



Radboud Universiteit Nijmegen

# Uncovering the Overall Portfolio Decision-Making Model for Achieving Strategic Alignment

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## Master Thesis

**Name:**

Anna Khachateryan

**Student number:**

S4295870

**Specialization:**

Organizational Design & Development

**Supervisor:**

Dr. Ir. R.G.M. Smals

**Second reader:**

Dr. A.A.J. Smits

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## Abstract

Given today's competitive and dynamic environment, firms are under pressure to continuously innovate to sustain a competitive advantage and long-term growth (Kester, Griffin, Hultink, & Lauche, 2011; Lerch & Spieth, 2012). It is therefore critical for a firm's success and survival to engage in the right innovation projects (Cooper, Edgett, & Kleinschmidt, 2001b; Lerch & Spieth, 2012). Furthermore, studies in the past have argued that innovation project portfolios that are aligned with the firm's strategy can lead to improved firm performance (e.g. Cooper, Edgett, & Kleinschmidt, 2001a; Kester, Hultink, & Griffin 2014; Lin and Lee, 2011). The goal of this research was to uncover multiple relationships within the overall portfolio decision-making model for achieving strategic alignment, thereby creating a better understanding of the overall portfolio decision-making model for achieving strategic alignment. To achieve this goal, this research integrated literature on portfolio decision-making for achieving strategic alignment, literature on methods that help the achievement of strategic alignment and literature on organizational structures involving the centralization and decentralization of decision-making power. A multiple case study was conducted in four firms from different industries to achieve this goal, resulting in 12 interviews and a few internal documents. The analysis of the data collected on the different concepts of this research resulted in uncovering multiple relationships between the portfolio decision-making processes, the methods that help the achievement of strategic alignment, the organizational structure involving the centralization and decentralization of decision-making power and the budget and the elements of portfolio decision-making effectiveness, through which strategic alignment is achieved. This has resulted in two main insights. Firstly, both evidence-based and opinion-based decision-making are needed in portfolio decision-making and contribute to the achievement of strategic alignment, also through the use of top-down roadmaps and financial methods and the budget. Secondly, also both centralization and decentralization are needed in portfolio decision-making and contribute to the achievement of strategic alignment. This means that a proper balance between evidence-based and opinion-based decision-making and centralization and decentralization needs to be realized to achieve strategic alignment. The results of this research help the achievement of this proper balance by illustrating the influence of each concept on the other concepts of this research. The results of this research can therefore be used by all firms that engage in bigger (strategic) innovation projects, but also external actors, to (re)design the portfolio decision-making toward the achievement of strategic alignment and thereby to improved firm performance. However, further research (both qualitative and quantitative) is recommended toward the expansion of the portfolio decision-making model of this research, to thereby create a better understanding of the overall portfolio decision-making model for achieving strategic alignment, because it is not possible for one research to uncover all possible relationships within the overall portfolio decision-making model for achieving strategic alignment.

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## 1. Introduction

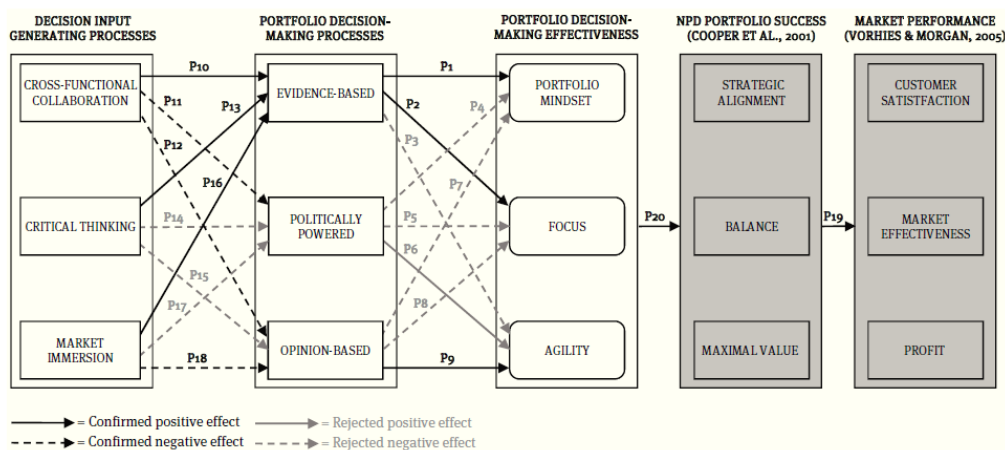
### 1.1. Context and problem statement

Given today's competitive and dynamic environment, firms are under pressure to continuously innovate to sustain a competitive advantage and long-term growth (Kester, Griffin, Hultink, & Lauche, 2011; Lerch & Spieth, 2012). It is therefore critical for a firm's success and survival to engage in the right innovation projects (Cooper, Edgett, & Kleinschmidt, 2001b; Lerch & Spieth, 2012). This leaves firms with the question of how to invest most efficiently and effectively in innovation projects and how to comprise an innovation project portfolio that enables the realization of their long-term goals, given the scarce resources available to them (Lerch & Spieth, 2012). Innovation projects aim at converting ideas into an innovation, meaning to either develop or significantly improve products (good or service), processes, a new marketing method and/or a new organizational method in business practices, workplace organization or external relations (Deák, 2009; Lerch & Spieth, 2012). Innovation Project Portfolio Management (IPPM) is one of the tools that can help firms select the right projects with regard to the resources that are available to them (Cooper, Edgett, & Kleinschmidt, 1999; Lerch & Spieth, 2012). IPPM can furthermore help align projects with the firm's strategy and maintain a balance between different project types (Cooper et al., 1999; Lerch & Spieth, 2012). IPPM can therefore be seen as "the process of evaluating, selecting and prioritizing new or existing innovation projects, according to its main objectives of resource fit, balance, strategic-alignment and value maximization", which can result in maximizing the projects contribution to the firm's success (Lerch & Spieth, 2012, p. 80). This research focuses on one of the four main objectives of IPPM, namely strategic alignment, which is the overarching goal of effective portfolio management, according to Cooper, Edgett and Kleinschmidt (2002). Furthermore, previous studies have argued that project portfolios which are aligned with the firm's strategy can lead to improved firm performance (e.g. Cooper, Edgett, & Kleinschmidt, 2001a; Kester, Hultink, & Griffin 2014; Lin and Lee, 2011). Strategic alignment is achieved when the selected innovation project portfolio reflects the firm's strategy (Lerch & Spieth, 2012), thereby contributing to the achievement of the firm's long-term goals. Thus, the question of how strategic alignment can be achieved arises.

### 1.2. Research aim

Given that selecting innovation projects which reflect the firm's strategy can lead to improved firm performance, the question of how strategic alignment can be achieved arises. Cooper et al. (2001a) identify three methods designed to help achieve strategic alignment: top-down business strategy (the Strategic Buckets approach), top-down roadmaps, and bottom-up strategic gates. However, while the implementation of strategic buckets, roadmaps and strategic gates can all help the achievement of strategic alignment (Cooper et al., 2001a), these methods alone do not contribute to

the understanding of the overall portfolio decision-making of firms involving the achievement of a strategically aligned portfolio (Kester, 2011). To create this understanding, Kester (2011) developed a portfolio decision-making model for achieving effective strategic portfolio decisions (see Figure 1 (Kester, 2011, p. 193)).



**Figure 1. A portfolio decision-making model for achieving effective strategic portfolio decisions (Kester, 2011, p. 193)**

Nonetheless, just like the different articles of Cooper (e.g. Cooper et al., 2001a; Cooper et al., 2002), Kester's portfolio decision-making model does not say anything about how the three methods that help the achievement of strategic alignment are related to portfolio decision-making toward the achievement of strategic alignment (gap 1). Furthermore, while there are many articles on organizational structures and innovation (e.g. Cosh, Fu, & Hughes, 2012; Damanpour & Gopalakrishnan, 1998) and organizational structures and decision-making processes (e.g. Gachet & Brézillon, 2005), there is a lack of literature regarding the relationship between the organizational structure and portfolio decision-making toward the achievement of strategic alignment (gap 2). These two gaps can lead to project failures within many firms due to the lack of strategic alignment of projects (Dash, 2016; Eden, 2019; Hamdan & Jaafar, 2014). According to research conducted by the Project Management Institute (PMI), organizations waste about 11 percent of the amount spent on projects, with the biggest reason (58 percent) being the lack of alignment with the firm's strategy (Dash, 2016). Furthermore, according to a global study (over 1,200 firms) by PricewaterhouseCoopers (PwC), 54 percent of the executives is struggling to align their innovation strategy with the firm's strategy (Eden, 2019). So, while multiple studies in the past have argued that project portfolios that are aligned with the firm's strategy can lead to improved firm performance, there are still multiple relationships, among which gap 1 and gap 2, that need to be uncovered to

fully answer the question of how to achieve strategic alignment through portfolio decision-making. That is where this research comes in. Finally, most literature so far related to IPPM focuses only on new product development (NPD) and not on innovation projects in general (e.g. Jugend & Da Silva, 2014; Jugend, Da Silva, Salgado, & Miguel, 2016; Kaiser, El Arbi, & Ahlemann, 2015; Kester, 2011; Kester et al., 2011; Kester et al., 2014) (Lerch & Spieth, 2012). To change this, this research focuses on all types of innovation projects (product, process, marketing, and organizational innovation) (Deák, 2009), when answering the question of how to achieve strategic alignment through portfolio decision-making.

### 1.3. Research question

The goal of this research is to uncover multiple relationships within the overall portfolio decision-making model for achieving strategic alignment, thereby creating a better understanding of the overall portfolio decision-making model for achieving strategic alignment and thus, filling in the gaps in the literature. This will be done by integrating portfolio decision-making literature for achieving strategic alignment with literature on methods that help the achievement of strategic alignment and literature on organizational structures. For this research, the literature on portfolio decision-making for achieving strategic alignment involves the portfolio decision-making processes and the three elements of portfolio decision-making effectiveness identified by Kester (2011) (see Figure 1 (Kester, 2011, p. 193)). The literature on methods that help the achievement of strategic alignment involves the three methods identified by Cooper et al. (2001a): top-down business strategy, top-down roadmaps, and bottom-up strategic gates. Finally, the literature on organizational structures involves centralization and decentralization of decision-making power. To achieve this goal, this research aims at answering the following research question:

*How are the methods that help the achievement of strategic alignment and the organizational structure involving centralization and decentralization of decision-making power related to the portfolio decision-making processes and the elements of portfolio decision-making effectiveness and thereby to the achievement of strategic alignment?*

To answer this research question, the following sub-questions need to be answered. The first two sub-questions focus on filling in the first gap in the literature, while the last sub-question focuses on filling in the second gap in the literature.

1. How are the portfolio decision-making processes related to the methods that help the achievement of strategic alignment?

2. How are the methods that help the achievement of strategic alignment related to the elements of portfolio decision-making effectiveness?
3. How is the organizational structure involving the centralization and decentralization of decision-making power related to the elements of portfolio decision-making effectiveness?

#### 1.4. Theoretical and practical relevance

While multiple studies in the past have argued that project portfolios which are aligned with the firm's strategy can lead to improved firm performance, there are still gaps in the literature regarding the achievement of strategic alignment (see section 1.2). Answering the research question will result in filling in these gaps in the literature, by integrating portfolio decision-making literature for achieving strategic alignment with literature on methods that help the achievement of strategic alignment as well as literature on organizational structures involving centralization and decentralization of decision-making power, to uncover multiple relationships within the overall portfolio decision-making model for achieving strategic alignment and to create a better understanding of the overall portfolio decision-making model involving the achievement of strategic alignment. The integration of literature and the creation of a better understanding can also help advance empirical research on the relationship between strategic alignment and firm performance, which is lacking according to Kester et al. (2014). Integrating literature and creating a better understanding will furthermore help firms to (re)design their portfolio decision-making toward the achievement of strategic alignment, which is also lacking at this moment (Dash, 2016; Eden, 2019; Hamdan & Jaafar, 2014). It can also be used by external actors (e.g. consultants) as a tool to help firms toward the achievement of strategic alignment. In both cases, leading to improved firm performance.

#### 1.5. Research outline

This research consists of six chapters, the first chapter being the introduction. The introduction involves the discussion of the context and problem statement, the research aim, the research question and the corresponding sub-questions and finally the theoretical and practical relevance. The second chapter involves a literature review of the different portfolio decision-making processes, the different methods that help the achievement of strategic alignment and the organizational structure involving the centralization and decentralization of decision-making power, with at the end of the chapter a conceptual model with all anticipated relationships. The third chapter presents the methodology of this research. Chapter 4 covers the results after data collection and analysis. Chapter 5 gives a final answer to the research question and includes practical recommendations. And finally,



the last chapter, chapter 6, provides the discussion, which includes theoretical implications, methodological reflection and limitations and recommendations for further research.

## 2. Theoretical framework

Literature on portfolio decision-making for achieving strategic alignment, on methods that help the achievement of strategic alignment and on organizational structures need to be reviewed to answer the research question. Thus, chapter 2 starts with discussing the different processes for portfolio decision-making and their relation to the three elements of portfolio decision-making effectiveness and to strategic alignment (section 2.1). The next section of chapter 2 discusses the three methods that help the achievement of strategic alignment and their relation to both the two decision-making processes and the three elements of portfolio decision-making effectiveness (section 2.2), followed by a section on organizational structures involving the centralization and decentralization of decision-making power and their relation to the three elements of portfolio decision-making effectiveness (section 2.3). Finally, at the end of this chapter, a conceptual model is presented to illustrate the different anticipated relationships (section 2.4).

### 2.1. Portfolio decision-making and strategic alignment

Kester et al. (2011) illustrate three different processes for project portfolio decision-making that are (to some extent) present in each firm: evidence-based decision-making, opinion-based decision-making and politically-powered decision-making. These processes can furthermore influence the three elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility (Kester et al., 2011). These three elements in turn have a positive effect on the different objectives of IPPM, among which strategic alignment (Kester et al., 2014). In the following sections, the three processes and their relation to the three elements of portfolio decision-making effectiveness are discussed in more detail and related to strategic alignment.

#### 2.1.1. Evidence-based decision-making

Evidence-based decision-making involves portfolio decision-making that is rational, analytic and fueled by facts. It focuses on “building objective decision-making rationales for portfolio decisions” (Kester, 2011, p. 90). Evidence-based decision-making is thus based on rational decision-making, which involves the use of facts and information, analysis and a step-by-step procedure to make an accurate or near accurate decision (Uzonwanne, 2016) to achieve the firm’s goals (Simon, 1993). Evidence-based decision-making is most suitable in stable environments where data are more reliable, pressures to collect data quickly are low and gathering data is less costly (Khatri & Ng, 2000). In such environments, evidence-based decision-making may achieve better performance than decisions based on intuition (part of opinion-based decision-making) (Khatri & Ng, 2000). Furthermore, according to Uzonwanne (2016), a fact-based decision which is properly analyzed often

results in a positive and effective solution. Rational decision-making is thus often used when something of value is at stake or when an investment is involved, with the focus to maximize expected utility through choices (Kester, 2011; Uzonwanne, 2016). To maximize expected utility, firms need to gather adequate materials of information in terms of: “availability of information, value of the information, precision of the information, and reliability of the information” (Uzonwanne, 2016, p. 3). This is, however, not always a possibility due to the inability of humans to gather and analyze adequate materials of information (Uzonwanne, 2016). According to Simon (1957), “the capability of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solutions required for objectively rational behavior in the real world - or even for a reasonable approximation to such objective rationality” (p. 198). He calls this bounded rationality. Bounded rationality is the reason why firms often strive toward decisions that are good enough instead of decisions that are the best (Kester, 2011).

Kester (2011) illustrates that evidence-based decision-making has a significant positive effect on both the firm’s ability to develop a portfolio mindset and on the firm’s ability to focus development efforts to achieve the firm’s long-term goals. A portfolio mindset involves the complete understanding of all projects and their interdependencies and having an ongoing overview of all projects being considered or underway, the status of each project and the expected launch into the market date (Kester et al., 2011; Kester et al., 2014). Focusing efforts on the other hand involves everyone in the firm knowing, at all times, what the development priorities are in the portfolio (which can be achieved by having a portfolio mindset) and how these priorities help them achieve the firm’s long-term goals (Kester et al., 2011; Kester et al., 2014). It furthermore involves the consistent assignment of employees to projects that help the achievement of the firm’s long-term goals (Kester et al., 2011; Kester et al., 2014). This prevents everyone in the firm from chasing innovations opportunistically and enables them to prioritize new opportunities against current priority projects, setting aside personal preferences (Kester et al., 2011; Kester et al., 2014). Both the firm’s ability to develop a portfolio mindset and the firm’s ability to focus development efforts on the achievement of the firm’s long-term goals have a significant positive effect on strategic alignment (Kester et al., 2014).

#### 2.1.2. Opinion-based decision-making

Opinion-based decision-making involves “discussing subjective opinions from naïve preferences or personal experiences for which it is difficult to articulate decision-making rationales” (Kester, 2011, p. 90). Opinion-based decision-making thus most of the times involves the use of intuition instead of reasoning or logic. In the literature, different definitions of intuition can be found (e.g. Dane & Pratt, 2007). Given these definitions, Dane and Pratt (2007) came up with the following definition of

intuition: “intuitions are affectively charged judgments that arise through rapid, nonconscious, and holistic associations” (p. 40). Integrating the different definitions of intuition, the following can be said about opinion-based decision-making: it is an unconscious, immediate, holistic processing mode of reaching a cognitive conclusion based on little information, on previous experiences and emotional input. It can therefore be said that opinion-based decision-making is person-dependent. According to Uzonwanne (2016), decisions based on intuition (part of opinion-based decision-making) are needed when information or knowledge is scarce, when immediate solutions are needed and when the problem and the decision to be made is challenging and complex. That is why opinion-based decision-making is more suited in an unstable environment, where not a lot of data are available or reliable, there is much pressure to collect data quickly and in high amount, to deal with environmental instability and where collecting data is more costly (Khatri & Ng, 2000). However, this can lead toward decision-making that is more error-prone and inconsistent, which in turn can lead toward uncertainty and loss of confidence in the manager (Uzonwanne, 2016). One reason for inconsistency can be the fact that opinion-based decision-making is person-dependent. Thus, opinion-based decision-making can be quite risky and rather costly when stakes are high and investments are involved. (Uzonwanne, 2016).

Kester (2011) illustrates that opinion-based decision-making has a significant positive effect on the firm’s ability to be agile in portfolio decision-making. Agility involves being able to make and implement portfolio decisions quickly (Kester et al., 2011; Kester et al., 2014), which is needed in unstable environments (Khatri & Ng, 2000). Firms furthermore need to be able to quickly shift their focus toward new opportunities (new innovation projects) and to quickly eliminate projects that no longer fit the firm’s strategy (Kester et al., 2011; Kester et al., 2014). Moreover, Kester et al. (2014) illustrate that the firm’s ability to be agile in portfolio decision-making has a significant positive effect on strategic alignment.

#### 2.1.3. Politically-powered decision-making

Politically-powered decision-making involves making portfolio decisions that reflect the interest and goals of certain powerful groups or individuals within the firm, due to differences in motivation (Kester et al., 2011). Thus, groups or individuals within the firm with enough power can use their power to influence the decision-making process to serve their own interests and goals. Political behavior is therefore frequently departed from rationality (Child, Elbanna, & Rodrigues, 2010). Serving your own interests or goals within the firm can be done by the use of political tactics, such as coalition formation, lobbying and cooptation agenda control. (Child et al., 2010; Kester, 2011). This behavior results in competing interests and goals within the firm, and balancing these competing

interests and goals can help ensure democracy and a “reasonably equitable distribution of benefits” (Child et al., 2010, p. 107). It can, nonetheless, also lead toward the exploitation of the less powerful and suppression of any discussion of alternatives, when certain groups gain more power than others, or when groups start to collude rather than compete (Child et al., 2010). Furthermore, using political tactics to serve your own interests and goals within the firm adds to the uncertainty of decision-making while it is in variance with and can easily undermine the formal decision rules of the firm (Child et al., 2010). Thus, decision makers feel a greater need to make decisions based on rationality instead of decision-making through politics when it comes to making decisions where the stakes are high or investments are involved (high consequences). (Child et al., 2010). This is because according to findings (Child et al., 2010; Kester, 2011), the use of rational procedures is positively related to decision-making effectiveness and organizational performance, leading toward a higher expectation of executives to be more rational when making decisions that can affect the success of the firm.

Kester (2011) illustrates that politically-powered decision-making has no significant effect on the three elements of portfolio decision-making effectiveness and thus also no significant effect on strategic alignment via the three elements of portfolio decision-making effectiveness.

#### 2.1.4. Conclusion section 2.1

According to, among others, Sadler-Smith and Shefy (2007) and Burke and Miller (1999), both rationality and intuition are used when making decisions. Also, Kester et al. (2011) claim that rationality and intuition can be combined in making decisions. Looking at section 2.1.1. and 2.1.2., it can be concluded that evidence-based and opinion-based decision-making complement each other and are both needed in selecting innovation projects when it comes to the achievement of strategic alignment. Evidence-based decision-making is needed to enhance focus toward achieving the firm’s long-term goals and to develop a portfolio mindset, both leading toward strategic alignment in stable environments. However, opinion-based decision-making is needed to be agile in making decisions to keep innovation projects aligned with the firm’s long-term goals in unstable environments where not a lot of information is available and decisions need to be made quickly. Moreover, opinion-based decision-making is especially of importance when it comes to high innovation level projects, especially at the early selection stage(s), while high innovation level projects go hand in hand with a high level of uncertainty and a low level of reliable information available (Deák, 2009; Kester, 2011; Kester et al., 2011). Thus, while

achieving strategic alignment relies on evidence-based decision-making to create a portfolio mindset and focus toward achieving the firm's long-term goals, it at the same time needs opinion-based decision-making to be agile at the early selection stage(s), especially when it comes to high innovation level projects. Also, while both evidence-based and opinion-based decision-making can be used to achieve the firm's long-term goals, politically-powered decision-making can be used by people to serve their own interests and goals within the firm, which can differ from the firm's long-term goals. Politically-powered decision-making will in that case not lead toward strategic alignment. Also, Kester (2011) illustrates that politically-powered decision-making has no significant effect on the three elements of portfolio decision-making effectiveness and thus, also no significant effect on strategic alignment. Given all this, politically-powered decision-making will not be included in the conceptual model illustrated in section 2.4.

