Westbrook, R. (1997). SWOT analysis: It's time for a product recall. *Long Range Planning*, 30(1), 46-52. doi:10.1016/S0024-6301(96)00095-7
- Houben, G., Lenie, K., & Vanhoof, K. (1999). A knowledge-based SWOT-analysis system as an instrument for strategic planning in small and medium sized enterprises. *Decision Support Systems*, 26(2), 125-135. doi:10.1016/S0167-9236(99)00024-X
- Jarzabkowski, P., & Giuletta, M. (2007). Strategic management as an applied science, but not as we (academics) know it (Refereed Paper Submission). Birmingham: Aston University.
- Kahraman, C., Demirel, N. C., & Demirel, T. (2007). Prioritization of e-Government strategies using a SWOT-AHP analysis: The case of Turkey. *European Journal of Information Systems*, 16(3), 284-298. doi:10.1057/palgrave.ejis.3000679
- Khatri, N., & Ng, H. A. (2000). The role of intuition in strategic decision making. *Human Relations*, 53(1), 57-86. doi:10.1177/0018726700531004
- Kramer, B. (2001). *De bijdrage van strategische analyse aan strategievorming in de gezondheidszorg*. Rotterdam: Optima Grafische Communicatie.
- Kurttila, M., Pesonen, M., Kangas, J., & Kajanus, M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis—a hybrid method and its application to a forest-certification case. *Forest Policy and Economics*, 1(1), 41-52. doi:10.1016/S1389-9341(99)00004-0
- Lu, W. (2010). Improved SWOT approach for conducting strategic planning in the construction industry. *Journal of Construction Engineering and Management*, 136(12), 1317-1328. doi:10.1061/(ASCE)CO.1943-7862.0000240
- MacKay, B., & Tambeau, P. (2013). A structuration approach to scenario praxis. *Technological Forecasting and Social Change*, 80(4), 673-686. doi:10.1016/j.techfore.2012.06.003
- Makridakis, S., & Gaba, A. (1998). *Judgment: Its role and value for strategy*. INSEAD Working Paper Series. Fontainebleau: INSEAD.
- Masini, E. B., & Vasquez, J. M. (2000). Scenarios as seen from a human and social perspective. *Technological Forecasting and Social Change*, 65(1), 49-66. doi:10.1016/S0040-1625(99)00127-4
- Miller, K. D., & Waller, H. G. (2003). Scenarios, real options and integrated risk management. *Long Range Planning*, 36(1), 93-107. doi:10.1016/S0024-6301(02)00205-4
- Mintzberg, H. (1994). The fall and rise of strategic planning. *Harvard Business Review*, 72(1), 107-114.

- O'Brien, F. A. (2004). Scenario planning—lessons for practice from teaching and learning. *European Journal of Operational Research*, 152(3), 709-722. doi:10.1016/S0377-2217(03)00068-7
- O'Brien, F. A., & Meadows, M. (2013). Scenario orientation and use to support strategy development. *Technological Forecasting and Social Change*, 80(4), 643-656. doi:10.1016/j.techfore.2012.06.006
- Oxford Dictionary. (2018, September 14). *Outcome*. Retrieved from: <https://en.oxforddictionaries.com/definition/outcome>
- Oxford Dictionary. (2018, September 14). *Technique*. Retrieved from: <https://en.oxforddictionaries.com/definition/technique>
- Paja, E., Maté, A., Woo, C., & Mylopoulos, J. (2016). Can goal reasoning techniques be used for strategic decision-making?. In I. Comyn-Wattiau, K. Tanaka, I.Y. Song, S. Yamamoto, & M. Saeki (Eds.), *International Conference on Conceptual Modeling* (pp. 530-543). Gifu: Springer International Publishing.
- Panagiotou, G. (2003). Bringing SWOT into focus. *Business Strategy Review*, 14(2), 8-10. doi:10.1111/1467-8616.00253
- Peterson, G. D., Cumming, G. S., & Carpenter, S. R. (2003). Scenario planning: A tool for conservation in an uncertain world. *Conservation Biology*, 17(2), 358-366. doi:10.1046/j.1523-1739.2003.01491.x
- Pickton, D. W., & Wright, S. (1998). What's swot in strategic analysis?. *Strategic Change*, 7(2), 101-109. doi:10.1002/(SICI)1099-1697(199803/04)7:2<101::AID-JSC332>3.0.CO;2-6
- Popper, R. (2008). How are foresight methods selected?. *Foresight*, 10(6), 62-89. doi:10.1108/14636680810918586
- Postma, T. J., & Liebl, F. (2005). How to improve scenario analysis as a strategic management tool?. *Technological Forecasting and Social Change*, 72(2), 161-173. doi:10.1016/j.techfore.2003.11.005
- Ram, C., & Montibeller, G. (2013). Exploring the impact of evaluating strategic options in a scenario-based multi-criteria framework. *Technological Forecasting and Social Change*, 80(4), 657-672. doi:10.1016/j.techfore.2012.09.019
- Rickards, L., Wiseman, J., Edwards, T., & Biggs, C. (2014). The problem of fit: Scenario planning and climate change adaptation in the public sector. *Environment and Planning C: Government and Policy*, 32(4), 641-662. doi:10.1068/c12106
- Schnaars, S. P. (1987). How to develop and use scenarios. *Long Range Planning*, 20(1), 105-114. doi:10.1016/0024-6301(87)90038-0
- Schoemaker, P. J. (1995). Scenario planning: A tool for strategic thinking. *Sloan Management Review*, 36(2), 25-40.
- Serrat, O. (2017). From Strategy to Practice. In Asian Development Bank, *Knowledge Solutions* (pp. 107-110). Singapore: Springer International Publishing.