## 2.2. Project selection methods that help the achievement of strategic alignment

Cooper et al. (2001a) have identified three methods that are designed to achieve strategic alignment: top-down business strategy (the Strategic Buckets approach), top-down roadmaps and bottom-up strategic gates. The question however is, how these three methods relate to the two decision-making processes and to the three elements of portfolio decision-making effectiveness and thereby to the achievement of strategic alignment. The three methods that help the achievement of strategic alignment need to be discussed in more detail to answer this question.

Besides these three methods that help the achievement of strategic alignment, Cooper et al. (2001b) mention several other methods that can be used for portfolio management. These methods can be used to support the achievement strategic alignment (Cooper et al., 2001a). Thus, in the following sections, the three different methods that help the achievement of strategic alignment are discussed in more detail, followed by a short discussion of other methods that can support the achievement of strategic alignment.

### 2.2.1. Top-down business strategy

This method involves keeping the firm's strategy as the basis for allocating the firm's resources to the different types of projects (top-down approach), and is the second most commonly used method (Cooper et al., 2001b). This method works as following: after the firm's strategy has been determined, the firm's resources are allocated and put into different buckets (the Strategic Buckets approach) where the different types of projects within buckets are then ranked or rated until the firm's resources allocated to that specific bucket reach their limit (Cooper et al., 2001b). This ranking

can be done via either a financial index, the Expected Commercial Value (ECV) or a scoring model (Cooper et al., 2001b). Thus, because the main purpose of top-down business strategy is keeping the firm's strategy as the basis for allocating firm's resources to the different types of projects, it can be said that top-down business strategy can have an influence on the firm's ability to focus development efforts toward the achievement of the firm's long-term goals. According to research by Cooper et al. (2001b), the best performing firms, meaning firms that achieve positive portfolio results, use top-down business strategy as the dominant method to allocate resources and make portfolio decisions, instead of the most popular methods which are the financial methods. Furthermore, firms are able to decrease the disadvantages of financial methods, scoring models or checklists that are used to rank the projects within the different buckets by choosing for top-down business strategy to be the dominant method. (Cooper et al., 2001b). Section 2.2.4 provides information on the disadvantages of financial methods, scoring models and checklists.

#### 2.2.2. Top-down roadmaps

Both bubble diagrams and top-down roadmaps can improve the visualization of projects (Jugend & Da Silva, 2014). However, while bubble diagrams only displaying the current portfolio of the firm and are therefore not suitable for making decisions (Cooper et al., 2001a), top-down roadmaps involve mapping major projects, which are required to realize the firm's long-term goals (top-down approach) along a timeline (Cooper et al., 2002). Thus, the selection of projects using top-down roadmaps is fully strategically driven (Cooper et al., 2001a). Both evidence-based decision-making and opinion-based decision-making are required to map major projects that are required to realize the firm's long-term goals, because information is not always available when planning for the long term. Furthermore, while top-down roadmaps involve starting with a clear firm strategy and then deciding on how to allocate the firm's resources (Cooper et al., 2001a, Kester, 2011), it can be said that top-down roadmaps can have an influence on the firm's ability to focus development efforts to achieve the firm's long-term goals. Also, top-down roadmaps can be designed to be more flexible, enabling decision makers to change and implement portfolio decisions quickly (Bastow, 2014).

#### 2.2.3. Bottom-up strategic gates

The idea of bottom-up strategic gates is to install a project gating system that accepts good projects and kills the poor ones, with the commonly accepted philosophy that the portfolio will take care of itself (bottom-up approach) by making good decisions on individual projects. (Cooper et al., 2001a). Thus, in contrast to top-down approaches, a bottom-up approach does not start with a clear firm strategy in mind before allocating the firm's resources (Cooper et al., 2001a). So, having only an effective gating process does not automatically result in an effective portfolio management, where

the overarching goal is to achieve strategic alignment (Cooper et al., 2002). A gating process needs to include strategic questions or criteria (in its scoring model), the Strategic Buckets approach or top-down roadmaps to achieve strategic alignment. (Cooper et al., 2002). Only by including one of these methods, the bottom-up strategic gates method can positively influence the firm's ability to focus development efforts to achieve the firm's long-term goals. Furthermore, according to recent literature, leading firms are starting to integrate agile methods into their gating process, which results in flexibility, speed and improved communication (Cooper, 2016; Cooper & Sommer, 2018; Sommer, Hedegaard, Dukovska-Popovska, & Steger-Jensen, 2015). This means that bottom-up strategic gates can have an influence on the firm's ability to be agile in portfolio decision-making by integrating agile methods into the current gating process.

#### 2.2.4. Other methods supporting the achievement of strategic alignment

##### 2.2.4.1. Financial methods

Financial methods are the most commonly used methods to select projects (Cooper et al., 2001b; Jugend & Da Silva, 2014). According to Jugend and Da Silva (2014), "financial methods aim at analyzing the maximization of the portfolio value in order to measure the ratio of resources used and projected returns from projects" (p. 20). Thus, adopting economic and financial indicators help firms evaluate the attractiveness of projects by looking at the ratio between resources used and projected returns, enabling them to prioritize the different projects and thus maximize value (Jugend & Da Silva, 2014). Examples of financial methods are: Net Present Value (NPV), ECV, Return on Investment (ROI), payback period and Internal Rate of Return (IRR) (Cooper et al., 2001b; Jugend & Da Silva, 2014). Even though financial methods are the most commonly used method, the use of only financial methods does not ensure strategic alignment of projects (Jugend & Da Silva, 2014; Lee, Kang, Part & Park, 2008). This is due to the fact that financial methods often do not measure long-term impact of innovations, which leads toward the discouragement to execute more innovative or more risky projects (Jugend & Da Silva, 2014). This is, nonetheless, prevented to some extent when financial methods are used in combination with the three methods that help the achievement of strategic alignment, while these methods also include a focus toward achieving the firm's long-term goals.

##### 2.2.4.2. Scoring models and checklists

Scoring models involve rating or scoring projects on a number of questions or criteria (Cooper et al., 2001b). After all, the ratings or scores of a certain project have been summed up, a total score rolls out, which can be used to make projects selection decisions. The ratings or scores can be weighted to represent their importance in the total score when summing up the ratings or scores. (Cooper et al.,



2001b). Besides facilitating the analysis and decision-making with regard to technical, market and risk characteristics that are associated with projects, scoring models can be used to analyze the alignment between projects and the firm's strategy (Jugend & Da Silva, 2014).

Checklists, similar to scoring models, can be used by firms to evaluate projects on a set of questions, with the difference that checklists involve answering questions with a yes or a no instead of rating or scoring them (Cooper et al., 2001b). Firms will only proceed with a certain project when it achieves all yes answers or a certain number of yes answers that has been set in advance (Cooper et al., 2001b). Checklists, just like scoring models, can include questions to analyze the alignment between projects and the firm's strategy. However, both scoring models and checklists have two disadvantages to them, one being the fact that scoring models and checklists neglect the interdependence between the different projects and the other one the fact that scoring models and checklists can be biased by the subjectivity of the attributed scores (Jugend & Da Silva, 2014).

#### 2.2.5. Conclusion section 2.2

A certain level of evidence-based decision-making is needed to use the three methods that help the achievement of strategic alignment. As mentioned in section 2.2.1, when it comes to top-down business strategy, the allocation of resources between the different buckets involves then use of either a financial index, the ECV or a scoring model, which implies the use of evidence-based decision-making. However, as mentioned in 2.2.4, scoring models can be biased by the subjectivity of the attributed scores, meaning that opinion-based decision-making is also to some extent involved when it comes to top-down business strategy. Moreover, evidence-based decision-making is needed because the use of top-down roadmaps involves mapping major projects along a timeline. To do this, (market) research and information is needed. Nonetheless, while information is not always available especially when it comes to the future, opinion-based decision-making is needed to plan for the long-term. Finally, when it comes to bottom-up strategic gates, evidence-based decision-making is also needed to accept or kill individual projects. However, opinion-based decision-making is to some extent involved as well when it comes to bottom-up strategic gates, while both scoring models and checklists can be biased by the subjectivity of the attributed scores, as mentioned in section 2.2.4.

Furthermore, the three methods that help the achievement of strategic alignment can be related to the three elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility. Top-down business strategy can have an influence on both having a portfolio mindset and focus. Firms need to have a complete overview of the entire portfolio, in-depth knowledge about the projects and understanding of how each project relates to the achievement of the firm's long-term

goals to use this method. Focus is achieved by the fact that the method top-down business strategy revolves around resource allocation in accordance with the firm's strategy. Top-down roadmaps can have an influence on all three elements of portfolio decision-making effectiveness. Just like top-down business strategy, this method can only be used when a firm has a complete overview of the entire portfolio, in-depth knowledge about the projects and understanding of how each project relates to the achievement of the firm's long-term goals. The fact that the selection of projects when using top-down roadmaps is fully strategically driven means that focus toward the firm's long-term goals can be achieved. Finally, top-down roadmaps can have an influence on agility. This, however, depends on the flexibility of the developed roadmap. The third method that helps the achievement of strategic alignment, bottom-up strategic gates, can have an influence on focus and agility. Nonetheless, both depend on the design of the gating system. Focus can only be achieved when strategic questions or criteria, the Strategic Buckets approach or top-down roadmaps are included in the gating system and agility when agile methods are included in the gating system.

In practice, most firms, use multiple methods in the decision-making process of selecting projects while having a dominant method. (Cooper et al., 2001b). This means that all methods mentioned above can in practice also be combined toward the achievement of strategic alignment.

### 2.3. The organizational structure involving centralization and decentralization of decision-making power

An organizational structure involves the division of work within a firm (Achterbergh & Vriens, 2009). According to Luhmann in Achterbergh and Vriens (2009), organizational structures are not only the result of a process of decision-making, but also serve as an infrastructural subject in further decision-making. In the literature, different types of organizational structures can be distinguished dependent on different design parameters (e.g. De Sitter in Achterbergh & Vriens, 2009; Mintzberg, 1980). One of these design parameters concerns the design of decision-making systems to either be more centralized or more decentralized. In the following section, both centralization and decentralization of decision-making power are discussed in more detail and linked to the three elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility.

#### 2.3.1. Centralization of decision-making power

Centralization means that the decision-making power for selecting projects is in the hands of the top-management (Zabojnik, 2002). This means that all decisions are made without consulting lower levels of management (top-down decision-making). This makes centralized firms extremely efficient in making decisions (Vitez, 2019). However, being responsible for making all of the decisions requires a

lot of time from the top-management, which can lead to delayed decision-making (Surbhi, 2017; Vitez, 2019). That is why centralization is most suitable for small sized firms (Surbhi, 2017). Furthermore, according to studies (Cohn & Turyn, 1984), a high level of centralization reduces the adoption of revolutionary innovations, which is often associated with a higher degree of uncertainty (Deák, 2009; Kester et al., 2011).

### 2.3.2. Decentralization of decision-making power

Decentralization on the other hand involves decision-making by all levels of management, where lower levels of management are able to make decisions without the interference of the top-management (bottom-up decision-making) (Surbhi, 2017; Zabochnik, 2002). The benefit of decentralization is that it enables quick decision-making as a response to the changing environment, by cutting down the long decision paths (Gachet & Brézillon, 2005; Zabochnik, 2002). Decentralization furthermore allows firms to utilize the expertise and knowledge of lower levels of management (Vitez, 2019). This, however, can lead to multiple individuals having different opinions, making it difficult to get everyone on the same page when making decisions (Vitez, 2019). Thus, decentralized decision-making can lead to a lack of leadership and coordination, making for inefficient decision making (Surbhi, 2017).

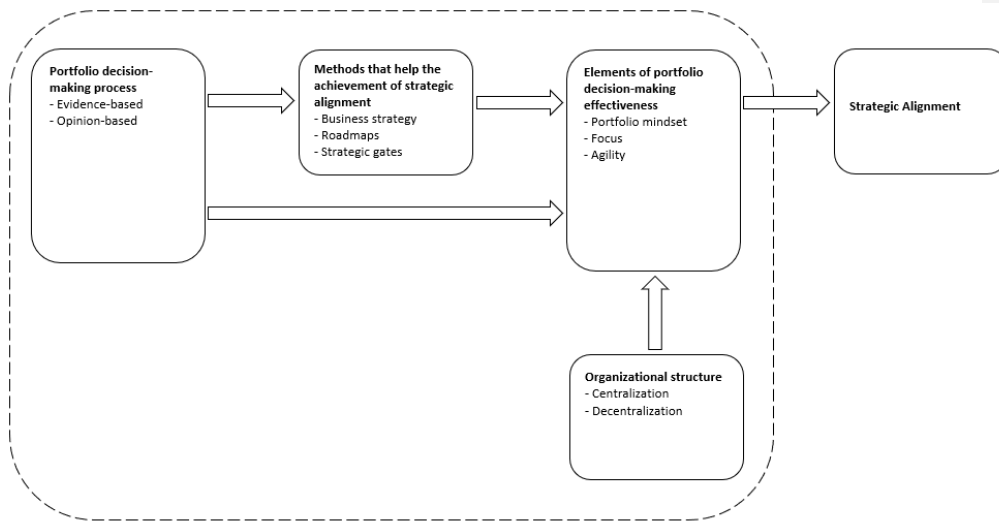
### 2.3.3. Conclusion section 2.3

There is an ongoing debate about centralization versus decentralization to determine which decision-making structure is better (Surbhi, 2017). With regard to portfolio decision-making, both centralization and decentralization have their advantages and disadvantages when relating them to the three elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility. In general, the top-management is responsible for determining the firm's strategy. This in combination with the top-management being the one who makes all (major) portfolio decisions can have an influence on having a portfolio mindset and on achieving and keeping focus toward the achievement of the firm's long-term goals. Furthermore, as illustrated above, decision-making by the top-management can have an influence on the firm's ability to be agile in portfolio decision-making. This is also the case for decentralization. Decentralization can furthermore have an influence on having a portfolio mindset due to independent decision-making by lower levels of management and the expertise and knowledge of lower levels of management. Finally, decentralization can also have an influence on focus, because of the involvement of multiple individuals with different opinions in the decision-making process and the lacking leadership and coordination. Given all of this, it can be said that both types of structures are needed in portfolio decision-making to achieve strategic alignment.

Nonetheless, the question of how the combination of centralization and decentralization within portfolio decision-making should look like remains.

#### 2.4. Conceptual model

After reviewing the literature on portfolio decision-making for achieving strategic alignment, on methods that help the achievement of strategic alignment and on organizational structures involving the centralization and decentralization of decision-making power, the conclusion can be drawn that both the three methods that help the achievement of strategic alignment and the organizational structure involving the centralization and decentralization of decision-making power can be related to the portfolio decision-making model of Kester (2011). Kester (2011) illustrates that evidence-based and opinion-based decision-making are positively related to the three elements of portfolio decision-making effectiveness. The literature review furthermore illustrates that evidence-based and opinion-based decision-making can also be related to the three methods that help the achievement of strategic alignment and that these three methods on the other hand can be related to the three elements of portfolio decision-making effectiveness. Also, the organizational structure involving the centralization and decentralization of decision-making power can be related to the three elements of portfolio decision-making effectiveness, according to the literature review. Finally, Kester et al. (2014) illustrate that the three elements of portfolio decision-making effectiveness are positively related to the achievement of strategic alignment. All of these anticipated relationships lead to the following conceptual model (Figure 2). However, given the aim of this research and the fact that the relationship between the three elements of portfolio decision-making effectiveness and strategic alignment has already been empirically tested by Kester et al. (2014), this latter relationship will not be included in this research.



**Figure 2. Conceptual model based on literature review**

### 3. Methodology

This chapter presents the methodology of this research. First, the choice for conducting a multiple case study (qualitative research) is explained. After that, the case selection is discussed, followed by the operationalization of the concepts discussed in chapter 2, the data collection, the data analysis and finally the research ethics. The different choices made in the methodology of this research have all been guided by the research question.

#### 3.1. Research method

The aim of this research is to uncover multiple relationships within the overall portfolio decision-making model and thereby creating a better understanding of the overall portfolio decision-making model involving the achievement of strategic alignment. While Kester (2011) has already developed a portfolio decision-making model for achieving effective strategic portfolio decisions, it is not possible for one research to uncover all possible relationships within the overall portfolio decision-making model for achieving strategic alignment. After reviewing the literature on the methods that help the achievement of strategic alignment and organizational structures involving the centralization and decentralization of decision-making power, multiple anticipated relationships have been detected when relating them to the portfolio decision-making model of Kester (2011) (see chapter 2). However, because no specific theoretical and empirical research can be found linking the methods that help the achievement of strategic alignment and organizational structures involving the centralization and decentralization of decision-making power to the concepts of the portfolio decision-making model of Kester (2011) (gap 1 & gap 2), in-depth (qualitative) research is needed to uncover these possible relationships to thereby create a better understanding of the overall portfolio decision-making model involving the achievement of strategic alignment. According to Eisenhardt (1989), a case study can be used to build a theory when research and theory are still in the early phases of development, which as mentioned above is the case when it comes to linking the methods that help the achievement of strategic alignment and organizational structures involving the centralization and decentralization of decision-making power to the elements of the portfolio decision-making model of Kester (2011). Thus, the research method that is most suitable for answering the research question is a case study. A case study furthermore allows for answering a “how” question, which is the case for this research, and for in-depth research of a phenomenon within its real-life context (Yin, 2003). The two other, more common methods, namely the experiment and the survey, are on the other hand not suitable for in-depth research of a phenomenon within its real-life context (Wester, 1991). As mentioned above, an in-depth research is needed for reaching a holistic understanding of the phenomenon being studied (Baxter & Jack, 2008). Furthermore, research within its real-life context is needed because, as mentioned in section 2.3, the organizational structure involving the centralization and

decentralization of decision-making power can have an influence on the three elements of portfolio decision-making effectiveness and the organizational structure can be seen as an characteristic of the organizational context (Hagar, 2011). Moreover, this research makes use of a multiple case study, because multiple case studies can help develop an understanding of the similarities and differences between the different cases (Baxter & Jack, 2008; Yin, 2003), which is useful when building an argumentation about relationships between different dimensions.

### 3.2. Case selection

The case that is being studied in this research is the overall decision-making of firms regarding innovation projects. According to Eisenhardt (1989), four to ten cases are needed to replicate findings across cases. However, because a multiple case study has proven to be robust and reliable, it can also be extremely time consuming (Baxter & Jack, 2008). For this reason, four firms have been selected for this research (see Table 1). All names are anonymized. As mentioned in section 1.2, most literature so far only related to IPPM focuses on new product development (NPD). To change this, this research has focused on innovation projects in general, meaning that no case selection has been made based specifically on the type of innovation project. To ensure the focus toward innovation projects in general, firms from different industries have been chosen. This has led toward both firms that mostly focus on NPD (Firm A and Firm B) and firms that also focus on other types of innovation (Firm C and Firm D). Furthermore, based on the literature review, no specific aspects come to light that are important to be kept similar. However, to ensure the possibility of collecting data on all dimensions of the conceptual model and especially the methods that help the achievement of strategic alignment, only firms that also engage in bigger (strategic) projects ( $\pm 500.000,00$  euros or more) have been selected, websites have been investigated and the characteristics age and size (number of employees) have been considered. According to the OECD (2005), firms that have fewer than 250 employees are qualified as small and medium-sized firms and firms that have 250 or more employees are qualified as large firms. This research consists of large firms only. Finally, all firms selected are located in the Netherlands, which has more pragmatic reasoning.

	<b>Firm A</b>	<b>Firm B</b>	<b>Firm C</b>	<b>Firm D</b>
<b>Industry</b>	High-tech	High-tech	Retail	Retail
<b>Founding year</b>	1927	1981	1978	1968
<b>Number of employees</b>	$\pm 3.900$	$\pm 600$	$\pm 370$	$\pm 300$
<b>Location</b>	Venlo (NL)	Ruurlo (NL)	Leusden (NL)	Amsterdam (NL)

**Table 1. Selected cases**

### 3.3. Operationalization

Observable and measurable variables need to be identified to collect data on the different concepts and dimensions discussed in chapter 2. Thus, this section involves the operationalization of the different concepts and their corresponding dimensions into indicators (see Table 2). The table also includes the main sources used for the operationalization.

The first concept of the conceptual model portfolio decision-making processes involves the dimensions evidence-based decision-making and opinion-based decision-making (Kester et al., 2011). Evidence-based decision-making involves rationality (Kester et al., 2011). Rational decision-making involves the use of facts and information, analysis, and a step-by-step procedure to make an accurate or near accurate decision (Uzonwanne, 2016). This means analyzing all relevant information by conducting multiple analyses, considering multiple sources of evidence, and incorporating multiple perspectives to make evidence-based decisions in a systematic way (Kester, 2011). Opinion-based decision-making on the other hand involves intuition (Kester et al., 2011). As mentioned in section 2.1.2, decision-making based on intuition can be seen as an unconscious, immediate, processing mode of reaching a cognitive conclusion based on little information, on previous experiences and emotional input. This means making quick decisions based on own opinions, gut feeling, previous experiences and/or emotional input instead of evidence (Kester, 2011).

The second concept methods that help the achievement of strategic alignment consists of three dimensions (Cooper et al., 2001a): top-down business strategy, top-down roadmaps and bottom-up strategic gates. Top-down business strategy involves allocating resources and putting them into buckets based on the firm's strategy, to then within the buckets divide the resources between the different projects using a ranking or rating system (Cooper et al., 2001b). This means making use of strategic buckets and assigning all resources of a bucket to specific projects. Top-down roadmaps involve mapping major projects, which are required in order to realize the firm's long-term goals, along a timeline (Cooper et al., 2002). Thus, top-down roadmaps involve selecting strategic projects and mapping them along a time line. Finally, bottom-up strategic gates involves the use of a gating system to assess individual projects to either accept or kill projects. However, as mentioned in section 2.2.3, to achieve strategic alignment a gating process needs to include strategic questions or criteria, the Strategic Buckets approach or top-down roadmaps (Cooper et al., 2002). Thus, bottom-up strategic gates involve a gating system to assess individual projects including strategic questions or criteria, the Strategic Buckets approach or top-down roadmaps.



The third concept is the organizational structure. As mentioned in section 2.3, this research focuses on the dimensions centralized and decentralized decision-making. Centralization involves top-down decision-making. So, the decision-making power is in the hands of the top management and lower levels of management are not consulted (Zabojnik, 2002). Decentralization on the other hand involves bottom-up decision-making. So, decision-making by all levels of management where lower levels of management are able to make decisions without the interference of the top-management (Surbhi, 2017; Zabojnik, 2002). This means that multiple people are involved in the decision-making process.

Finally, the last concept elements of portfolio decision-making effectiveness has three dimensions: portfolio mindset, focus and agility (Kester et al., 2011; Kester et al., 2014). As mentioned in section 2.1.1, having a portfolio mindset involves having a complete understanding of all projects and their interdependencies and having an ongoing overview of all the projects being considered or underway, the status of each project and the expected launch into the market date (Kester et al., 2011; Kester et al., 2014). This means at all times having a complete overview of all projects, having in-depth knowledge about each individual project and understanding how each project relates to the achievement of the firm's long-term goals (Kester et al., 2014). The dimension focus involves everyone in the firm knowing, at all times, what the priorities are and how these priorities help them achieve the firm's long-term goals (Kester et al., 2011; Kester et al., 2014). It also involves the consistent assignment of employees to projects that help the achievement of the firm's long-term goals (Kester et al., 2011; Kester et al., 2014). This means focusing resources on the achievement of innovation portfolio priorities, working in a focused manner and being not easily distracted from executing priorities and focusing resource allocation on short-term goals that help achieve the firm's long-term goals (Kester et al., 2015). Finally, the dimension agility involves being able to make and implement portfolio decisions quickly (Kester et al., 2011; Kester et al., 2014). Firms also need to be able to quickly shift their focus toward new opportunities (new innovation projects) and to quickly eliminate projects that no longer fit the firm's strategy (Kester et al., 2011; Kester et al., 2014). Agility can therefore be divided into two aspects: flexibility and decision-making speed. Flexibility involves the ability to change and implement new opportunities, while decision-making speed involves the ability to make and implement new opportunities quickly (Kester et al., 2015).

Concept	Dimension	Indicator	Main source
Portfolio decision-making process	Evidence-based decision-making	Analyzing all relevant information	Kester et al. (2014)
		Conducting multiple analyses and considering multiple sources of evidence	
		Incorporating multiple perspectives in portfolio decision-making	
		Making portfolio decisions in a systematic way	
		Portfolio decisions are evidence based	
	Opinion-based decision-making	Based on what feels right (gut feeling)	Kester et al. (2014); a few indicators are set up specifically for this research
		Based on previous experiences and/or emotional input	
		Portfolio decisions are opinion-based	
		Quick decision making	
Methods that help the achievement of strategic alignment	Top-down business strategy	Use of strategic buckets	Cooper et al. (2001a); indicators are set up specifically for this research
		Assigning all resources of a bucket to specific projects	
	Top-down roadmaps	Selection and mapping of strategic projects along a time line	
	Bottom-up strategic gates	Use of a gating system to assess individual projects	
		Gating system includes strategic questions or criteria, the Strategic Buckets approach, or top-down roadmaps	
Organizational structure	Centralization	Decision-making power is in the hands of the top management	De Sitter in Achterbergh & Vriens (2009); Mintzberg (1980); indicators are set up specifically for this research
	Decentralization	Decision-making by all levels of management, without the interference of the top-management	
		Multiple people are involved in the decision-making process	
Element of portfolio decision-making effectiveness	Portfolio mindset	At all times having an overview of all innovation projects in portfolio	Kester et al. (2014)
		In-depth knowledge about each innovation project in portfolio	
		Understanding of the relationship of each innovation project to the achievement of the firm's long-term goals	

	Focus	Focusing resources on the achievement of innovation portfolio priorities	
		It is clear which innovation projects in portfolio have priority and how they help achieve the firm's long-term goals	
		Working in a focused manner and being not easily distracted from executing priorities	
	Agility	Flexibility to be able to change and implement the composition of portfolio in response to new strategic opportunities	
		Portfolio decision-making processes are speedy enough to assure quick acting upon new opportunities	
		Being able to implement portfolio decisions fast	

**Table 2. Operationalization of the main concepts**

### 3.4. Methods and sources for data collection

According to Baxter and Jack (2008), case studies promote data credibility through triangulation of data. Data triangulation involves both using different methods to collect data (interviews, documents and observations) and collecting data from different sources (Baxter & Jack, 2008; Bleijenbergh, 2015). This means viewing and exploring a phenomenon from multiple perspectives. Thus, in this research, data are collected through interviews with different employees that are involved in portfolio decision-making, through a few internal documents and through personal experiences.

This research makes use of 12 semi-structured interviews as the primary method for data collection. The use of semi-structured interviews with open questions has, during the interviews, enabled flexibility (Pagell & Wu, 2009) to create an in-depth understanding of the overall portfolio decision-making model for achieving strategic alignment and to improve the reliability of the data (Bleijenbergh, 2015). These interviews are conducted with different people within the different firms that are involved in portfolio decision-making. Also, people that are more involved with the firm's strategy have been interviewed, because this research focuses on the overall portfolio decision-making model for achieving strategic alignment. So, people with different job functions have interviewed (different sources), which included a board member, people from the R&D department, from Strategic Planning, from the Innovation and IT department, from Marketing and finally a District manager. Table 3 provides an overview of all interviewees. The interviews took place at the different firms and were conducted face-to-face, enabling the interviewer to go more in-depth when needed and the interviewee to elaborate on answers. Face-to-face interviews also allowed the interviewer to elaborate on the questions and to adjust the questions to fit the situation of the firm if needed. The interview questions developed cover all the indicators and thereby all the dimensions of the

operationalization. After the first interview, which is also included in this research due to the limited number of interviews, the interview questions were to some extent adjusted to ensure that all anticipated relationships were discussed. During the remainder of the interviews, the questions were for the most part kept the same to increase reliability (Bleijenbergh, 2015). The interview was divided into four parts, apart from the introduction of the research by the interviewer, to ensure that all anticipated relationships discussed in chapter 2 were discussed during the interviews. Each part involves the discussion of different concepts and/or dimensions of the operationalization. Part 1 involves the discussion of the role of the interviewee within portfolio decision-making, followed by the discussion of the innovation portfolio, to obtain an overview of the portfolio mindset of the firm and finally the discussion of the organizational structure involving the portfolio decision-making. The second part involves the discussion of the decision-making processes and the methods used in the decision-making process by the firm. When it comes to the discussion of the methods used, the methods discussed in section 2.2 are not explicitly mentioned, to also acquire information about other methods used in portfolio decision-making. As mentioned in section 2.2, even though financial methods alone do not ensure strategic alignment of projects (Jugend & Da Silva, 2014; Lee et al., 2008), financial methods are still the most commonly used method in portfolio decision-making (Cooper et al., 2001b; Jugend & Da Silva, 2014) and can be used to support the achievement of strategic alignment (see section 2.2). Part 3 involves the discussion of the prioritization of and the methods used in the prioritization of innovation projects. This allows the researcher to obtain information about the focus toward the firm's long-term goals, but also about the methods used. Finally, the fourth part involves the discussion of the firm's response to its environment, enabling the researcher to obtain information about the agility of the firm. Appendix 1 provides the interview questions. All interviews conducted have been recorded and transcribed, which can result in enhanced validity and reliability (Langley & Adballah, 2011).

Interview	Firm	Job function	Date	Duration
Interview 1	Firm A	Strategic Planner	15-08-2019	57:48
Interview 2	Firm A	Senior Project Leader R&D	15-08-2019	53:35
Interview 3	Firm A	Project Leader and Prince System Architect R&D	22-08-2019	53:26
Interview 4	Firm A	Strategic Planner	22-08-2019	1:07:22
Interview 5	Firm B	Manager R&D	04-09-2019	38:22
Interview 6	Firm B	Project Leader R&D	04-09-2019	52:22
Interview 7	Firm B	Product Marketing Analyst	04-09-2019	1:00:19

Interview 8	Firm C	COO	29-08-2019	43:30
Interview 9	Firm C	Head of Technology and Innovation	16-09-2019	41:34
Interview 10	Firm C	District Manager	18-09-2019	38:40
Interview 11	Firm D	Head of Digital	13-09-2019	34:27
Interview 12	Firm D	Head of IT and Innovation	21-10-2019	30:06

**Table 3. Overview of interviews conducted**

Because data triangulation involves the use of different data collection methods, a few internal documents were acquired. Nonetheless, in practice internal documents are extremely challenging to gain access to (Bleijenbergh, 2015). Therefore, only a few internal documents at Firm B about the product portfolio's, PLC, choice process, objectives and top priorities, and the business model canvas and selection criteria were acquired, with the promise that these documents are not explicitly illustrated in this research. Furthermore, during the interview with interviewee 6 (Project Leader R&D in Firm B), a few internal documents about the product portfolio's, the prioritization and current status of innovation projects were shown. Because interviews can be viewed as subjective data (e.g. Bleijenbergh, 2015), these documents can be used to support the statements made during the interviews of Firm B, thereby improve the credibility of the data.

Finally, because the researcher has worked approximately 5,5 years in one of the locations of Firm C, the personal experience of the researcher can be used to clarify a few of the claims made in the interviews of Firm C. The personal experience of the researcher involves both personal experiences (anecdotal evidence) and the experiences of others within the firm (hearsay evidence) (What types of evidence are there?, n.d.). Both anecdotal and hearsay evidence can sometimes be unreliable (What types of evidence are there?, n.d.), so therefore, the personal experiences of the researcher are used cautiously and only if needed to clarify the claims made in the interviews of Firm C, but not to make substantive claims.

### 3.5. Methods for data analysis

This research uses template analysis to analyze the collected data. Template analysis involves a thematic analysis that combines a relatively high degree of structure in the process of analyzing data with the flexibility to adapt to the needs of a particular study (Brooks, McCluskey, Turley, & King, 2015; Symon & Cassell, 2012). Thus, while this research makes use of concepts, dimensions and indicators that are developed in advance (deductive approach) (see Table 2) to analyze data, the use of template analysis allows for flexibility, making it possible to change, add and/or delete concepts,

dimensions and/or indicators if needed (Symon & Cassell, 2012). The software ATLAS.ti was used to code the data to bring some order to the overwhelming amount of data in a short amount of time. The advantage of using ATLAS.ti is that this computer program supports the researcher in combining different fragments from various sources to find differences, patterns and relationships (Bleijenbergh, 2015). The first step in analyzing the data was coding the data by attaching labels to different text fragments from both the interviews and the internal documents, based on the indicators and dimensions from the operationalization. Also, during coding, a few new indicators, a new dimension and a new concept were introduced. Appendix 2 provides the coding scheme, which also includes the new indicators dimension and concept. Then, the different text fragments within a certain dimension within a certain firm were compared to each other, to see how each firm was doing with respect to a certain dimension (within-case analysis). Within-case analysis allows for in-depth knowledge and description of the phenomenon under study (Mills, Durepos, & Wiebe, 2010), making it possible to compare the different firms with each other across the different dimensions (cross-case analysis), to find general patterns (Mathison, 2004; Mills et al., 2010) and thus possible relationships between the different dimensions. Furthermore, the pattern matching technique was used to test if the observed patterns match the expected patterns (see chapter 2) (Yin, 2003). All findings are illustrated and discussed in chapter 4 and provide an answer to the research question.

### 3.6. Quality of the research

Guba and Lincoln (1989) have created a set of criteria that are parallel to the criteria for quantitative research to determine the trustworthiness of qualitative research, because criteria for determining the quality of quantitative research are not suitable for qualitative research. These criteria are: credibility (vs. internal validity), transferability (vs. external validity/generalizability), dependability (vs. reliability) and confirmability (vs. objectivity). The use of multiple methods and multiple sources for data collection (triangulation) can increase the credibility of a research (Baxter & Jack, 2008). Furthermore, transferability of the results is increased through the use of a multiple case study, allowing for cross-case analysis to replicate findings (Eisenhardt, 1989; Yin, 2003) and find general patterns across cases. This allows the researcher to make generalizations (Mathison, 2004; Mills et al., 2010). However, the literature review did not reveal specific aspects which are important to be kept similar. Therefore, limited specific boundary conditions have been introduced before selecting the four cases (see section 3.2). This can have an influence on the transferability of results to similar situations (Symon & Cassell, 2012). Dependability involves findings being consistent and repeatable (Lincoln & Guba, 1985). This can be achieved through the use of structure within the research (Guest, MacQueen, & Namey, 2011). Nonetheless, a proper balance of structure is needed to maintain the flexibility and inductive nature of qualitative research (Guest et al., 2011). For this reason, this

research used semi-structured interviews were the structure of the interview questions and the interview questions were for the most part kept the same. Furthermore, the interviews were recorded, transcribed, and then analyzed through the use of template analysis (see section 3.5), which involves a relatively high degree of structure, but also allows for flexibility (Brooks et al., 2015; Symon & Cassell, 2012). Finally, the three criteria mentioned above together affect confirmability (Guba & Lincoln, 1989; Nowell, Norris, White, & Moules, 2017). Confirmability involves neutrality of the researcher, meaning that the findings of the research are not affected by researcher bias, motivation, or interest (Lincoln & Guba, 1985). Besides the aforementioned remarks about credibility, transferability and dependability, as mentioned in section 3.4, the interview questions of this research were developed carefully to decrease chances of bias. Furthermore, even though the researcher has worked approximately 5,5 years in one of the locations of Firm C, the use of structure in data collection and data analysis has reduced the possibility of researcher bias, motivation, or interest.

### 3.7. Research ethics

In every type of research and especially in qualitative research, ethical issues are present and revolve around the tension of researchers making generalizations and respondents' rights to maintain privacy (Orb, Eisenhauer, & Wynaden, 2001). This involves a balancing act between transparency (academic interests) and the protection of privacy (practical interest), especially with respect to sensitive information. Keeping all of this in mind, in this research interviewees were informed beforehand about the purpose of the research, the level of expected involvement, the duration of the research and the way the collected data would be used. Also, during the interviews, permission was asked to record the interviews and to store the collected data until the end of the master. The interviews recorded were immediately transferred onto the researcher's laptop, which is password protected and only used for this research, and then deleted from the recorder. Furthermore, both the recordings and the transcripts were only stored on the laptop and not online (e.g. Dropbox). Also, information and/or documents that the interviewee has indicated as being confidential (e.g. internal documents acquired) have not been included in this research. Finally, in this research, all firms and interviewees have been anonymized.

## 4. Results

This chapter involves the discussion of the research results. The first three sections of this chapter focus on answering the three sub-questions. To answer each sub-question, the interviews of the four firms are analyzed to see how each firm is doing regarding the different dimensions (within-case analysis) and then the four firms researched are compared on the different dimensions discussed in section 3.3 (cross case analysis) to find possible relationships. By comparing the four firms, also, conclusions can be drawn about the nature of the relationships between the different dimensions. In the fourth section, a new concept is introduced, whereby multiple relationships with different dimensions from section 3.3 are discussed. Finally, each section ends with an intermediate conclusion to summarize the findings of that section and to illustrate the hitherto discussed relationships by means of a conceptual model.

### 4.1. Sub-question 1: Relationship between portfolio decision-making processes and methods that help the achievement of strategic alignment

This section focuses on answering sub-question 1: *How are the portfolio decision-making processes related to the methods that help the achievement of strategic alignment?*

In this research, the concept portfolio decision-making processes contains the dimensions evidence-based and opinion-based decision-making. Evidence-based decision-making involves making decisions based on evidence. This means analyzing all relevant information by conducting multiple analyses, considering multiple sources of evidence and incorporating multiple perspectives, to make decisions in a systematic way. It furthermore involves conducting market research and making decisions based on all details and rationality. Opinion-based decision-making on the other hand involves making quick decisions based on own opinions, gut feeling, previous experiences and/or emotional input instead of evidence. However, it also involves making decisions based on the main lines and intuition. The concept methods that help the achievement of strategic alignment contain the dimensions top-down business strategy, top-down roadmaps and bottom-up strategic gates. Top-down business strategy involves making use of strategic buckets and assigning all resources of a bucket to specific projects. Furthermore, top-down roadmaps involve selecting strategic projects and mapping them along a time line. Finally, bottom-up strategic gates involves the use of a gating system including strategic questions or criteria, the Strategic Buckets approach or top-down roadmaps, to assess individual projects. However, the data illustrate that the use of financial methods plays an important part when it comes to making project portfolio related decisions (see Appendix 3). This is in line with the literature review that illustrates that financial methods play an important part in portfolio decision-making and can thereby support the achievement of strategic



alignment. For this reason, financial methods are included in this research as a dimension of methods that help the achievement of strategic alignment, to investigate the influence of the use of financial methods on the different dimensions of this research and thereby on the achievement of strategic alignment. In this research, financial methods involve the ROI, the costs, and the yields of innovation projects.

#### 4.1.1. Analysis

##### Opinion-based decision-making and financial methods

The interviews show that both decision-making processes play a part in the portfolio decision-making of all firms researched (see Appendix 4). The interviews furthermore illustrate that Firm B places more emphasis on opinion-based decision-making than the other firms when comparing the four firms on both dimensions. According to interviewee 5 (Manager R&D in Firm B), there is a lot of intuition involved in making decisions, because the firm has a lot of experience when it comes to certain cases.

*“Yes, it is always a mix, but there is a lot of intuition and that is also because there is a lot of experience with certain types of things”<sup>1</sup>*

The interviewee also mentioned that it sometimes can feel as if the firm is doing “the things they like”, thereby implying that the firm is not very strict when it comes to the budget, the planning and the substantiation of ideas.

*“Hey you notice that we have a fairly loose structure, not very budget oriented, yes it is going too far to say we do the things we like that is not what I mean, but yes it can feel that way and that makes it a bit non-committal. I can imagine that there are other organizations that are very strict on their budget and plans and so on and if it is not properly substantiated then they will not start.”<sup>2</sup>*

Furthermore, investments are not very important according to interviewee 6 (Project Leader R&D in Firm B), because the firm is doing well financially. This leads to “rough” estimations when it comes to for example the ROI.

*“But actually, because things are going well financially, the investments are not really important. And that is not entirely true. (...) Yes, in principle we do return of investment, but*

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<sup>1</sup> “Ja het het het is altijd een een uhh mengelmoes maar uh maar der is wel veel intuïtie bij uhh en en dat komt ook wel omdat er heel veel ervaring is met bepaalde type zaken.” – Firm B, interview 5, p. 10.

<sup>2</sup> “He je merkt dat wij een vrij losse structuur hebben, uhh niet erg budget gericht, uhm ja ik het gaat te ver om te zeggen we doen de dingen die we leuk vinden z.. dat is niet wat ik bedoel maar ja het he zo kan het wel een beetje aanvoelen en daarmee maakt het het ook wel wat vrijblijvend uhh he ik kan me voorstellen dat er andere organisaties zijn die juist heel strikt op die die budget en plannen en zo zitten en als het niet fatsoenlijk is onderbouwd dan beginnen we der niet aan.” – Firm B, interview 5, p. 14.

*that is not the most important thing. Look, when I do a project, before that I try to estimate well I just think it is 500 hours so it's a ton of investment or something hey.”<sup>3</sup>*

These “rough” estimates are mostly based on previous experiences with other technologies instead of on evidence/research, but are still accurate enough according to the interviewee.

*“Some things we can compare. You can compare it with other technologies. If we have to make a new piece of valve mechanism, then you know oh the previous one was so expensive so ah 20 percent more expensive.”<sup>4</sup>*

*“Because look, why is it accurate enough whether it costs 100 or 110 euros, yes it is nice of course and it is certainly important to try to make it 100, but that is not so important for the first return on investment because the market is more uncertain.”<sup>5</sup>*

Finally, decisions at this point in time are mainly based on intuition (also according to interviewee 7 (Product Marketing Analyst in Firm B)), but the economic aspect is being looked at more strictly.

*“Then I think that better wording is currently mainly intuitive, although the economic side of the story is now looked at more strictly. So, there will be more, from there they look at can it be done at all, hey what are the yields”<sup>6</sup>*

However, the interviewee also mentioned that the question of what does it yield (financial results) is pushed to the back when selecting new projects, because financial outcomes do not really live within the firm.

*“And only in the third step you look at what it yields. So, I consciously pushed back (the question of, AK) what does it yield, because it does not really live within the organization.”<sup>7</sup>*

Also, no financial department is involved when making project portfolio-related decisions. In Firm B, most calculations are done by the project leaders and these are more “rough” estimates based on previous experiences instead of evidence/research.

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<sup>3</sup> Maar eigenlijk omdat het hier financieel goed gaat zijn eigenlijk de investeringen niet van belang. En dat is niet helemaal waar. (...) Ja. Ja return of investment doen we in principe wel, maar dat is niet het allerbelangrijkste. Kijk als ik een project doe, probeer ik voor die tijd af te schatten van nou ik denk gewoon dat het 500 uur is zo het is een ton investering ofzo he.” – Firm B, interview 6, p. 17.

<sup>4</sup> “Sommige dingen kunnen we vergelijken. Kun je zo vergelijken met andere technologieën. Als wij nieuwe stukje uh klepje moeten maken mechaniek dan weet je oh de vorige was zo duur dus ach 20 procent duurder.” – Firm B, interview 6, p. 18.

<sup>5</sup> “Want uh kijk waarom is nauwkeurig genoeg of nou 100 of 110 euro kost, ja is wel leuk natuurlijk maar vast wel belangrijk tuurlijk probeer je het 100 te maken, maar dat is voor de eerste return investment niet zo belangrijk want de markt is toch onzekerder.” – Firm B, interview 6, p. 18.

<sup>6</sup> “Dan denk ik dan uhh betere uhh formulering is dat uhh momenteel voornamelijk nog intuïtief alhoewel der aan uhhh de de economische kant van het verhaal wordt nu wel strenger naar gekeken. Dus worden wel meer uh vandaaruit gaan ze van kan het überhaupt wel uit he wat wat wat zijn de opbrengsten.” – Firm B, interview 7, p. 22.