- Sevкли, M., Oztekin, A., Uysal, O., Torlak, G., Turkyilmaz, A., & Delen, D. (2012). Development of a fuzzy ANP based SWOT analysis for the airline industry in Turkey. *Expert Systems With Applications*, 39(1), 14-24. doi:10.1016/j.eswa.2011.06.047
- Tapinos, E. (2012). Perceived environmental uncertainty in scenario planning. *Futures*, 44(4), 338-345. doi:10.1016/j.futures.2011.11.002
- Taylor, C., & Gibbs, G. R. (2018, October 4). "What is Qualitative Data Analysis (QDA)?". Retrieved from: [http://onlineqda.hud.ac.uk/Intro\\_QDA/what\\_is\\_qda.php](http://onlineqda.hud.ac.uk/Intro_QDA/what_is_qda.php)
- Van der Heijden, K. (1996). *Scenarios: The art of strategic conversation*. Chichester: Wiley.
- Van der Heijden, K. (2000). Scenarios and forecasting: Two perspectives. *Technological Forecasting and Social Change*, 65(1), 31-36. doi:10.1016/S0040-1625(99)00121-3
- Van Reedt Dortland, M., Voordijk, H., & Dewulf, G. (2014). Making sense of future uncertainties using real options and scenario planning. *Futures*, 55, 15-31. doi:10.1016/j.futures.2013.12.004
- Van Wijngaarden, J. D., Scholten, G. R., & Van Wijk, K. P. (2012). Strategic analysis for health care organizations: The suitability of the SWOT-analysis. *The International Journal of Health Planning and Management*, 27(1), 34-49. doi:10.1002/hpm.1032
- Van Zwieten, M., & Willems, D. (2004). Waardering van kwalitatief onderzoek. *Huisarts en Wetenschap*, 47(13), 38-43. doi:10.1007/BF03083653
- Verhoeven, N. (2014). *Wat is onderzoek? Praktijkboek voor methoden en technieken*. Den Haag: Boom Lemma Uitgevers.
- Wilson, I. (2000). From scenario thinking to strategic action. *Technological Forecasting and Social Change*, 65(1), 23-29. doi:10.1016/S0040-1625(99)00122-5
- Wright, G., Bradfield, R., & Cairns, G. (2013). Does the intuitive logics method—and its recent enhancements—produce “effective” scenarios?. *Technological Forecasting and Social Change*, 80(4), 631-642. doi:10.1016/j.techfore.2012.09.003
- Zarkos, S., Morgan, R. E., & Kouropalatis, Y. (2007). Real options and real strategies. *Strategic Change*, 16(7), 315-325. doi:10.1002/jsc.802

## Appendix I Interview protocol SWOT-team

Interviewee: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_

In the context of the experiment of the course STM&I, I would like to ask you a few questions. The questions are especially about the tasks and your vision on the experiment. If you have any comments or more information, please feel free to share this. All information that you give will remain confidential and anonymous. Furthermore, I would like to ask permission to contact you if I need more information or in case something is missing or not understandable. I also would like to check afterwards if you agree with the conclusions I draw from your answers. Lastly, I would like ask for permission to record this conversation, so that I can fully focus on this interview.