<sup>7</sup> “En in de derde stap ga je pas kijken wat levert het op. Dus ik dus ik heb bewust uhh wat levert het op omdat het toch niet echt binnen de organisatie leeft meer naar achteren geschoven.” – Firm B, interview 7, p. 19.

*"We of course have a financial department, but they do nothing with projects. No, the project leader does. So, he yes, he at least does some research for how much work it should cost and he is supposed to keep a little bit track of how much we spend on it, but we do not have a really good system to check that it happens."*<sup>8</sup>

*"No. Because they cannot just say that. We can estimate that much better. Look, what we do, when I start a project, I know approximately... I have a price target. If I make a bus interface, I just know oh certain amount X costs that in hardware."*<sup>9</sup>

Moreover, by placing the emphasis more on opinion-based decision-making instead of evidence-based decision-making, the use of financial methods becomes more a sanity check of ideas.

*"Yes, actually the sanity check, so to speak. Of yes, it is not a personal game, so to say, of someone. Is there really an idea behind it. So, we are actually trying to get that from the market and also from the various offices."*<sup>10</sup>

The previous illustrates that Firm B places more emphasis on opinion-based decision-making compared to the other firms. It also shows that placing the emphasis more on opinion-based decision-making can have an influence on the emphasis placed on the use of financial methods. As illustrated above, placing the emphasis on opinion-based decision-making can lead to more "rough" estimates based on previous experiences instead of evidence/research, pushing back and looking less strictly at the economic aspect, and financial methods becoming more of a sanity check of ideas. Thus, it can be concluded that the emphasis placed on opinion-based decision-making has an influence on the emphasis placed on the use of financial methods.

#### **Evidence-based decision-making and financial methods**

On the other hand, the interviews illustrate that Firm A, Firm C and Firm D, place the emphasis more on evidence-based decision-making compared to Firm B (see Appendix 4). The interviews furthermore show that these firms also place more emphasis on the use of financial methods when making project-related decisions compared to Firm B (see Appendix 3). For example, the controlling department in Firm A is involved in portfolio decision-making, while in Firm C, the CFO is involved in portfolio decision-making and in Firm D, the finance department is involved in portfolio decision-

<sup>8</sup> "Wij hebben natuurlijk wel een financiële afdeling maar die doet niks met projecten. Nee de projectleider wel. Dus die uhh uhm ja die doet in ieder geval wat onderzoek voor voor voor hoeveel werk moet het gaan kosten en en hij wordt geacht een beetje bij te houden uh hoeveel we deraan besteden maar wij hebben geen echt goed systeem om te controleren dat het ook gebeurd." – Firm B, interview 5, p. 6.

<sup>9</sup> "Nee. Want die die kunnen dat niet zo even zeggen. Wij kunnen dat veel beter afschatten. Kijk wat we doen, als ik een project start, dan weet ik ongeveer.. heb ik een prijs target. Als ik een bus interface maak weet ik gewoon oh bepaald bedrag X kost moet dat kost dat aan hardware." – Firm B, interview 6, p. 17.

<sup>10</sup> "Ja de de eigenlijk de sanity check omdat zomaar te zeggen van ja dat is allemaal uh is het niet uhh een persoonlijk speeltje zeg maar van iemand. Uhm der zit er echt wel een idee achter. Dus dat proberen wij eigenlijk op te halen uit de markt en ook ui.. bij de verschillende kantoren." – Firm B, interview 7, p. 2.

making. Furthermore, in multiple interviews interviewees also mentioned the use of financial methods when they were asked about evidence-based decision-making (see Appendix 4). Also, according to interviewee 8 (COO in Firm C), moving toward more evidence-based decision-making can be related to making more calculations to, more explicitly, answer the question of what does it yield (financial returns).

*“Well, I think we do that a little too little, but that is from the history. So that we, so to say, have that as a background and actually we now say gosh you have to take a critical look at what it actually yields. So, you invest so much, but what does it yield at the bottom of the line. Yes, that question should come up even better. So, we do it, but I think it can come even better, even more explicit, on the table.”<sup>11</sup>*

The above illustrates that placing the emphasis more on evidence-based decision-making leads toward making more financial calculations and/or financial calculations that are more based on evidence/research instead of on previous experiences. Thus, it can be concluded that the emphasis placed on evidence-based decision-making can have an influence on the emphasis placed on the use of financial methods.

In reverse, it can be assumed that wanting more financial calculations and/or financial calculations that are more based on evidence/research instead of on previous experiences involves evidence-based decision-making. According to interviewee 12 (Head of IT and Innovation in Firm D), the firm is working on improving the use of financial methods, which can be achieved by being more fact-based (evidence-based decision-making).

*“No there we are, that is also a learning process. Hey we do that now quite tight, but that was also really a very low maturity. (...) So there is also in the enthusiasm I would say hey, yes there is also, is that a little less fact based. And we are going to do that more and more now.”<sup>12</sup>*

Thus, in reverse, the emphasis placed on the use of financial methods is assumed to have an influence on the emphasis placed on evidence-based decision-making.

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<sup>11</sup> “Uhh nou ja dat dat dat doen we denk ik nog wat te weinig uhh maar dat komt dus vanuit de historie he dus dat we zeg maar dat als achtergrond hebben uhh en eigenlijk zeggen we nu van goh uhm je moet kritisch kijken van uhh wat levert het eigenlijk op. Dus je investeert zoveel maar wa.. wat levert het onder aan de streep ook op. Ja die vraag die moet moet nog beter op tafel komen. Dus we doen het wel maar ik denk dat ie nog beter uhh nog explicieter zeg maar op tafel kan komen.” – Firm C, interview 8, p. 9.

<sup>12</sup> “Nee daar zijn we da dat is ook een leerproces. He we doen dat dus nu vrij strak en we uhh uhh maar uhh maar dat was ook echt een hele lage maturity. (...) Dus da daar zit ook wel in in het enthousiasme zou ik dan maar zeggen he ja is daar ook wel is dat wat minder fact based. En dat gaan we nu steeds meer doen.” – Firm D, interview 12, p. 10.

### Opinion-based decision-making and top-down roadmaps

Furthermore, the interviews illustrate that top-down roadmaps to some extent play a role in Firm A, Firm B and Firm D (see Appendix 5). When it comes to Firm C, there is some contradiction regarding the use of roadmaps. According to interviewee 8 (COO in Firm C), the firm uses roadmaps for big projects, mapping the different phases along a time line (p. 18), while according to interviewee 9 (Head of Technology and Innovation in Firm C), no roadmaps can be detected for the bigger projects at firm strategy level at this time (p. 10). One explanation for this contradiction could be the fact that Firm C has taken over another firm recently and interviewee 8, who says that the firm makes use of roadmaps, is originally from the firm that has been taken over, while interviewee 9 is originally from Firm C. Thus, this research assumes that Firm C does not make use of top-down roadmaps for the bigger projects at firm strategy level. Even though Firm A, Firm B and Firm D all make use of top-down roadmaps, the interviews show that Firm A and Firm D place more emphasis on the use of top-down roadmaps compared to Firm B (see Appendix 6). Roadmaps need to be flexible given the rapidly changing environment, as illustrated in the literature review and in the interviews.

*"Yes, they must be flexible."*<sup>13</sup>

*"Yes, and I think it should be. Especially if you, in the field of innovation, because of course you do not know what is coming. And certainly not hey where the world changes very quickly, you have to be very flexible. So that is why I also think you should have a continuous process to update that. And also, do not be afraid to stop things."*<sup>14</sup>

However, according to the interviewees of Firm B, the roadmaps of Firm B can be seen as being "too flexible".

*"No, the planning is there, but it is too flexible. We are not sufficiently aware of that you have to stick to data to keep things going."*<sup>15</sup>

*"They are much too flexible ."*<sup>16</sup>

As mentioned in the citation above, this can be the result of not being aware that one has to stick to the data. The roadmaps of Firm B can furthermore be seen as being "not detailed enough" and involving "much too little" input from the market.

<sup>13</sup> "Ja die moeten wel flexibel zijn." – Firm B, interview 6, p. 12

<sup>14</sup> "Ja en dat moet het ook zijn denk ik. Zeker als je het op het gebied van innovatie want je weet natuurlijk niet wat er gaat komen. En zeker niet hey waar de wereld heel snel veranderd moet je heel flexibel zijn. Dus daarom vind ik ook dat je dat je een continu proces moet hebben om dat te updaten. En ook niet bang moet zijn om dingen te stoppen." – Firm D, interview 12, p. 11.

<sup>15</sup> "Nee de de de planning staat er wel in, maar die is die is te flexibel. Dat uh.. We zijn onvoldoende uhh uhh uhh ja bewust dat dat je aan data moet houden om om uh de gang derin te houden." – Firm B, interview 5, p. 9.

<sup>16</sup> Ze zijn veel te flexibel." – Firm B, interview 6, p. 24.

*“Yes, we want to make them more and more detailed. We are working on that. It is not quite right.”<sup>17</sup>*

*“And they maintain the roadmap together. Actually, there is still too little input from the market, but well that is where we are now.”<sup>18</sup>*

Moreover, being “too flexible” and “not detailed enough” can also be due to the fact that product managers within Firm B are “a bit more positive” about the planning than reality, according to interviewee 7 (Product Marketing Analyst in Firm B).

*“Product manager is of course even more positive than the reality”<sup>19</sup>*

The previous illustrates that all of the above to a certain extent can be the result of the fact that Firm B compared to the other firms places more emphasis on opinion-based decision-making instead of evidence-based decision-making. Thus, it can be concluded that the emphasis placed on opinion-based decision-making has an influence on the emphasis placed on the use of top-down roadmaps.

#### **Evidence-based decision-making and top-down roadmaps**

As mentioned above, both Firm A and Firm D place the emphasis more on evidence-based decision-making instead of opinion-based decision-making compared to Firm B. Both firms also place the emphasis more on top-down roadmaps compared to Firm B (see appendix 6). According to interviewee 2 (Senior Project Leader R&D in Firm A), their product roadmaps are more detailed than their technology roadmaps, while there is more concrete information available.

*“Those product roadmaps are much more detailed when it comes to product in the market.*

*(...) It is also often clearer because we have much more concrete information about what kind of changes make sense.”<sup>20</sup>*

Furthermore, according to interviewee 11 (Head of Digital in Firm D), their roadmaps need to be as detailed as possible, as far as the details are available.

*“As far as they are there. But you don't have to completely... especially for projects in two- or three-years' time, you don't need to know all the details.”<sup>21</sup>*

This means that both firms generate (market) input for their roadmaps (evidence-based decision-making), to make their roadmaps more detailed (Firm A)/as detailed as possible (Firm D) and thus

<sup>17</sup> “Ja die willen we steeds gedetailleerder maken. Dat werken we wel aan. Dat is nog niet helemaal goed.” – Firm B, interview 6, p. 12.

<sup>18</sup> “En die onderhouden samen uhh de roadmap i.. ma.. komt eigenlijk nog veel te input.. veel te weinig input van de m.. van de markt eigenlijk op maar goed dat is dan waar we nu staan.” – Firm B, interview 7, p. 10.

<sup>19</sup> “Productmanager is nog meer iets positiever natuurlijk dan de realiteit.” – Firm B, interview 7, p. 10.

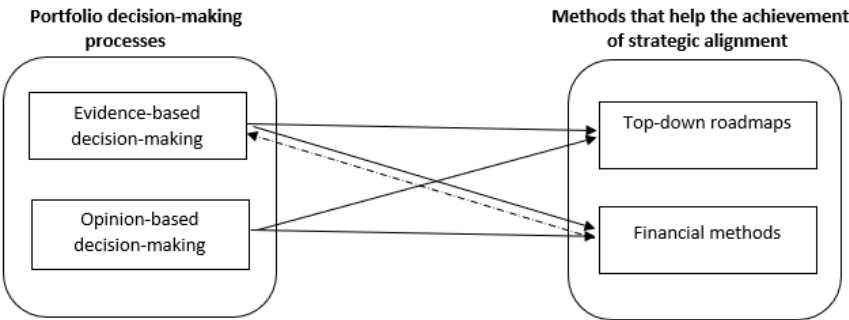
<sup>20</sup> “Die productroadmaps die zijn veel gedetailleerder als het gaat om product in de markt. (...) Hij is ook vaak duidelijker omdat we veel concretere informatie hebben over wat uhh wat voor wijzigingen zin hebben.” – Firm A, interview 2, p. 16-17.

<sup>21</sup> “Voor zover ze der zijn. Maar je hoeft niet uhhhh het helemaal uhh zeker voor projecten over twee of drie jaar dan hoeft je niet alle details te weten.” – Firm D, interview 11, p. 16.

less flexible. Generating (market) input to make roadmaps more detailed/as detailed as possible can lead to a roadmap that involves more input from the market and is closer to reality. Therefore, it can be concluded that the emphasis placed on evidence-based decision-making has an influence on the emphasis placed on the use of top-down roadmaps.

#### 4.1.2. Intermediate conclusion

The analysis of the relationship between the concept portfolio decision-making processes and the concept methods that help the achievement of strategic alignment illustrates that the emphasis placed on opinion-based and evidence-based decision-making has an influence on the emphasis placed on the use of both financial methods and top-down roadmaps. Furthermore, the emphasis placed on financial methods is assumed to have an influence on evidence-based decision-making. All relationships lead to the following conceptual model (see Figure 3). The relationships based on assumptions only are illustrated by a dotted line.



**Figure 3. Conceptual model based on section 4.1.1**

#### 4.2. Sub-question 2: Relationship between methods that help the achievement of strategic alignment and elements of portfolio decision-making effectiveness

This section focuses on sub-question 2: *How are the methods that help the achievement of strategic alignment related to the elements of portfolio decision-making effectiveness?*

The concept elements of portfolio decision-making effectiveness involves the following dimensions: portfolio mindset, focus and agility. A portfolio mindset is centered around the firm's ability to develop a portfolio mindset. It involves at all times having a complete overview of all projects, having in-depth knowledge about each individual project and understanding how each project relates to the

achievement of the firm's long-term goals. The dimension focus is centered around the firm's ability to focus development efforts toward the achievement of the firm's long-term goals. This involves focusing resources on the achievement of innovation portfolio priorities, working in a focused manner, being not easily distracted from executing priorities and focusing resource allocation on short-term goals that help achieve the firm's long-term goals. Finally, the dimension agility involves the ability to change and implement new opportunities (flexibility) and the ability to make and implement new opportunities quickly (decision-making speed). However, besides discussing the relationship between the methods that help the achievement of strategic alignment and the elements of portfolio decision-making effectiveness, this section also involves the discussion of the relationship between the portfolio decision-making processes and the elements of portfolio decision-making effectiveness (section 4.2.2), because Kester et al. (2011) illustrate that the concept portfolio decision-making processes has a direct significant positive effect on the elements of portfolio decision-making effectiveness.

#### 4.2.1. Analysis part I

##### Top-down roadmaps and focus

The interviews of Firm B illustrate that there is a clear prioritization of projects within Firm B: first customer and production problems and then the development of new products.

*"The priority is just very simple. If there are problems with the customer, you just go there hey, if an R&D employee should help to solve that problem and after that production and only after that the work for which you were hired (research & development, AK)."*<sup>22</sup>

*"In principle, our director actually says hey, the most important thing is that we solve customer problems and that the customer is satisfied."*<sup>23</sup>

*"So, let's say that is our priority, customer, production problems and then new products."*<sup>24</sup>

*"Customer goes first, then the factory has to keep running and only then do you do your own work (research & development, AK)."*<sup>25</sup>

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<sup>22</sup> "De prioriteit ligt uh gewoon gewoon heel simpel als er problemen zijn bij de klant dan dan ga je daar gewoon heen he als der een R&D'er zou moeten helpen om dat o.. probleem op te lossen en daarna de productie en daarna pas uhh het gewoon het werk waarvoor je was was aangenomen." – Firm B, interview 5, p. 7.

<sup>23</sup> "In principe zegt onze directeur ook eigenlijk he, het belangrijkste is dat we klantproblemen oplossen en de klant tevreden is." – Firm B, interview 6, p.

<sup>24</sup> "Dus zeg maar dat is onze prioriteitsstelling, klant, productieproblemen en dan nieuwe producten." – Firm B, interview 6, p. 9.

<sup>25</sup> "Klant gaat eerst, dan moet de fabriek blijven draaien en dan pas doe je je eigen werk." – Firm B, interview 7, p. 11.



And even though both customer and production problems are important aspects when it comes to the achievement of the firm's long-term goals, developing new products is crucial for the achievement of the firm's long-term goals. So, there needs to be a balance between solving customer and production problems and developing new products. However, the interviews of Firm B furthermore illustrate that Firm B has to "drop what they are doing" (new product development) to solve customer and production problems.

*"The MT comes together, guys this is a problem, this has to be solved and let everything fall out of your hands."*<sup>26</sup>

*"Very quickly, all requests from production, the customer simply end up at R&D and that disturbs us very much. So that's why the effectiveness is simply low. (...) If production comes to a standstill, well then if R&D has to be pulled in, then let everything fall out of your hands and then we have to do that. And only then comes our product development. So, we just have to hope that we are not disturbed by customer problems."*<sup>27</sup>

*"And the rest, yes they are simply the dupe if there is something."*<sup>28</sup>

The previous says something about the ability to focus developmental efforts toward the achievement of the firm's long-term goals. Moreover, according to interviewee 5 (Manager R&D in Firm B), having a focus on customer and production problems can lead to especially long-term projects not being finished on time, since they are not promised to customers and production. He calls this a "self-fulfilling prophecy".

*"Long term things are not promised to production and not promised to customers, so they are the least bad of all things if they do not come the day we came up with them. And yes, that is a self-fulfilling prophecy (...) they do not come on the day you expected them."*<sup>29</sup>

This way of thinking can be assumed to lead to roadmaps that can be seen as being "too flexible", "not detailed enough", involving "much too little" input from the market and "a bit more positive" than reality, which is the case for Firm B (see section 4.1.1). Thus, the dimension focus is assumed to have an influence on the emphasis placed on the use of top-down roadmaps. Furthermore, all interviews of Firm B mention that projects are being prolonged within the firm. According to

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<sup>26</sup> "Het MT komt bij mekaar jongens dit is een probleem, dit moet opgelost gaan worden en en laat alles maar uit je handen vallen da.. dus dus die zijn eigenlijk het makkelijkst." – Firm B, interview 5, p. 11.

<sup>27</sup> "Heel snel komen alle v.. alle verzoeken vanuit uh productie, klant komen gewoon bij R&D terecht en dat verstoort ons heel erg. Dus daarom is zeg maar de effectiviteit is gewoon laag. (...) Als productie stil staat nou dan uh als R&D bij getrokken moet worden alles uit handen laten vallen en dan moeten we dat doen. En daarna komt pas onze productontwikkeling. Dus wij moeten gewoon hopen dat weinig verstoord worden door klantproblemen." – Firm B, interview 6, p. 9.

<sup>28</sup> "En de rest uh ja die is gewoon de de sjaak als der wat is." – Firm B, interview 7, p. 7.

<sup>29</sup> "Lange termijn dingen zijn niet beloofd aan producties en niet beloofd aan klanten. Uhm dus zijn het minst erg van alle dingen uh als ze niet komen op de dag dat we ze bedacht hadden. Uhm en ja dat is een selffulfilling prophecy (...) ze komen dus ook niet op de dag dat je ze verwacht had." – Firm B, interview 5, p. 7.

interviewee 5 (Manager R&D in Firm B), this mainly applies to long-term projects while they are not promised to customers and production (see citation above). Furthermore, according to interviewee 6 (Project Leader R&D in Firm B), being “too flexible” can lead to not being able to “ever” finish things.

*“If everyone is flexible, you will never finish anything.”<sup>30</sup>*

Moreover, according to interviewee 7 (Product Marketing Analyst in Firm B), being “a bit more positive” than reality can lead to a shift in project deadlines.

*“So, they mainly indicate the time, but yes that is not always realized. Yes, so that unfortunately shifts a bit.”<sup>31</sup>*

Finally, the firms (Firm A and Firm D, see section 4.1.1) that place more emphasis on the use of top-down roadmaps compared to Firm B also place more emphasis on the achievement of the firm’s long-term goals (see Appendix 7). Thus, it can be concluded that, in reverse, the emphasis placed on the use of top-down roadmaps has an influence on the dimension focus.

#### **Financial methods and focus**

As mentioned in section 4.1.1, Firm B compared to the other firms places less emphasis on the use of financial methods. Firm B furthermore, as mentioned above, places more emphasis on customer and production problems and less on the firm’s long-term goals. According to interviewee 7 (Product Marketing Analyst in Firm B), before the department that analyzes the product market existed, some projects could be seen as “point solutions” meaning that they were intended for one single customer who did not buy in big amounts, leading to almost no revenue being generated. According to the interviewee, between the lines, this type of “point solutions” are unfortunately coming back a bit.

*“Before we existed as a department... if you look in the database now, you really see quite a few products where only one customer buys it and of each piece really only ones and twos are sold. (...) So yes, that is simply not properly checked whether it had enough own potential. Because we do not welcome such point solutions. Especially if the numbers are low. Look, if numbers are high, is of course fine, but if it hardly generates any revenue, there will of course never start a development process for it. So, between the lines you can see that unfortunately suddenly come back a bit (point solutions, AK).”<sup>32</sup>*

<sup>30</sup> “Als iedereen flexibel is krijg je namelijk nooit iets af.” – Firm B, interview 6, p. 24.

<sup>31</sup> Dus de tijd hebben zij voornamelijk (??) aangeven maar ja dat is niet altijd gerealiseerd. Uhm uhhh ja dus dat schuift helaas wel een beetje door.” – Firm B, interview 7, p. 10.

<sup>32</sup> “Voordat wij als afdeling bestonden als je nu in de database kijkt zie je heel v.. zie je echt best wel aardig wat producten waar gewoon waar maar één klant het koopt en elk stuks uhh echt maar eentjes en tweetjes van worden verkocht. (...) Dus uhh ja dat is gewoon niet goed niet goed ge.. uhh gecheckt of er wel uhhh uhh.. ja of of ja of het wel genoeg pot.. eigen potentie had. Want wij juichen niet voor dat soort puntoplossingen uhh zeker als het aantallen laag zijn. Kijk als an.. aantallen hoog zijn is natuurlijk prima maar.. maar als het bijna geen omzet mee wordt gegenereerd dan wordt het natuurlijk nooit.. een uhhh een ontwikkeltraject voor

The above illustrates that placing the emphasis less on the use of financial methods can lead to more projects that are “point solutions”, with the risk of generating almost no revenue, thereby jeopardizing the ability of the firm to achieve the firm’s long-term goals. Furthermore, the interviews show that financial results have an influence on the prioritization of projects (see Appendix 8). The interviews of Firm C furthermore illustrate that Firm C is “strongly” business case and financially driven.

*“The main choice that is included in the choice to do or not to do something, that is simply yes what does it yield.”<sup>33</sup>*

*“It is more in that rationalization side yes. So, it is very strongly financially driven, business case driven yes.”<sup>34</sup>*

*“Yes, in the end it is of course true that we are a company. So, money has to be made at the bottom of the line. And we often work with business cases.”<sup>35</sup>*

Being “strongly” business case and financially driven can lead to mostly moving around horizon 1 innovations (incremental; 3-12 months (Coley, 2009)).

*“Well and Firm C mainly moves on those horizon 1 innovations. So incrementally and then somewhat larger projects and in some cases, it goes a bit more toward business model innovation.”<sup>36</sup>*

Also, when interviewee 9 (Head of Technology and Innovation in Firm C) is asked if he thinks that the focus is more toward the short-term financial return projects when the Firm has multiple projects, the interviewee answered with a yes.

*“Yes, I think so. Yes.”<sup>37</sup>*

Furthermore, according to interviewee 9 (Head of Technology and Innovation in Firm C), being “strongly” business case and financially driven, does not fit the idea of exploring new areas.

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instarten. Dus da.. tussen de regels door zie je dat helaas inderdaad opeens wel beetje terugkomen.” – Firm B, interview 7, p. 3-4.

<sup>33</sup> “De voornaamste keuze waar uhh of de wat wordt meegenomen in de keuze om iets wel of niet te doen. Dat is toch wel gewoon ja wat levert het op.” – Firm C, interview 9, p. 12.

<sup>34</sup> “Uhm het zit meer in die uh rationalisatie kant ja. Dus v.. en het is heel sterk financieel gedreven. Business case gedreven ja.” – Firm C, interview 9, p. 12.

<sup>35</sup> “Ja uh uiteindelijk is het natuurlijk zo dat uhh kijk we zijn wel een bedrijf. Dus moet geld verdiend worden onderaan de streep. En uhm we werken vaak met business cases.” – Firm C, interview 10, p. 2.

<sup>36</sup> “Nou en Firm C beweegt zich voornamelijk op die horizon 1 innovaties. Dus incrementeel en dan wat grotere projecten en in sommige gevallen gaat het wat meer naar business model innovation toe.” – Firm C, interview 9, p. 2.

<sup>37</sup> “Ja dat denk ik wel ja. Ja.” – Firm C, interview 9, p. 13.

*“So, when you talk about innovation, I have to think back for a moment. If you say well I want to explore much more or discover many more new areas, a business case thought does not fit in there.”<sup>38</sup>*

Thus, it can be concluded that the emphasis placed on the use of financial methods has an influence on the dimension focus.

### **Top-down roadmaps and agility**

As illustrated in section 4.1.1, according to interviewee 6 (Project Leader R&D in Firm B) and interviewee 12 (Project Leader R&D in Firm B), roadmaps need to be flexible, especially when it comes to innovation, to enable decision makers to change and implement portfolio decisions quickly (Bastow, 2014) given the rapidly changing environment. When comparing the interviews of Firm A, Firm B and Firm D, the interviews show that roadmaps that are “too flexible” (Firm B) can lead to being more flexible when it comes to changing and implementing new opportunities, compared to roadmaps that are less flexible (Firm A and Firm D). For example, as mentioned in section 4.1.1, people within Firm B are not aware that they have to stick to the data, while according to interviewee 1 (Strategic planner in Firm A), there is a certain basis and it’s not always as easy to make changes within the roadmap.

*“So, there is, there is a certain basis for innovation projects.”<sup>39</sup>*

*“Not, not always.”<sup>40</sup>*

Furthermore, according to interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), the main lines of their roadmap are fixed, while their roadmaps are at a certain abstraction level, leaving the firm some room to within that part go in different directions.

*“Yes, yes it is... in the longer term it is, there are a number of things that you have agreed upon and that are also recorded. Is of course at a certain level of abstraction so that you can also move in that part. But the main line is fixed.”<sup>41</sup>*

Finally, according to interviewee 11 (Head of Digital in Firm D), the intention is to work toward the roadmaps.

*“The intention is that we all work toward it.”<sup>42</sup>*

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<sup>38</sup> “Dus als je het dan hebt over innovatie moet ik heel even terug. Als je zegt van nou ik wil veel meer uh exploreren of uhh veel meer uhh nieuwe terreinen ontdekken. Daar pas een business case gedachte past daar niet in.” – Firm C, interview 9, p. 12.

<sup>39</sup> “Dus der staat wel een bepaalde basis staat er wel uhm van innovatieprojecten.” – Firm A, interview 1, p. 22.

<sup>40</sup> “Nie.. niet altijd.” – Firm A, interview 1, p. 22.

<sup>41</sup> “Ja, ja der zit.. op de langere termijn is het wel uh.. zijn een aantal dingen uh die heb je afgesproken uh en wordt ook vastgelegd. Is natuurlijk op een bepaalde abstractieniveau waardoor je binnen dat stuk ook nog uh kanten op kunt, maar de hoofdlijn staat wel vast.” – Firm A, interview 3, p. 15.

<sup>42</sup> “De bedoeling is wel dat we allemaal uh naartoe werken.” – Firm D, interview 11, p. 15.

Thus, it can be concluded that the emphasis placed on the use of top-down roadmaps has an influence on the dimension agility.

### Financial methods and agility

According to interviewee 2 (Senior Project Leader R&D in Firm A), interviewee 6 (Project Leader R&D in Firm B) and interviewee 10 (District Manager in Firm C), not calculating everything until the last cent can result in the ability to change and implement new opportunities and in being creative, which is needed when it comes to innovation.

*“And sometimes we do not work all the way through to the penny but we find oh here we could realize additional placements or here you can grow the volume.”<sup>43</sup>*

*“Often creativity does not go well together with costs control. Because when you talk about innovation, well that belief... yes, it also makes you more creative. Because if you first think about what something costs, then that is also not good for the breadth of all the ideas that come up on the table.”<sup>44</sup>*

*“And we think, the product first year you think there are 200 sales, second year 500,000 you name it. And those numbers are much more inaccurate. (...) At some point you will also know yes you have to support that technique, otherwise you will have a problem. For example, also know new buses, they just know about yes customers just ask that, yes then you just have to offer it, otherwise you will be out soon.”<sup>45</sup>*

Furthermore, as mentioned above, according to the interviews of Firm C, Firm C is “strongly” business case and financially driven. According to interviewee 9 (Head of Technology and Innovation in Firm C), being business case driven can lead to rarely looking back to see if the firm is still doing the right thing.

*“Yes, and then along the journey to the end is very rarely looked at, are we still doing the right thing. No, business case is approved, we are going to do it.”<sup>46</sup>*

<sup>43</sup> “En uh soms gaan we niet helemaal doorwerken tot de euro’s maar constateren we oh hier zouden we extra plaatsingen mee kunnen realiseren of hier kun je het volume uh laten groeien.” – Firm A, interview 2, p. 11.

<sup>44</sup> “Gaat vaak niet zo goed samen uhh creativiteit en uhh en kost control. (...) Want als je het hebt over innoveren.. Nou dat geloof.. ja. Het het het maakt ook wel weer creatiever. Want als je eerst gaat nadenken wat iets kost dan dat is ook niet goed voor de uhh.. Voor de voor de breedheid van alle ideeën die die op tafel komen.” – Firm C, interview 10, p. 12.

<sup>45</sup> “En denken we zo van nou dat denken we zo van van het product eerste jaar denk je dat er 200 verkopen, tweede jaar 500.000 he noem maar wat. En die getallen zijn veel onnauwkeuriger. (...) Op een gegeven moment weet je ook van ja dan die techniek moet je toch ondersteunen anders heb je een probleem. Weten bijvoorbeeld ook een nieuwe bussen ze weten gewoon van ja klanten vraagt dat gewoon ja dan moet je gewoon aan gaan bieden anders lig je er straks uit.” – Firm B, interview 6, p. 18.

<sup>46</sup> “Ja en dan gaandeweg die die die reis naar het einde wordt er zeer zelden nog gekeken van zijn we nou nog wel het juiste aan het doen. Nee business case is goed gekeurd, we gaan het doen.” – Firm C, interview 9, p. 13.

Rarely looking back to see if the firm is still doing the right thing, but just carrying out the business case, can have an influence on changing and implementing new opportunities and on being creative. Thus, it can be concluded that the emphasis placed on the use of financial methods has an influence on the dimension agility.

#### 4.2.2. Analysis part II

##### **Evidence-based and opinion-based decision-making and portfolio mindset**

When comparing the four firms on the dimension portfolio mindset, the interviews show that Firm B, Firm C and Firm D all have a lower portfolio mindset compared to Firm A for different reasons (see Appendix 9). One of these reasons is that according to interviewee 1 (Strategic Planner in Firm A), Firm A has a midterm plan with an overview of all projects and what everybody is going to do.

*"I can find it because there is a midterm plan that contains everything they are going to do and also what we are going to do."*<sup>47</sup>

When it comes to for example Firm B, the interviews show that Firm B has multiple documents that show an overview and a few details of the ongoing projects (these documents were also shown to the researcher during the interview with interviewee 6), but according to interviewee 7 (Product Marketing Analyst in Firm B), these documents can be seen as a "paper illusion".

*"Yes, well we all have lists that everyone can see of these projects are there."*<sup>48</sup>

*"And for each type (of project, AK), they make a bit of a document what they want to do."*<sup>49</sup>

*"But yes, I do remember that tooling sometimes seems to be more important there than what it is trying to accomplish so to speak. So, it is a bit of a paper illusion or something. So that if I say it really harshly."*<sup>50</sup>

These documents can be seen as a "paper illusion", while according to the interviewee, the firm does not have time management (hour registration), which leads to not knowing what is going on within the R&D department, which results in making "rough" estimations based on own interpretation when it comes to the current status of the projects.

*"From time to time, we have no idea what is happening at R&D. We just do not have time management. No need to write hours on projects. (...) So, in the end what it says is an*

<sup>47</sup> "Ik kan het wel vinden want er is een uh een midterm plan waar alles in staat wat ze gaan doen en ook wat wij gaan doen." – Firm A, interview 1, p. 2.

<sup>48</sup> "Ja goed we hebben allemaal wel lijstjes dat die iedereen kan zien van deze projecten spelen er." – Firm B, interview 5, p. 2.

<sup>49</sup> "En voor elk type maken ze een beetje een document wat ze willen doen." – Firm B, interview 6, p. 5-6.

<sup>50</sup> "Uhm maar ja ik weet niet goed ik weet nog d.. dat daar lijkt af en toe het het de tooling belangrijker dan wat het probeert te bewerkstelligen om dat zo maar te zeggen. Dus uhh uhh het is een beetje papieren illusie ofzo zeg maar. Dus dat uhh uit.. als je heel.. als ik het echt heel ha.. het heel hard zeg." – Firm B, interview 7, p. 8.

*estimate at best. (...) Actually, I do not think anyone really has a complete overview of what we are doing.*"<sup>51</sup>

*"Yes, several people do work/initiate at the same time, so an attempt is made to give an update, but it is always an interpretation. So, I cannot check whether that what it says actually also..."*<sup>52</sup>

Not having time management (hour registration) and making "rough" estimations based on own interpretation when it comes to the current status of the projects can be the result of Firm B placing the emphasis more on opinion-based decision-making instead of on evidence-based decision-making (see section 4.1.1). Firm A on the other hand places the emphasis more on evidence-based decision-making (see section 4.1.1), which is also a reason for Firm A to have a higher portfolio mindset compared to the other firms (as Appendix 9 illustrates). Thus, it can be concluded that the emphasis placed on opinion-based and evidence-based decision-making has an influence on the dimension portfolio mindset. Other reasons for having a lower portfolio mindset compared to Firm A can be related to the organizational structure involving the centralization and decentralization of decision-making power and is discussed in section 4.3.1.

#### **Evidence-based and opinion-based decision-making and agility**

Finally, when it comes to the second aspect of the dimension agility, decision-making speed, the interviews illustrate that wanting or needing more information/details (evidence-based decision-making) can have an influence on the decision-making speed (see Appendix 10). Furthermore, according to interviewee 2 (Senior Project Leader R&D in Firm A), not delivering the right information can delay the decision-making process.

*"Yes, this often leads toward delays because those Dutch people do not provide the right information with which their process can work."*<sup>53</sup>

So, firms that place the emphasis more on evidence-based decision-making may experience some delay when the wrong kind of information is delivered. Moreover, Appendix 10 illustrates that the incorporation of multiple perspectives in portfolio decision-making (part of evidence-based decision-

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<sup>51</sup> "Wij hebben g.. af en toe geen idee wat er op de R&D gebeurd. We hebben we hebben gewoon geen time management. Uhh hoeven geen uren te schrijven op projecten. (...) Dus uhh uiteindelijk is wat daar staat is een.. is een op zijn best een schatting te noemen. (...) Eigenlijk heeft volgens mij niemand echt een totaaloverzicht van wat we aan het doen.. wat wat eigen aan het doen is." – Firm B, interview 7, p. 8.

<sup>52</sup> "Uhh ja der wou.. der werken wel meerdere mensen tegelijkertijd initieert dus eigenlijk wordt er wel geprobeerd een update te geven, maar het is natuurlijk altijd weer een interpretatie uiteindelijk dus je.. het is niet.. Dus dit dit dus ik kan niet checken of dat wat er staat daadwerkelijk ook.." – Firm B, interview 7, p. 9.

<sup>53</sup> "Ja dat leidt wel vaak tot vertraging want die Nederlanders die leveren niet de goeie informatie op waarmee dat.. Dat proces van hun kan werken." – Firm A, interview 2, p. 19.

making) also can have an influence on the decision-making speed. Finally, according to interviewee 4 (Strategic Planner in Firm A), firms that decide intuitively also move faster.

“So, the guys deciding intuitively and faster they move faster also.”<sup>54</sup>

Thus, it can be concluded that the emphasis placed on opinion-based and evidence-based decision-making has an influence on the dimension agility, while the emphasis place on opinion-based decision-making is assumed to have an influence on the dimension agility. However, this is not the only factor influencing the decision-making speed. The structure of the organization involving the centralization and decentralization of decision-making power can also have an influence on the decision-making speed. This is however discussed in more detail in section 4.3.1.

#### 4.2.3. Intermediate conclusion

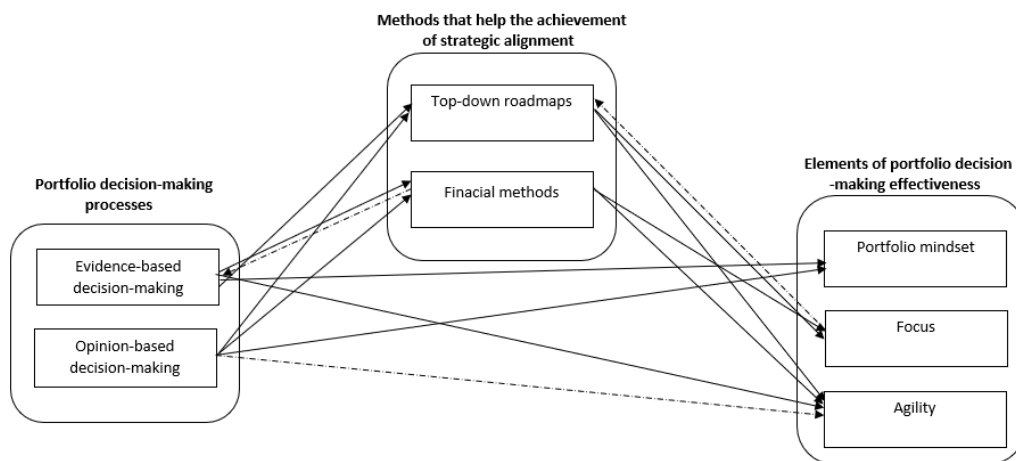
Firstly, the analysis of the relationship between the concept methods that help the achievement of strategic alignment and the concept elements of portfolio decision-making effectiveness illustrates that the emphasis placed on the use of top-down roadmaps and financial methods has an influence on the dimension focus and the dimension agility. In reverse, the dimension focus is assumed to have an influence on the emphasis placed on the use of top-down roadmaps.

Secondly, the analysis of the relationship between the concept portfolio decision-making processes and the concept elements of portfolio decision-making effectiveness illustrates that the emphasis placed on evidence-based and opinion-based decision-making has an influence on the dimension portfolio mindset. Furthermore, the emphasis placed on evidence-based decision-making has an influence on the dimension agility, while the emphasis placed on opinion-based decision-making is assumed to have an influence on the dimension agility. All of these relationships and the relationships discussed in section 4.1.1 lead to the following conceptual model (see Figure 4). The relationships that are only assumed, are illustrated by a dotted line.

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<sup>54</sup> “So the guys deciding uh intuitively and faster they move faster also.” – Firm A, interview 4, p. 17.





**Figure 4. Conceptual model based on section 4.1.1, 4.2.1 and 4.2.2**

#### 4.3. Sub-question 3: Relationship between organizational structure and elements of portfolio decision-making effectiveness

This section focuses on sub-question 3: *How is the organizational structure involving the centralization and decentralization of decision-making power related to the elements of portfolio decision-making effectiveness?*

The concept organizational structure contains the two dimensions centralization and decentralization of decision-making power. The dimension centralization involves top-down decision making where the decision-making power is in the hands of the top management and lower levels of management are not consulted. The dimension decentralization on the other hand involves bottom-up decision-making, meaning decision-making by all levels of management where lower levels of management are able to make decisions without the interference of the top-management. This means that multiple people are involved in the decision-making process. To illustrate the level of centralization and decentralization of each firm, the four firms have been compared on six different aspects (see Appendix 11). As Appendix 11 illustrates, none of the firms has a “highly” centralized organizational structure. This means that most of the relationships discussed in section 4.3.1 are focused on the dimension decentralization. However, in a few cases, assumed relationships regarding the dimension centralization are also mentioned.

#### 4.3.1. Analysis

##### Decentralization and portfolio mindset

As mentioned in section 4.2.2, the organizational structure can also have an influence on having a portfolio mindset. Section 4.2.2 also mentions that the interviews show that Firm B, Firm C and Firm D, for different reasons, all have a lower portfolio mindset compared to Firm A when comparing the four firms on the dimension portfolio mindset. According to interviewee 1 (Strategic Planner in Firm A), Firm A has multiple alignment teams which monitor who is doing what exactly.

*“So, there are different alignment teams to keep an eye on who does exactly what.”<sup>55</sup>*

Also, according to interviewee 2 (Senior Project Leader R&D in Firm A), the PBSC (strategy department at parent company level, AK) was founded to create a line in the different business units that act more or less autonomously, thereby also attempting to create an overall picture.

*“Well the PBSC was actually founded to try to create a line in all those business units that act more or less autonomously. And well that is immediately taken very broadly in Japanese. That goes immediately about technologies, about markets, about products, about competitors and well everything is included. But in any case, to make an attempt to create an overall picture.”<sup>56</sup>*

When looking at Firm B and Firm D, according to interviewee 7 (Product Marketing Analyst in Firm B), interviewee 11 (Head of Digital in Firm D) and interviewee 12 (Head of IT and Innovation in Firm D), Firm B and Firm D have to some extent a silo effect within their firm.

*“It is now very silo oriented unfortunately.”<sup>57</sup>*

*“Traditionally we are a pretty silo (oriented, AK) company.”<sup>58</sup>*

*“Yes, it is very silo driven yes.”<sup>59</sup>*

According to Vatanpour, Khorramnia and Forutan (2013), silos can be seen as an “offshoot” of decentralized management (p. 212). Furthermore, silos within a firm can result in poor communication according to the literature (Hotăran, 2009; Vatanpour et al., 2013). According to interviewee 6 (Project Leader R&D in Firm B), projects within the R&D department do not overlap due to “reasonable” communication.

<sup>55</sup> “Uhm dus er zijn verschillende alignment teams om wel in de gaten te houden van wie doet nou precies wat.” – Firm A, interview 1, p. 3.

<sup>56</sup> “Nou de PBSC is eigenlijk opgericht om te proberen om al die businessunits die min of meer autonoom acteren omdat toch een lijn in te creëren. En uhh nou dat wordt gelijk erg breed getrokken op zijn Japans. Dat gaat gelijk over technologieën, over makten, over producten, over concurrenten en nou alles wordt erbij gehaald. Maar in ieder geval een poging te doen om daar een totaalbeeld in te scheppen.” – Firm A, interview 2, p. 23.

<sup>57</sup> “Het is nu heel erg silo georiënteerd helaas.” – Firm B, interview 7, p. 15.

<sup>58</sup> “Van oudsher zijn wij een behoorlijk silo bedrijf.” – Firm D, interview 11, p. 5.

<sup>59</sup> “Ja j.. het is heel erg uh silo gedreven ja.” – Firm D, interview 12, p. 7.

*“This is not so bad within the department (R&D, AK) because we now have reasonable communication with each other.”<sup>60</sup>*

However, the interviewee also mentioned that projects outside of the R&D department do overlap.

*“What can happen at some point, that something comes in here that we are also working on within R&D. And recently we just had, in the factory they preferably wanted to use a new circuit board, it is convenient for them and then they just think they can replace a circuit board and we have it as a project. Look and then it may be that almost the same is happening in two places.”<sup>61</sup>*

Furthermore, the interviews of Firm D illustrate that projects can overlap due to “no optimal” collaboration and “insufficient” consultation.