Permission to contact: \_\_\_\_\_

Permission to record: \_\_\_\_\_

If you do not have any questions right now, can we then start the interview?

I first would like to talk briefly about some general topics.

### Background student

- Could you please introduce yourself in a few sentences.
- What is your education?
- What was your motivation to choose the course of STM&I?
- What were your expectations before the experiment started?
- Did your expectations become true?

### Experience

- What do you think of the experiment in general?
  - Supervision during the experiment?
  - Instructions
  - Time span for each activity
  - Paper and computer facilities
- What went well during the experiment?
- What would be a suggestion for improving the experiment? (can be anything)
  - Could you explain why you suggest this?

**Two methods**

- How did you perform the SWOT-analysis?
  - What kind of input did you use?
  - What were the considerations of the approach?
  - What was easy to do?
  - What were difficulties?
  - What are advantages of this approach?
  - What are disadvantages of this approach?
- How did you create the scenarios?
  - What kind of input did you use?
  - What were the considerations of the approach?
  - What was easy to do?
  - What were difficulties?
  - What are advantages of this approach?
  - What are disadvantages of this approach?
- What do you see as the biggest difference between the methods?
- Which method do you prefer, and why?

**Outcomes**

- How did you create your real options?
  - What were your considerations during this task?
  - What was easy to do?
  - What were difficulties?
- What do you think of your own real options?
  - To what extent do you think that your created options are relevant for the company?
- What are difference between your real options, when looking at the real options of both sessions?
  - Could you declare these differences?
- What are similarities between your real options, when looking at the real options of both sessions?
  - Could you declare these similarities?
- To what extent do the real options have overlap?
- To what extent are the real options complementary to each other?

We now come to the end of the interview. Is there anything that I forgot to ask that you would like to elaborate on? Do you have the feeling that we forgot something? Are there any other comments that you would like to share with me? As I mentioned before, I will send you a message when I have the results of this interview. I would like to ask you to verify the results before I interpret them into my final report.

I would again thank you for your time and effort that you have put into this interview!

Ending time: \_\_\_\_\_

## Appendix II Interview protocol Scenario-team

Interviewee: \_\_\_\_\_ Date: \_\_\_\_\_

Start time: \_\_\_\_\_

In the context of the experiment of the course STM&I, I would like to ask you a few questions. The questions are especially about the tasks and your vision on the experiment. If you have any comments or more information, please feel free to share this. All information that you give will remain confidential and anonymous. Furthermore, I would like to ask permission to contact you if I need more information or in case something is missing or not understandable. I also would like to check afterwards if you agree with the conclusions I draw from your answers. Lastly, I would like ask for permission to record this conversation, so that I can fully focus on this interview.

Permission to contact: \_\_\_\_\_

Permission to record: \_\_\_\_\_

If you do not have any questions right now, can we then start the interview?

I first would like to talk briefly about some general topics.

### Background student (5 minutes)

- Could you please introduce yourself in a few sentences?
- What is your education?
- What was your motivation to choose the course of STM&I?
- What were your expectations before the experiment started?
- Did your expectations become true?

### Experience

- What do you think of the experiment in general?
  - Supervision during the experiment?
  - Instructions
  - Time span for each activity
  - Paper and computer facilities
- What went well during the experiment?
- What would be a suggestion for improving the experiment? (can be anything)
  - Could you explain why you suggest this?

**Method**

- How did you create the scenarios?
  - What kind of input did you use?
  - What were the considerations of the approach?
  - What was easy to do?
  - What were difficulties?
  - What are advantages of this approach?
  - What are disadvantages of this approach?

**Outcomes**

- How did you create your real options?
  - What were your considerations during this task?
  - What was easy to do?
  - What were difficulties?
- What do you think of your own real options?
  - To what extent do you think that your created options are relevant for the company?
- What were your experiences while re-evaluating the real options?
  - Did you know you got real options from both groups?
  - What were similarities between the real options?
  - What were differences between the real options?
  - Why do you think that these differences existed?

We now come to the end of the interview. Is there anything that I forgot to ask that you would like to elaborate on? Do you have the feeling that we forgot something? Are there any other comments that you would like to share with me? As I mentioned before, I will send you a message when I have the results of this interview. I would like to ask you to verify the results before I interpret them into my final report.

I would again thank you for your time and effort that you have put into this interview!

Ending time: \_\_\_\_\_