*“But you see, it is definitely not yet optimal in the collaboration. So, you also see that indeed different people are sometimes engaged with the same things”<sup>62</sup>*

*“So, someone is doing this, someone is doing this and there was not always sufficient consultation with each other and that also went wrong sometimes. That people were then working on something, that someone else said yes but we already have that or then you also need this.”<sup>63</sup>*

It can be said that projects overlapping is related to the dimension portfolio mindset which, among other things, involves at all times having an overview of all projects. So, because a silo effect (“offshoot” of decentralization) can have an influence on communication, and communication in turn can have an influence on projects overlapping, it can be concluded that decentralization has an influence on the dimension portfolio mindset.

### **Decentralization and focus**

When it comes to the dimension focus, the interviews of Firm B illustrate that the organizational structure can have an influence on the dimension focus. According to interviewee 7 (Product Marketing Analyst in Firm B), Firm B had a top-down organizational structure in the past.

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<sup>60</sup> “Hier binnen afdeling valt dat mee omdat we nou redelijk communicatie met elkaar hebben.” – Firm B, interview 6, p. 7.

<sup>61</sup> “Wat op een gegeven moment wel kan gebeuren, dat hier iets binnen komt waar we binnen R&D ook gewoon mee bezig zijn. En laatst hadden we gewoon van willen ze uhh in het fabriek willen ze het liefst een nieuwe nieuw printbordje gebruiken is voor hun wel zo handig he en dan denken ze gewoon dat ze even een printbordje zo kunnen vervangen en wij hebben het als project staan. Kijk en dan kan het zo zijn dat er bijna op twee plakken bijna hetzelfde gebeurt.” – Firm B, interview 6, p. 8.

<sup>62</sup> “En uhm maar je ziet het uh ja nee het is absoluut nog niet optimaal in de samenwerking. Je ziet dus ook dat dat inderdaad verschillende mensen soms met dezelfde dingen bezig zijn.” – Firm D, interview 12, p. 7.

<sup>63</sup> “Dus die doet dit, die doet dit en der werd niet altijd voldoende met elkaar overlegt en dat dat liep dus ook wel is mis dat mensen dan met iets bezig waren dat iemand anders zei ja maar dat hebben we al of dan heb je ook dit nodig.” – Firm D, interview 11, p. 5.

*"Yes, back when the owners were still here, it was very top-down."*<sup>64</sup>

However, in the present, the clear leadership from above has disappeared and the management board does not seem to be mutually aligned, departments have started to organize themselves, leading to departments having their own project lists and prioritization of projects (a silo effect). This in turn leads to negotiations between departments regarding the prioritization of projects. Sometimes when others within the firm do not find a project important, the department does not get the resources for it.

*"I have the idea that they (the management board, AK) are not yet fully aligned there. (...) So that's why departments or at least their managers started to organize themselves a little."*<sup>65</sup>

*"So, because there is actually here that that very clear leadership has disappeared from above, you actually see that now the different departments actually have their own project lists, so to speak, or keep their own program, their own project list. And yes then you have to negotiate with each other what will be the most important thing and sometimes then yes I do not think that is important so you will not get people."*<sup>66</sup>

Moreover, according to interviewee 6 (Project Leader R&D in Firm B), other departments are involved in the next phases when the firm's prototype is reasonably good, which is a bit more difficult according to the interviewee, especially when it comes to aligning capacities and resources.

*"And if you so to say have the first prototypes reasonably well, then in that other phase you very well involve the other departments. So engineering is involved in how can you produce it in the factory, but also marketing is involved."*<sup>67</sup>

*"That is a bit more difficult, especially with aligning capacities and resources."*<sup>68</sup>

Departments must in the first instance resolve it amongst each other when conflicts about the prioritization arise. Only when conflicts do not get resolved, departments can go to the board.

*"When there are conflicts, they initially have to try to just solve the problem themselves, of where does the conflict come from. Yes, or what should we prioritize now. So, then you try to*

<sup>64</sup> "Ja vroeger met toen toen de eigenaren hier nog waren, was het heel erg top-down." – Firm B, interview 7, p. 13.

<sup>65</sup> "Ik heb het idee dat ze daar nog onderling nog niet helemaal uhh aligned zijn. (...) Dus daarom gingen afdelingen zichzelf maar een beetje organiseren of althans de de de leiding.. leidinggevend de dervan." – Firm B, interview 7, p. 16.

<sup>66</sup> "Dus omdat er eigenlijk uhh he dat die hele duidelijke uhh leiding van bovenaf verdwenen is zie je eigenlijk dat nu de verschillende afdelingen eigenlijk hun eigen.. Projectenlijst en om het zo maar te noemen of hun eigen programma eigen projectenlijst zeg maar bijhouden. En ja dan moet je maar onderling onderhandelen wat dan het belangrijkste ofzo zal en soms dan ja ja ik vind die ik vind niet belangrijk dus je krijgt geen mensen." – Firm B, interview 7, p. 15.

<sup>67</sup> "En als je zeg maar uhh de eerste prototypes redelijk goed hebt dan ga je in die andere fase daar betrek je heel goed de andere afdelingen bij. Dus wordt engineering bij betrokken van he van hoe kun je het produceren in de fabriek uhh maar ook marketing wordt bij betrokken." – Firm B, interview 6, p. 4.

<sup>68</sup> "Dat is iets lastiger met name met capaciteiten en resources afstemmen." – Firm B, interview 6, p. 4.

*figure out okay are resources available or what do we find more important if it is indeed a conflict. And if they do not figure it out themselves, they will step toward the board.”<sup>69</sup>*

The previous can be related to the clarity regarding which innovation projects in the portfolio have priority (part of the dimension focus) and thereby on the ability to focus resources on the achievement of the innovation portfolio priorities. Thus, it can be concluded that decentralization also has an influence on the dimension focus.

### **Decentralization and agility**

Finally, as mentioned in section 4.2.1, the organizational structure can have an influence on the decision-making speed. The interviews show that decentralization can both speed up and slow down the decision-making process. When it comes to speeding up the decision-making process, as illustrated in Appendix 11, the organizational structure of Firm D can be seen as being quite decentralized. According to interviewee 11 (Head of Digital in Firm D), people within the firm are able to make decisions fairly independently.

*“Then I can also decide fairly independently. Actually, everyone can do that here.”<sup>70</sup>*

When interviewee 11 was asked if project-related decisions within the firm can be made quickly since the firm is quite decentralized, the interviewee responded with a yes.

*“Yes, yes, yes.”<sup>71</sup>*

Furthermore, the interviews of Firm A illustrate that lower levels of management have a mandate to make decisions independently.

*“I am appointed by the management, also with the mandate to act on behalf of R&D in that process.”<sup>72</sup>*

*“In the end we work with a mandate, so we are... I have an assignment from the management and I have a team of people from the departments and those people from departments, they have a mandate from the department.”<sup>73</sup>*

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<sup>69</sup> “Op moment dat er uhm con.. conflicten zijn, dan uhh moeten ze in eerste instantie proberen gewoon zelf op te lossen van waar zit dan het waar zit het dan het conflict. Ja of o.. ja wat wat moeten we nu gaan prioriteren. Dus dan probeer je achterhalen van oké is een resources beschikbaar of uhh wat vinden we uhh belangrijker als het uhh als het inderdaad een conflict is. En als ze zelf niet uitkomen dan stappen ze dus naar de uhh board toe.” – Firm B, interview 7, p. 17.

<sup>70</sup> “Dan kan ik ook redelijk zelfstandig beslissen. Dat kan eigenlijk iedereen hier wel.” – Firm D, interview 11, p. 12.

<sup>71</sup> “Ja, ja, ja.” – Firm D, interview 11, p. 13.

<sup>72</sup> “Uhhm ik uhh wordt door de directie benoemd uhh ook met het mandaat om namens R&D daarover in in dat proces uhh te acteren.” – Firm A, interview 2, p. 2.

<sup>73</sup> “Uiteindelijk uhh werken wij met een mandaat dus wij zijn uhh ik heb een opdracht v.. ik heb een opdracht vanuit de directie en ik heb een team van mensen uit de afdelingen en die mensen uit afdelingen die hebben een mandaat vanuit de afdeling.” – Firm A, interview 3, p. 5.

*“Yes R&D also has the freedom to say this is the best solution for this specification. Hey that's something for R&D.”<sup>74</sup>*

Mandates enable lower levels of management to act independently when making project-related decisions. Furthermore, according to interviewee 1 (Strategic Planner in Firm A) and interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), project-related decisions within Firm B can generally be made quickly.

*“Then, at the moment things are moving fast.”<sup>75</sup>*

*“I think that within Firm A we are good at responding very quickly if necessary.”<sup>76</sup>*

Furthermore, as mentioned above, decentralization can result in slowing down the decision-making process. As mentioned in section 2.3.2, according to the literature review, decentralization can lead to multiple individuals having different opinions, which can lead to slowing down the decision-making process. The interviews illustrate that the decision-making process can take longer when a project-related decision needs to be made involving multiple individuals and/or departments. As mentioned above, according to interviewee 1 (Strategic Planner in Firm A) and interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), present decisions can generally be made quickly. However, interviewee 1 (Strategic Planner in Firm A) also mentioned that a few project-related decisions can take a while, because sometimes a lot of people have a say.

*“We have a number of topics that a lot of people are allowed to say something about.”<sup>77</sup>*

*“So, there are a few of them that I think well this can be done faster. But that has more to do with the organization and that we then cannot say we now appoint one person who is just about that (in charge of that, AK).”<sup>78</sup>*

Also, according to interviewee 5 (Manager R&D in Firm B), the firm has difficulty in making decisions, while decisions made in Firm B can be endlessly revoked in different places.

*“We have a lot of trouble taking decisions. And they can sometimes be endlessly revoked in many places. So, a decision what really stands and applies to the company, that is not easy.”<sup>79</sup>*

<sup>74</sup> “Ja R&D heeft zelfs de.. ook de vrijheid om te zeggen dit is de beste oplossing voor uh deze specificatie. He dat uh dat is iets voor R&D.” – Firm A, interview 3, p. 6.

<sup>75</sup> “Dan gaat het op dit moment snel.” – Firm A, interview 1, p. 16.

<sup>76</sup> “Ik denk dat uh wij binnen Firm A uh juist goed zijn om heel snel te reageren. Als het moet.” – Firm A, interview 3, p. 14.

<sup>77</sup> “We hebben een aantal onderwerpen daar mogen wel heel veel mensen wat van zeggen.” – Firm A, interview 1, p. 17.

<sup>78</sup> “Dus, der zitten er wel een paar bij dat ik denk nouu dit kan sneller. Maar dat dat heeft te.. dat heeft meer met de organisatie te maken en dat we dan dus niet kunnen zeggen we wijzen nu één iemand aan die gaat gewoon over.” – Firm A, interview 1, p. 17.

<sup>79</sup> “We hebben der erg veel moeite mee met besluiten nemen. En die uh die kunnen soms eindeloos herroepen worden op op allerlei plekken. Dat uh.. dus een een besluit wat echt staat en voor het bedrijf geldt dat dat valt niet mee.” – Firm B, interview 5, p. 9.

When the interviewee was asked if the reason for this was the say of multiple people, the interviewee responded with a yes.

*“Yes. So, it is, well you could say, either too soon in too small a group pre-determined. But then you have to take the whole company further along with it and then there is always someone somewhere who has a reason not to want it that way.”<sup>80</sup>*

Furthermore, a silo effect within a firm can have an influence on the decision-making speed. As mentioned above, departments within Firm B have started to organize themselves, leading to departments having their own project lists and prioritization of projects (silo effect). This in turn has led to negotiations between departments when it comes to the prioritization of projects. Also, according to interviewee 6 (Project Leader R&D in Firm B), involving different departments in the next phases is always difficult. Moreover, when interviewee 12 (Head of IT and Innovation in Firm D) was talking about that Firm D is silo driven and was asked if decisions sometimes take longer because of this, the interviewee answered with a yes.

*“Yes, I think our speed is very low.”<sup>81</sup>*

The interviewee also mentioned that decisions can be made “very” quickly when people within the firm work together.

*“Yes, yes so it is, no I have to say if we work well together, it goes very well and very quickly. Then it is possible.”<sup>82</sup>*

This implies that decisions can take a while when people do not work together, which can be the result of silos. Thus, it can be concluded that decentralization has an influence on the dimension agility.

### **Centralization and agility**

Finally, when it comes to centralized decision-making, interviewee 9 (Head of Technology and Innovation in Firm C) mentioned that decisions by the top-management can be made fairly quickly, among other things because of the small number of board members. However, they first need to reach the board.

*“Now there are only three men. So, hey the CEO, COO and the CCO. (...) Well then you can of course decide quickly yes.”<sup>83</sup>*

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<sup>80</sup> “Ja. Dus het is de de het wordt uh nou ja je zou kunnen zeggen ofwel te snel in een in een te kleine groepje uhh voor besloten. Maar dan moet je het hele bedrijf der verder in meenemen en dan is er altijd wel ergens iemand die uhh die een reden heeft om dat niet zo te willen.” – Firm B, interview 5, p. 9.

<sup>81</sup> “Ja ik vind wel ja nee onze onze onze onze snelheid is heel laag.” – Firm D, interview 12, p. 7.

<sup>82</sup> “Ja, ja dus het is nee ik moet zeggen als je nee als we als we goed samenwerken, gaat het heel goed en heel snel. Dan kan het wel.” – Firm D, interview 12, p. 14.

<sup>83</sup> “Nu zitten der uh drie man nog. He dus de CEO, COO en de CCO. (...) Nou ja dan kan je natuurlijk wel uhh snel besluiten ja.” – Firm C, interview 9, p. 18

*“In general, I think when something reaches the board that decisions are made fairly quickly.”<sup>84</sup>*

This implies that it can take time before things reach the board, which means that the total decision-making time, from the moment that new opportunities arise until the final decision by the board, can still be long even though the board is able to make quick decisions. This is in line with the literature review (see section 2.3). Furthermore, according to interviewee 10 (District Manager in Firm C), in the present it can take a very long time before the board gives his approval if needed.

*“That can take a long time. That can take a long time, yes.”<sup>85</sup>*

According to the interviewee, this is due to the fact that the board-members only have 24 hours in a day and that the board does not have the time for certain things at this moment in time, because they are working on the integration of the firm.

*“Yes, and what I say you only have 24 hours. There is simply no time for it.”<sup>86</sup>*

*“Yes, that is right. But they do not have time for that at the moment, because they are working on the integration.”<sup>87</sup>*

So, as mentioned in section 2.3.1, being responsible for making all of the decisions requires a lot of time from the top-management, which can lead to delayed decision-making. Thus, it can be assumed that centralization also has an influence on the dimension agility.

#### 4.3.2. Intermediate conclusion

The analysis of the relationship between the concept organizational structure and the concept elements of portfolio decision-making effectiveness illustrates that decentralization has an influence on all three elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility. Furthermore, centralization is assumed to have an influence on the dimension agility. All of these relationships and the relationships discussed in section 4.1.1, section 4.2.1 and section 4.2.2 lead to the following conceptual model (see Figure 5). The relationships that are only assumed, are illustrated by a dotted line.

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<sup>84</sup> “Ik vind over het algemeen als als uh als het iets het bestuur bereikt dat er wel redelijk snel besloten wordt.” – Firm C, interview 9, p. 18.

<sup>85</sup> “Dat kan heel lang duren haha. Dat kan heel lang duren ja.” – Firm C, interview 10, p. 9.

<sup>86</sup> “Ja en wat ik zeg je hebt maar 24 uur. Der is gewoon geen tijd voor.” – Firm C, interview 10, p. 8.

<sup>87</sup> “Ja dat klopt. Maar die hebben maar die hebben daar geen tijd voor op dit moment. Omdat ze met de integratie bezig zijn.” – Firm C, interview 10, p. 10.



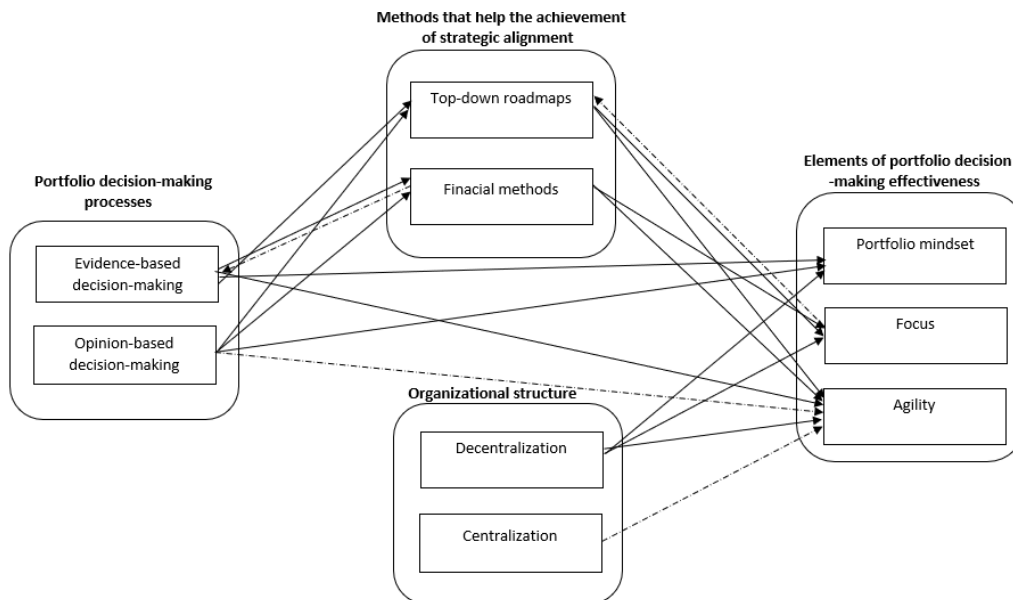


Figure 5. Conceptual model based on section 4.1.1, 4.2.1, 4.2.2 and 4.3.2

#### 4.4. Budget

While conducting, transcribing and coding the interviews, it stood out that the budget is also an important concept with respect to portfolio decision-making. The budget is the amount of money reserved for projects and involves the allocation of money into pockets/buckets. For this research, the most important aspect of the budget is its flexibility. The budget flexibility involves the freedom of movement within the budget set and the possibility to expand the budget. The interviews illustrate that the budgets of all firms are flexible to some extent (see Appendix 12). The interviews furthermore illustrate that the budget can have an influence on the multiple dimensions of the different concepts mentioned in section 3.3. For this reason, the budget is added as an extra concept to this research and the conceptual model. The different relationships between the concept budget and the other concepts mentioned in section 3.3 are discussed in section 4.4.1.

##### 4.4.1. Analysis

##### Evidence-based and opinion-based decision-making and budget

As mentioned in the introduction of section 4.4, the budget can have an influence on the different dimensions illustrated in section 3.3. The interviews of Firm B illustrate that Firm B places less emphasis on the budget compared to the other firms due to the fact that the firm is doing financially well (see section 4.1.1), leading to a more flexible budget. According to interviewee 5 (Manager R&D

**Met opmerkingen [RS1]:** Is de conclusie dan niet (ook) dat evidence DM in feite overlapt met top-down roadmaps en financial methods/budgets etc?

2: hoe kun je precies dat rechte-effect van evidence/opinion DM op portfolio mindset & agility vaststellen?

3: zijn focus & agility elkaars inverse — dezelfde dimensie? (nee, want het gaat bij agility vooral over DM speed en niet zozeer de aard van de beslissingen?)

4: Is er dan geen verband tussen org. Structure en DM?

in Firm B), the firm “does not do really strict when it comes to the budget” and is, as illustrated in section 4.1.1, “not very budget oriented” due to a fairly loose structure.

*“No, well, as said, we are not doing very strict on budget hey, so, and the company is doing reasonably well.”<sup>88</sup>*

Furthermore, when interviewee 5 (Manager R&D in Firm B) is asked about the flexibility of the budget, the interviewee responds that they are trying to set rules about the division of the budget.

*“Yes, well that sounds like it is very free but hey in practice we try to make a few rules of well let's aim for this much percent of our time on that we are dealing with problems.”<sup>89</sup>*

This citation comes across as if the flexibility of the overall budget allows for a distribution of the budget based on more opinion-based instead of evidence-based decision-making. The interviewee also mentioned that he can imagine that firms which are very strict when it comes to the budget and planning also place more emphasis on evidence-based decision-making (see section 4.1.1). As section 4.1.1 illustrates, Firm A, Firm C and Firm D place more emphasis on evidence-based decision-making compared to Firm B. According to interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), decisions are mostly based on facts (evidence-based) because the firm cannot (financially) afford to make wrong decisions.

*“I think it is quite often somewhat factual, but also that, yes look you cannot afford (financially, AK) to make wrong decisions now.”<sup>90</sup>*

Not being able to (financially) afford making wrong decisions can imply having a not “too” flexible budget. Furthermore, according to interviewee 8 (COO in Firm C), while budget is budget, it is important to make good estimates of the situation (evidence-based decision-making).

*“Yes, budget is budget.”<sup>91</sup>*

*“That is important then. So that is why I think you should make a good estimate in the beginning of gosh what is actually up with that.”<sup>92</sup>*

So, while having a “too flexible” budget can allow for opinion-based decision-making, having a less flexible budget can increase the necessity evidence-based decision-making. Thus, it can be concluded that the emphasis placed on the budget has an influence on evidence-based decision-making.

Moreover, because the interviews illustrate that the firm that places the emphasis more on opinion-

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<sup>88</sup> “Nee nou ja dat ja .. w.. zoals gezegd wij doen niet heel strikt aan aan budget he dus uhh en en het bedrijf gaat het redelijk voor de wind.” – Firm B, interview 5, p. 13.

<sup>89</sup> “Ja nou ja goed dat dat dat klinkt nou alsof het wel heel vrij is maar het.. he we proberen in de praktijk ook een paar regeltjes van te maken van nou laten we laten we zoveel procent van onze tijd mikken op dat we met problemen bezig zijn.” – Firm B, interview 5, p. 6.

<sup>90</sup> “Ik denk dat het toch wel uh uh veelal wat feitelijkheid uh.. maar ook dat uh ja kijk je kunt niet veroorloven om nu verkeerde beslissingen te nemen.” – Firm A, interview 3, p. 10.

<sup>91</sup> “Ja budget is budget.” – Firm C, interview 8, p. 10.

<sup>92</sup> “Uhh da.. dat is dan wel van belang. Dus vandaar dat je ook denk ik goeie inschatting in het begin moet maken van uhh goh uhh hoe zit dat eigenlijk.” – Firm C, interview 8, p. 10.

based decision-making and thus makes use of more “rough” estimates instead of evidence/research (Firm B), has a more flexible budget than the firms that place the emphasis more on evidence-based decision-making (Firm A, Firm C and Firm D), it can also be assumed that the emphasis placed on opinion-based and evidence-based decision-making in reverse has an influence on the budget.

### **Budget and focus**

Secondly, according to interviewee 1 (Strategic Planner in Firm A), choices need to be made regarding the prioritization of projects (long-term product development versus short-term business continuity), because budget and money constraints are always present.

*“So, because you always have constraints in budget and money and sometimes something happens, so than you have to make a choice, so you have to have priorities. There can still be some differences.”<sup>93</sup>*

Also, according to interviewee 2 (Senior Project Leader R&D in Firm A), not having a budget for a project anymore can be a reason for stopping a project.

*“That is more a reason to quit.”<sup>94</sup>*

One can decide to continue a project to at the end of the project still reap the benefits (profits), because according to the interviewee, the budget is to some extent flexible, meaning that it is possible to expand the budget.

*“But it is possible at some point to establish that the pocket money we thought we needed is already gone or it turns out to be too small. Yes, then it happens that at that moment is look at again of okay well we have made a certain investment that has led to a certain status of the project. If we stop now then yes you have more or less lost it. (...) And if you continue to invest now, that income will still come.”<sup>95</sup>*

It can take a while before real profit is generated when it comes to long-term projects. Having a budget that is not really flexible can in that case result in stopping the project sooner. Furthermore, according to interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), choices need to be made between new product development and maintenance of existing products, because generally “issues” need to be handled within the budget.

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<sup>93</sup> “Dus uhh.. want je hebt altijd constraints in budget en geld en en der gebeurd wel is wat dus dan moet je een keuze maken dus je moet prioriteiten hebben. Uhm die kunnen nog wel is verschillen.” – Firm A, interview 1, p. 18.

<sup>94</sup> “Dat is.. dat is meer een reden om te stoppen haha.” – Firm A, interview 2, p. 15.

<sup>95</sup> “Uhm maar het uh het is mogelijk om op een gegeven moment te constateren van ja die zakgeld die we dachten nodig te hebben is al op of die blijkt te klein te zijn.. Ja dan uhh dan komt het wel voor dat op dat moment opnieuw wordt gekeken van oké nou wij hebben.. we hebben een bepaalde investering gedaan die heeft geleidt tot een bepaalde status van het project.. Uhh als we nu stoppen uh dan ja ben je het min of meer kwijt. (...) En als je nu door investeert dan komen die in inkomsten alsnog.” – Firm A, interview 2, p. 15-16.

*“But basically, it has to be handled within the budget that we have. So, then it comes at a cost... then we have to choose.”<sup>96</sup>*

Because “issues” generally need to be handled within the budget according to the interviewee 3, when “issues” arise and the budget at that moment runs out, the interviewee will at that moment decide to focus on maintenance instead of new product development/innovation.

*“But if it really affects people and the budget is hit at that moment, yes, then we have to choose the smart way. (...) So, also the people who expect that you might be working on prio 2 issues, yes you will not if you cannot. Because yes you sometimes have people who have knowledge, who work on new projects, so the innovative things, but also have to help out in the pocket of maintenance.”<sup>97</sup>*

Moreover, according to interviewee 4 (Strategic Planner in Firm A), the size of the steps toward the future depends on the budget.

*“So, depending on how much of that we have and then how much of that we have in different pockets, we can look for really bigger steps in the future as one.”<sup>98</sup>*

When the interviewee was asked if this meant that the budget can have an influence on the choice between long-term and short-term project, the interviewee responded with a yes.

*“Indirectly yes so yes indirectly yes.”<sup>99</sup>*

The interviewee then mentioned that every R&D-budget is under pressure from the horizon 1-businesses.

*“Every R&D budget regardless whether it is large or small, it is under pressure from the horizon 1 businesses.”<sup>100</sup>*

Finally, also according to interviewee 8 (COO in Firm C), while budget is budget choices need to be made about what the firm finds important (prioritization).

*“So, then you have to make the choice of well if I do that because we find it is important, yes where am I going to take it away.”<sup>101</sup>*

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<sup>96</sup> “Maar in principe moet het uhh uh binnen het budget afgehandeld worden wat we hebben. Dus dan gaat het ten koste.. dan moeten we kiezen.” – Firm A, interview 3, p. 11.

<sup>97</sup> “Maar uh als het echt de de mens raakt en het het budget raakt op dat moment ja dan moeten we op op de slimme manier kiezen. (...) Dus ook de mensen die verwachten dat je misschien aan prio 2 uhh uh issues werkt ja dat even niet als het niet kan. Want ja je zit soms met mensen die kennis hebben die dus aan nieuwe projecten werken dus de innovatieve dingen maar ook.. een stukje bij moeten springen in het.. in het pocket van uh maintenance.” – Firm A, interview 3, p. 13.

<sup>98</sup> “So depending on how much of that we have and then how much we.. of that we have in different pockets we can uhh look for really bigger steps in the future as one.” – Firm A, interview 4, p. 8.

<sup>99</sup> “Indirectly yes so uhm jah indirectly yes.” – Firm A, interview 4, p. 9.

<sup>100</sup> “Every R&D budget regardless whether its large or small, it’s under pressure from the horizon 1 businesses.” – Firm A, interview 4, p. 9.

<sup>101</sup> “Dus dan moet je wel de keuze maken van nou ja uhh als ik dat wel ga doen omdat we het belangrijk vinden. Uhh ja wa.. waar ga ik het dan uhh weghalen.” – Firm C, interview 8, p. 11.

However, as mentioned in section 4.2.1, Firm C has the tendency to strive toward achieving the year budget. The interviewee also mentioned that in the end, the question about (financial) results still needs to be answered when it comes to the budget.

*“But in the end, you will still get that question of results.”<sup>102</sup>*

So, the budget can have an influence when it comes to the choice between long-term (product development) versus short-term (business continuity) projects. The interviews furthermore illustrate that having a budget that is not really flexible can result in choosing short-term projects over long-term projects. Thus, it can be concluded that the emphasis placed on the budget has an influence on the dimension focus.

### **Budget and agility**

Finally, according to interviewee 3 (Project Leader and Prince System Architect R&D in Firm A), when it comes to the long-term, a budget is set, but as more of a thinking direction, probably because the future is not always predictable.

*“And for the longer term, you also have no budget for commit yet, but do have a thinking direction. And there we want... you still have that, but that is especially in the longer term that it is not quite yet... you will come back to that a year later or something.”<sup>103</sup>*

Looking at this citation, it can be said that the firm is able to change and implement new opportunities that might arise in the future by keeping the budget flexible. Furthermore, according to interviewee 8 (COO in Firm C), different risks are taken into account when determining the budget and if something unexpected happens, the firm returns to its decision-making to make a decision about (dis)continuing a project.

*“Yes you, well you estimate how observable it is that something like this will take place. So, then you have to take it into account of course, but in principle you would say gosh we try to take as much as possible and that is also included in the budget. But now you know of course with risks yes you cannot always plan them hey. Sometimes when the sun does not rise anymore tomorrow, yes, then we all have a different problem. So that is also per case you come back to the decision-making process of gosh guys this is happening now, it has this impact on the project or on the organization, stop or continue.”<sup>104</sup>*

<sup>102</sup> “Maar uiteindelijk uhh ga je nog wel weer die vraag krijgen van van resultaat.” – Firm C, interview 8, p. 21.

<sup>103</sup> ““En voor de langere termijn heb jij ook nog.. denk van ja nog geen budget voor commit maar wel uh uh dit is de denk... de denkrichting. En uh daar willen we.. Dat heb je ook nog wel maar dat is wel vooral op de langere termijn dat dat nog niet helemaal.. daar kom je dan een jaar later ofzo wel op terug.” – Firm A, interview 3, p. 15.

<sup>104</sup> “Uhh ja je goed je maakt een inschatting van hoe waarnemelijk is het dat zoiets gaat plaatsvinden. Dus dan moet je dan moet je der wel rekening mee houden natuurlijk, maar in principe uhh zou je zeggen van goh we we proberen zo veel mogelijk mee te nemen en dat zit dan ook in het budget opgesloten maar nou weet je

However, the interviewee cannot remember a case where the firm has decided to discontinue a project.

*“Thinking out loud, well not really yet.”<sup>105</sup>*

So, taking risks into account when determining the budget and being able to adapt (not discontinue a project) when something unexpected happens can mean that the firm is able to change and implement new opportunities by keeping the budget to some extent flexible. Thus, it can be concluded that the emphasis placed on the budget also has an influence on agility.

#### 4.4.2. Intermediate conclusion

The analysis of the relationship between the concept budget and the concept portfolio decision-making processes illustrates that the emphasis placed on opinion-based and evidence-based decision-making is assumed to have an influence on the emphasis placed on the budget and in reverse, the emphasis placed on the budget has an influence on evidence-based decision-making and both the dimension focus and the dimension agility. All of these relationships and the relationships discussed in section 4.1.1, section 4.2.1, section 4.2.2 and section 4.3.1 lead to the following conceptual model (see Figure 6). The relationships that are only assumed, are illustrated by a dotted line.

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tuurlijk met risico's ja die kun je niet altijd plannen he.. Soms uhh als morgen de zon niet meer op gaat dan uhh ja dan hebben we met zijn allen een ander probleem uhh dus dat is dan ook per case kom je toch weer terug bij in de besluitvorming van goh jongens uhh dit gebeurd er nu dat heeft deze impact op het project.. Of op de organisatie uhh stoppen of doorgaan.” – Firm C, interview 8, p. 16.

<sup>105</sup> “Uhm even hardop te denken uhh nou nog niet echt.” – Firm C, interview 8, p. 16.

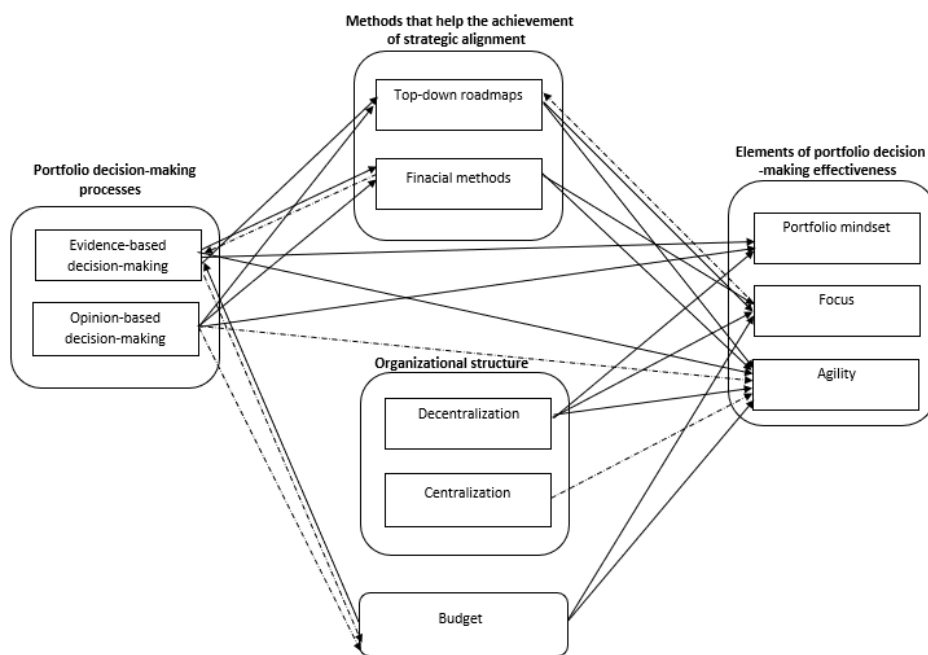


Figure 6. Conceptual model based on overall results

## 5. Conclusion and practical implications

### 5.1. Conclusion

By integrating portfolio decision-making literature for achieving strategic alignment with literature on methods that help the achievement of strategic alignment and literature on organizational structures involving centralization and decentralization of decision-making power, the goal of this research was to uncover multiple relationships within the overall portfolio decision-making model for achieving strategic alignment, to thereby create a better understanding of the overall portfolio decision-making model for achieving strategic alignment. This understanding can serve as a tool for firms and external actors toward the achievement of strategic alignment and thereby to improved firm performance.

This goal is achieved by answering the following research question:

*How are the methods that help the achievement of strategic alignment and the organizational structure involving centralization and decentralization of decision-making power related to the portfolio decision-making processes and the elements of portfolio decision-making effectiveness and thereby to the achievement of strategic alignment?*

A multiple case study has been conducted in four firms from different industries to answer this research question, resulting in 12 interviews and a few internal documents. With the data collected, the different dimensions within the four firms have been analyzed to uncover multiple relationships between the different dimensions, to create a better understanding of the overall portfolio decision-making model for achieving strategic alignment.

The conclusion can be drawn that the methods that help the achievement of strategic alignment and the organizational structure, but also the budget, are related to the portfolio decision-making processes and the elements of portfolio decision-making effectiveness, and thereby to the achievement of strategic alignment. Strategic alignment is achieved through the elements of portfolio decision-making effectiveness: portfolio mindset, focus and agility (Kester et al., 2014). The results illustrate that the portfolio decision-making processes, the methods that help the achievement of strategic alignment, the organizational structure and the budget all have or are assumed to have an influence on the elements of portfolio decision-making effectiveness (see Figure 6).

The literature review and the research results illustrate that both evidence-based and opinion-based decision-making are needed in portfolio decision-making and contribute to the achievement of strategic alignment. When it comes to opinion-based decision-making, the results illustrate that



opinion-based decision-making is needed to enable firms to make, change and/or implement new opportunities, which is needed given the rapidly changing environment. By using opinion-based decision-making, firms are able to make and implement new opportunities more quickly, thereby also moving faster. Furthermore, opinion-based decision-making can result in rough (financial) estimates based on previous experiences, looking less strictly at the economic aspect and financial methods becoming more of a sanity check of ideas, resulting in the ability to change and implement new opportunities. Nonetheless, an increasing degree of this can in turn result in projects that can be seen as point solutions, that do not generate enough revenue (short-term focus). And, firms with limited resources and thus a less flexible budget have the tendency to choose short-term projects over long-term projects. An increasing degree of opinion-based decision-making can furthermore result in roadmaps that are too flexible, not detailed enough, involve much too little input from the market and are a bit more positive than reality. While this enables firms to change and implement new opportunities, it can also result in projects, and especially long-term projects, being prolonged or not being finished at all. Moreover, opinion-based decision-making can result in a more flexible budget, by making rough estimates based on previous experiences, resulting in the ability to change and implement new opportunities. Finally, making rough estimations based on own interpretation when it comes to the current status of projects, can result in documents, that provide an overview of and in-dept knowledge on projects, being seen as a paper illusion.

The results illustrate that evidence-based decision-making is needed to enable firms to have a portfolio mindset and to focus developmental efforts toward the achievement of the firm's long-term goals. Because evidence-based decision-making involves making estimations based on evidence/research instead of own interpretations, when it comes to the current status of projects, evidence-based decision-making can result in documents that provide an overview of and in-dept knowledge about projects. Evidence-based decision-making can furthermore result in the generation of (market) input, thereby making the roadmaps more detailed/as detailed as possible, involving more input from the market and being closer to reality, resulting in fewer projects, and especially long-term projects, being prolonged or not finished at all. However, it decreases the ability to change and implement new opportunities. Furthermore, evidence-based decision-making can also result in a budget that is less flexible, by making estimations based on evidence/research. Nonetheless, an increasing degree of evidence-based decision-making that can result in a decreased flexibility of the budget, can result in the tendency to choose short-term projects over long-term projects, thereby jeopardizing the ability of the firm to achieve the firm's long-term goals. An increasing degree of evidence-based decision-making can moreover result in making more financial calculations and/or financial calculations that are more based on evidence/research instead of on previous experience

**Met opmerkingen [RS2]:** Het lijkt er een beetje op dat bedrijven die ruim in hun jas zitten financieel gezien, zich ook effectievere besluitvorming kunnen veroorloven, waardoor ze het mogelijk financieel beter doen. Dat suggereert een soort zelfversterkend effect, maar dat is uiteraard wel een erg vereenvoudigde zienswijze. Niettemin, als je kijkt naar het succes (bv. financial performance), zie je dan een duidelijk verschil tussen bedrijven? Zou hier wellicht ruimte zijn voor een meer grootschalig vervolgonderzoek (en hoe zou dat eruit kunnen zien)?

**Met opmerkingen [RS3]:** Je komt in organisaties nogal eens zo'n papieren 'werkelijkheid' tegen. Kun je op basis van je cases of eigen ervaring daar wellicht een voorbeeld van geven, waar het je in het bijzonder is opgevallen?

and in being strongly business case and financially driven, which does not fit the idea of exploring new areas and thus also jeopardizes the firm's ability to achieve the firm's long-term goals. Making more financial calculations and/or financial calculations that are more based on evidence/research instead of on previous experiences and being strongly business case and financially driven can also result in rarely looking back to see if the firm is still doing the right thing, thereby decreasing the ability to change and implement new opportunities. Finally, because evidence-based decision-making involves wanting or needing more information/details and the incorporation of multiple perspectives in portfolio decision-making, it can result in delayed decision-making, especially when not the right information is delivered.

Finally, the literature review and the research results illustrate that both centralization and decentralization are needed in portfolio decision-making and contribute to the achievement of strategic alignment. Being able to make decisions fairly independently can result in the ability to make and implement new opportunities more quickly. Nonetheless, an increasing degree of decentralization can result in slowing down the decision-making process when decision-making is needed to be made involving multiple individuals and/or departments. This is reinforced when the decentralization results in silos within the firm, where departments do not work well together. Silos within the firm can furthermore result in conflicts when it comes to the prioritization of projects, thereby influencing the ability of firms to focus resources on the achievement of innovation portfolio priorities. This is in reverse decreased by the introduction of a committee on a higher level that resolves conflicts. Moreover, silos within the firm can result in projects overlapping due to the lack of communication, no optimal collaboration and insufficient consultation. Finally, while decisions by the top-management can be made fairly quickly, also because of the small number of board members, an increasing degree of centralization can result in decreasing the ability to make and implement new opportunities more quickly due to long decision paths. Also, being responsible for making all decisions requires a lot of time from the top-management, which can also result in a decreased ability to make and implement new opportunities more quickly.

This previous illustrates that a proper balance of the dimensions of the portfolio decision-making processes, the methods that help the achievement of strategic alignment, the organizational structure and the concept budget is needed for effective portfolio decision-making and thus for the achievement of strategic alignment. The results of this research help the achievement of this proper balance by illustrating the influence of each dimension on the other dimensions of this research. The results of this research can therefore be used to (re)design the portfolio decision-making of firms to achieve strategic alignment and thereby improve firm performance.

## 5.2. Practical implications

Project portfolio decision-making is to some extent present in every firm regardless of whether the firm is small, medium or large. However, as illustrated in section 1.2, many firms lack the ability to (re)design their portfolio decision-making toward the achievement of strategic alignment and thereby also to improved firm performance. That is where this research comes in. The integration of literature and the creation of a better understanding of the overall portfolio-decision-making model for achieving strategic alignment helps firms, but also external actors, to (re)design the portfolio decision-making toward the achievement of strategic alignment.

The results of this research illustrating that there is no easy answer on how to achieve strategic alignment. Nonetheless, it is still important for firms to be aware of the influence their choices regarding portfolio decision-making have on the achievement of strategic alignment to achieve a proper balance in the use of opinion-based decision-making and evidence based decision making, the use of top-down roadmaps and financial methods, the budget, and the organizational structure.

Firstly, firms need to be aware of that both evidence-based and opinion-based decision-making are needed for the achievement of strategic alignment. Firms will not be able to make, change and/or implement new opportunities (agility) without opinion-based decision-making. However, while the importance of agility is emphasized in the present, firms need to be aware of that too much opinion-based decision-making can decrease the firm's ability to develop a portfolio mindset and indirectly (via top-down roadmaps, financial methods and budget) decrease the firm's ability to focus development efforts toward the achievement of the firm's long-term goals. Therefore, a certain degree of evidence-based decision-making is recommended in portfolio decision-making, with the awareness that too much evidence-based decision-making on the other hand can directly, but also indirectly (via top-down roadmaps and budget) decrease the firm's ability to be agile and indirectly (via financial methods and budget) decrease the firm's ability to focus development efforts toward the achievement of the firm's long-term goals.

Furthermore, firms need to be aware that achieving a proper balance can mean different things, depending on the environment the firm is in. This implies that firms can use evidence-based decision-making within a more stable environment, while more opinion-based decision-making is suitable in a more unstable and rapidly changing environment. The same goes for the use of top-down roadmaps and financial methods and the budget. A more unstable and rapidly changing environment requires firms to be more flexible in their use of top-down roadmaps and financial methods and in their

**Met opmerkingen [RS4]:** Even een stap terug: in hoeverre is het eigenlijk goed mogelijk om strategic alignment daadwerkelijk inzichtelijk te maken?

budget to, make, change and/or implement new opportunities. However, firms in stable environments are recommended to use more evidence-based decision-making, because opinion-based decision-making can be quite risky and rather costly.

Finally, firms need to be aware that they can benefit from both centralization and decentralization in portfolio decision-making, especially when it comes to the ability to make and implement new opportunities quickly. A certain level of decentralization is recommended to allow lower levels of management to independently make project-related decisions, thereby also utilizing the expertise and knowledge of lower levels of management. However, in some cases decisions involve multiple individuals and/or departments sometimes having different opinions. Therefore, it is also recommended to introduce a decision-making committee on a higher level, to safeguard the firm's ability to make and implement new opportunities quickly in cases of conflict. Here it is important for firms to be aware that the higher the level of decision-making, the longer the decision paths. Furthermore, because decentralization can lead toward silos within the firm, it is recommended to introduce communication mechanisms to safeguard the firm's ability to develop a portfolio mindset and to introduce a coordination mechanism on a higher level to safeguard the ability to focus developmental efforts toward the achievement of the firm's long-term goals.

## 6. Discussion

This research answers the research question, thereby providing an understanding of multiple relationships within the overall portfolio decision-making model for achieving strategic alignment and illustrating that besides the portfolio-decision-making processes also the methods that help the achievement of strategic alignment, the organizational structure and the budget have an influence on the elements of portfolio decision-making effectiveness and thereby on the achievement of strategic alignment. This chapter focuses on discussing the theoretical implications given these findings. Furthermore, a methodological reflection with possible limitations is provided and recommendations for future research are made toward (further) uncovering the overall portfolio decision-making model for achieving strategic alignment.

### 6.1. Theoretical implications

This research firstly confirms the literature on the portfolio decision-making processes evidence-based and opinion-based decision-making, illustrating that both evidence-based and opinion-based decision-making play a role in the portfolio decision making of every firm, by uncovering multiple relationships within the overall portfolio decision-making model for achieving strategic alignment. This research furthermore confirms multiple relationships between the portfolio decision-making processes and the elements of portfolio decision-making effectiveness researched by Kester et al. (2011).

Nonetheless, the results also illustrate multiple relationships between the portfolio decision-making processes and the elements of portfolio decision-making effectiveness via the methods that help the achievement of strategic alignment. Even though different studies have been conducted, especially by Cooper when it comes to the methods that help the achievement of strategic alignment (e.g. Cooper et al., 2001a; Cooper et al., 2002), these methods have not been related to the portfolio decision-making processes and the elements of portfolio decision-making effectiveness researched by Kester et al. (2011) until this research. Moreover, while Kester (2011) briefly discusses these methods, it does not include these methods in the portfolio decision-making model developed. Thus, by integrating literature on portfolio decision-making for achieving strategic alignment and literature on methods that help the achievement of strategic alignment, this research has uncovered multiple relationships between the portfolio decision-making processes and the elements of portfolio decision-making effectiveness via the methods that help the achievement of strategic alignment. Furthermore, while multiple studies have been conducted on organizational structures and innovation (e.g. Cosh et al., 2012; Damanpour & Gopalakrishnan, 1998) and organizational structures

and decision-making processes (e.g. Gachet & Brézillon, 2005) no research has been done to relate the organizational structure involving centralization and decentralization of decision-making power to the portfolio decision-making model of Kester (2011) until this research. So, this research has uncovered multiple relationships between the organizational structure involving centralization and decentralization of decision-making power and the elements of portfolio decision-making effectiveness by integrating the literature on organizational structures involving centralization and decentralization of decision-making power with the literature on portfolio decision-making for achieving strategic alignment. Finally, this research has uncovered multiple relationships between the budget and the portfolio decision-making processes and the budget and the elements of portfolio decision-making effectiveness.

By uncovering multiple relationships within the overall portfolio decision making model for achieving strategic alignment, this research furthermore adds multiple dimensions that also have an influence on the achievement of strategic alignment to the model of Kester (2011), thereby creating a better understanding of the overall portfolio decision-making model for achieving strategic alignment. This addition can furthermore result in a different outcome of the quantitative result of the research of Kester (2011) when it comes to the direct effect of the portfolio decision-making processes on the elements of portfolio decision-making effectiveness, because according to this research a few of the relationships between the portfolio decision-making processes and the elements of portfolio decision-making effectiveness (also) go via and thus (also) involve the methods that help the achievement of strategic alignment. Therefore, overall, the results of this research bring nuance to and provide a deeper insight into the findings of Kester et al. (2011) and Kester (2011).

Finally, as mentioned in section 1.2, most literature so far related to IPPM focuses only on NPD. By conducting research at firms from different industries (high-tech and retail), thereby ensuring a focus toward not only NPD but also other types of innovation projects (e.g. process and organizational innovation), this research has contributed to the expansion of the existing literature on IPPM. However, more research on IPPM that focuses on multiple types of innovation projects is recommended to significantly expand the existing literature on IPPM.

## 6.2. Methodological reflection and limitations

Conducting a multiple case study with two or more interviews per case enabled the researcher to do both a within-case analysis and a cross-case analysis, which allows for in-depth knowledge and description of the phenomenon under study (Mills et al., 2010) and to find general patterns across

**Met opmerkingen [RS5]:** OK, die laatste zin snap ik, maar voor zover je onderzoek dat toelaat, wat kun je zeggen over het verschil tussen NPD projecten en andersoortige innovatieprojecten?

cases to making generalizations (Mathison, 2004; Mills et al., 2010). Thus, this research has tried to find a balance between going in-depth, but also being able to make generalizations. However, time and accessibility constraints have resulted in conducting a limited number of interviews per case (two to four). Moreover, conducting a limited number of interviews per case has in some cases also resulted in not being able to provide a sufficient explanation for contradictions between the answers of different interviewees of Firm C. The previous can have an influence on the credibility of the data (Baxter & Jack, 2008) and thereby on creating an in-depth understanding of the overall portfolio decision-making model for achieving strategic alignment. Finally, constraints in accessibility have resulted in a limited use of different methods to collect data, which can also have an influence on the credibility of the data (Baxter & Jack, 2008). Secondly, due to time constraints, only four cases have been studied, which is the minimum number of cases needed to be able to replicate findings across cases according to Eisenhardt (1989). Also, limited specific boundary conditions have been introduced before selecting the four cases (see section 3.2). Both of these choices combined have an influence on the transferability/generalizability of this research. The previous also illustrates that wanting to go in-depth, but also wanting to make generalizations, when having constraints in both time and accessibility, can lead to having too many cases to go more in-depth, but too few cases to make generalizations.

Furthermore, only firms that also engage in bigger (strategic) projects have been selected to ensure the possibility of data collection on all dimensions of the conceptual model and especially the methods that help the achievement of strategic alignment. This has resulted in selecting four large firms ( $\pm 370$  or more employees) for this research. Nonetheless, the literature illustrates that larger organizations often require a more decentralized structure while small businesses often operate in a centralized way due to a smaller workforce (Ingram, 2019; Marcez, n.d.; Vitez, 2019). Thus, the selection of only large firms has decreased the possibility of collecting a sufficient amount of data on the dimension centralization. Also, it was not possible to ensure that both decentralized and centralized firms were selected because of time and accessibility constraints. The previous has led toward none of the firms selected having a “highly” centralized organizational structure, as mentioned in section 4.3. This means that even though centralization has been observed to a limited extent (see section 4.3.1), a full understanding of the relationship between centralization and the elements of portfolio decision-making effectiveness has remained out of reach of this research.

Furthermore, it was also not possible to ensure that data could be collected on all three methods that help the achievement of strategic alignment when selecting the firms, because of the aforementioned constraints. As mentioned in section 4.1, only one firm (Firm D) explicitly uses the

top-down business strategy and no data was found on the use of bottom-up strategic gates.

However, another explanation for the latter could be the choice to formulate interview questions that do not explicitly mention the three methods that help the achievement of strategic alignment, to reduce bias (confirmability) and to acquire information about other methods used in the decision-making process.

All of the above results, in some cases, in only being able to make assumptions about relationships and thus, not in uncovering all anticipated relationships discussed in chapter 2. These assumed relationships are indicated through dotted lines to denote their not (sufficiently) verified character.

Finally, it is not possible for one research to uncover all possible relationships within the overall portfolio decision-making model for achieving strategic alignment. Due to time constraints, this research has focused on two concepts from the model developed by Kester (2011) (the portfolio decision-making processes and the elements of portfolio decision-making effectiveness) and two new concepts (the methods that help the achievement of strategic alignment and the organizational structure). Nonetheless, other concepts can also have an influence on the different concepts of this research, one more prominent and defensible, one being the concept budget. Across cases, the interviews of the different firms illustrate that the budget is related to both the portfolio decision-making processes and the elements of the portfolio decision-making effectiveness (see section 4.4). Other concepts (e.g. alternative explanations) were either only visible within one firm or had only an influence on one dimension. That is why only the concept budget has been included as an extra concept in this research.

### 6.3. Recommendations for further research.

Many recommendations for further research can be made, but this section only focuses on the three main ones. First of all, in some cases the limitations of this research resulted in only being able to make assumptions about relationships and thus, not uncovering all anticipated relationships discussed in chapter 2, as mentioned in section 6.2. It can therefore be recommended to repeat this research on a bigger scale (more cases) and to use more data methods and data sources (triangulation). Furthermore, the case selection criteria can be adjusted to enable a more in-depth study of relationships between certain concepts or to enhance transferability/generalization.

Secondly, even though multiple relationships have been uncovered within the overall portfolio decision-making model for achieving strategic alignment and both statements and assumptions have been made about the nature of these relationships (positive vs. negative), quantitative research on a



bigger scale is recommended to confirm the significance and the nature of these relationships. This research can then be used to help advance empirical research on the relationship between strategic alignment and firm's performance, which is lacking according to Kester et al. (2014).

Finally, it is not possible for one research to uncover all possible relationships within the overall portfolio decision-making model for achieving strategic alignment, as mentioned in section 6.2. Therefore, it is recommended to merge the portfolio decision-making model of Kester (2011) concerning the achievement of strategic alignment with the portfolio decision-making model of this research, to possibly uncover new relationships within the overall portfolio decision-making model for achieving strategic alignment. Moreover, it can be recommended to further research the expansion of the overall portfolio decision-making model with new concepts to thereby create a better understanding of the overall portfolio decision-making model for achieving strategic alignment.

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## Appendices

### Appendix 1: Interview questions

For my Master Thesis for the Master Business Administration – Organizational Design and Development at the Radboud University, I am conducting research that focuses on creating an understanding of the overall innovation portfolio decision-making model for achieving strategic alignment. This means conducting multiple interviews with different actors within several firms, that are involved in portfolio decision-making.

The interview questions are subdivided into four parts that mainly focus on the innovation portfolio, the decision-making within the innovation portfolio, the use of methods and tools within the decision-making and the organizational structure concerning the portfolio decision-making. The results will be used to make recommendations to firms about (re)designing their portfolio decision-making toward the achievement of strategic alignment, which in turn can lead to improved firms performance. The results will furthermore be used for theoretical implications.

The interviews will be recorded and the recordings will be stored and used with due regard for research ethics (mainly privacy).

#### **Part 1: The role of the interviewee within portfolio decision-making, the innovation portfolio and the organizational structure involving portfolio decision-making**

1. What is your function within the firm?
2. What is your role within portfolio decision-making when it comes to innovation projects?
3. To what extent are you aware of all innovation projects within the firm?
4. To what extent are you familiar with the details of each innovation project?
5. How are the innovation projects related to the achievement of the firm's long-term goals?
6. Could you describe how the firm's innovation portfolio approximately looks like? What kind of things are included and what kind of things are excluded from the innovation portfolio?
7. Could you briefly describe how these decisions are made?
8. Who else is involved in the portfolio decision-making?
9. Who makes the actual decision about a particular innovation project?
10. To what extent are others involved in portfolio decision-making aware of all innovation projects?
11. To what extent are others involved in portfolio decision-making familiar with the details of each innovation project?
12. To what extent are others involved in portfolio decision-making aware of how the innovation projects are related to the achievement of the firm's long-term goals?

#### **Part 2: The portfolio decision-making processes and the methods used in portfolio decision-making**

13. On what kind of information are decisions based?
14. What kind of questions are asked to come to certain decisions?
15. What kind of questions does the top-management ask to come to certain decisions?
16. What kind of methods or tools are used to come to a decision about selecting innovation projects?
17. Are decisions sometimes made in a less rational way? If so, in what way are the decisions made?
18. Why is then a choice made that is not entirely in line with the objective information that is available?

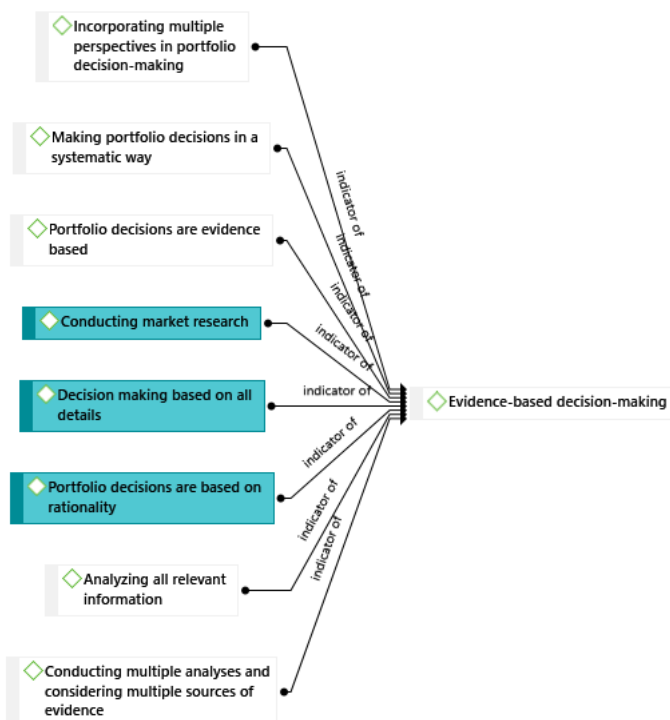
### Part 3: The prioritization of innovation projects and the methods used in the prioritization of projects

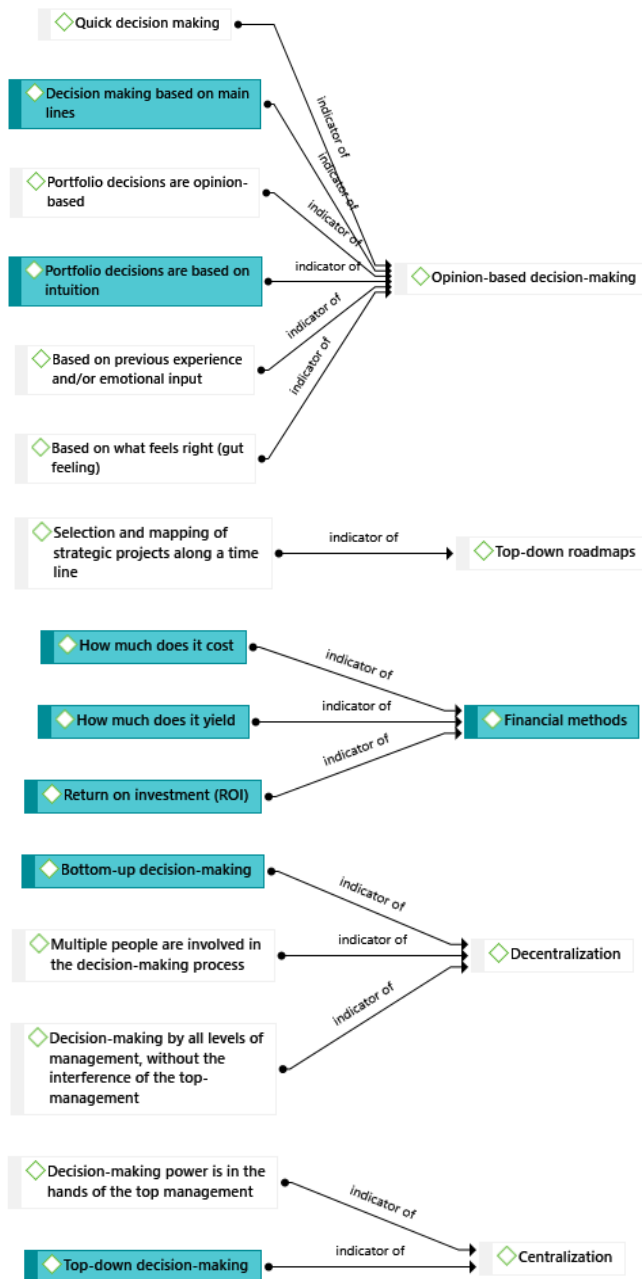
19. How are projects within the portfolio prioritized?
20. What kind of tools or methods are used for this prioritization?
21. Who determines which projects have priority and in which the most is invested?
22. On what kind of information are such decisions based?
23. Is it clear for everyone which innovation projects have priority?
24. If so, what kind of innovation projects get priority?

### Part 4: The firm's response to its environment

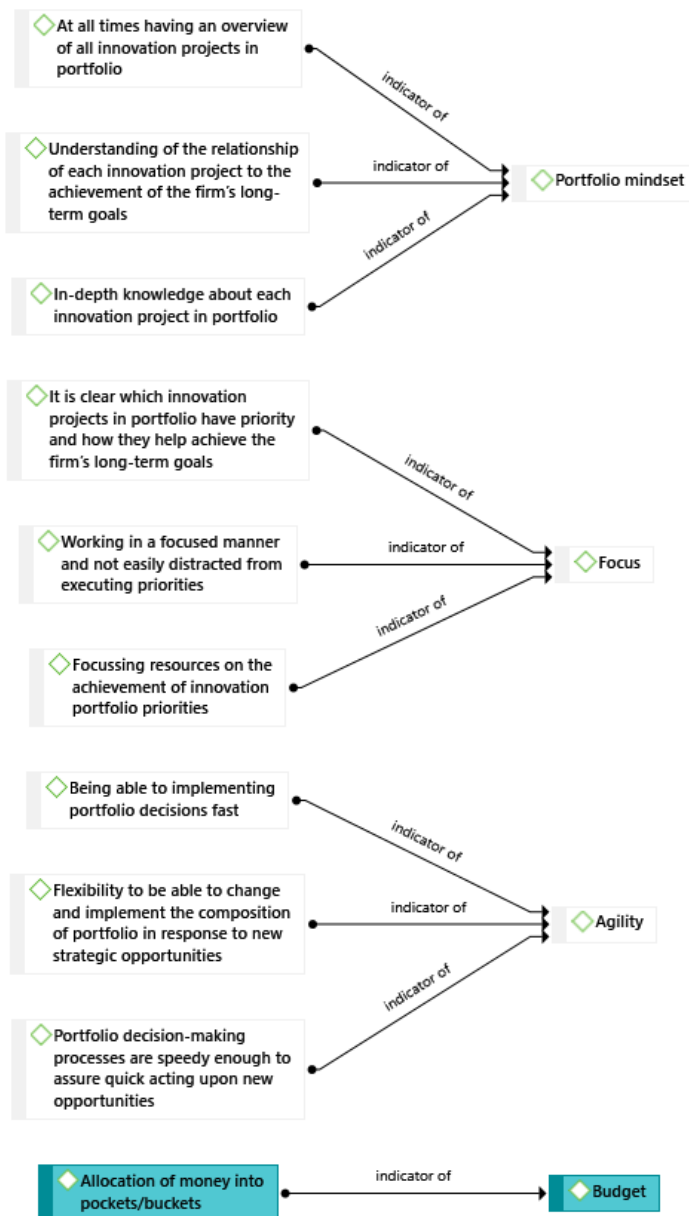
25. How does the firm respond to new information from the environment concerning existing or new innovation projects?
26. How has this changed the innovation portfolio in previous years?
27. Why have these changes taken place exactly?
28. When is the decision made to stop certain innovation projects or to invest more in them?
29. To what extent can changes easily and quickly be implemented in the existing innovation portfolio?

### Appendix 2: Coding scheme









\*Blue markings indicate the newly introduced indicators, the newly introduced dimension financial methods and the newly introduced concept budget

### Appendix 3: The use of and the emphasis placed on the use of financial methods by all four firms

Firm	Citation
Firm A	"Well, all that information, that brings controlling together and it makes it financial and it also does all kinds of let's say financial analyzes on, from which ultimately financial decision information follows." <sup>106</sup>
	"But in general, I would say yes, it is much financially substantiated yes." <sup>107</sup>
Firm B	"We of course have a financial department, but they do nothing with projects. No, the project leader does. So, he yes, he at least does some research for how much work it should cost and he is supposed to keep a little bit track of how much we spend on it, but we don't have a really good system to check that it happens." <sup>108</sup>
	"But actually, because things are going well financially, the investments are not really important. And that is not entirely true. (...) Yes, in principle we do return of investment, but that is not the most important thing. Look, when I do a project, before that I try to estimate well I just think it is 500 hours so it's a ton of investment or something." <sup>109</sup>
	"Then I think that better wording is currently mainly intuitive, although the economic side of the story is now looked at more strictly. So, there will be more, from there they look at can it be done at all, hey what are the yields. (...) So, the costs are now better visualized." <sup>110</sup>
Firm C	"Well yes, the CFO is often one of the money. So, he will of course find something about it or advise on it." <sup>111</sup>
	"Well look, in the end, you of course always want to know about a project of gosh well literally what does it yield." <sup>112</sup>
	"Well, I think we do that a little too little, but that is from the history. So that we, so to say, have that as a background and actually we now say gosh you have to take a critical look at what it actually yields. So, you invest so much, but what does it yield at the bottom of the line. Yes, that question should come up even better. So, we do it, but I think it can come even better, even more explicit, on the table." <sup>113</sup>

<sup>106</sup> "Nou al die informatie die brengt controlling bij elkaar en die maakt het financieel en die doet er ook allerlei uhm laten we zeggen financiële analyses op uhh waar uiteindelijk financiële beslisinformatie uh uit volgt." – Firm A, interview 2, p. 9.

<sup>107</sup> "Maar uh ik zou zeggen over het algemeen uhh ja is het veel financieel onderbouwd ja." – Firm A, interview 2, p. 11.

<sup>108</sup> "Wij hebben natuurlijk wel een financiële afdeling maar die doet niks met projecten. Nee de projectleider wel. Dus die uhh uhm ja die doet in ieder geval wat onderzoek voor voor voor hoeveel werk moet het gaan kosten en en hij wordt geacht een beetje bij te houden uh hoeveel we deraan besteden maar wij hebben geen echt goed systeem om te controleren dat het ook gebeurt." – Firm B, interview 5, p. 6.

<sup>109</sup> Maar eigenlijk omdat het hier financieel goed gaat zijn eigenlijk de investeringen niet van belang. En dat is niet helemaal waar. (...) Ja. Ja return of investment doen we in principe wel, maar dat is niet het allerbelangrijkste. Kijk als ik een project doe, probeer ik voor die tijd af te schatten van nou ik denk gewoon dat het 500 uur is zo het is een ton investering ofzo he." – Firm B, interview 6, p. 17.

<sup>110</sup> "Dan denk ik dan uhh betere uhh formulering is dat uhh momenteel voornamelijk nog intuïtief alhoewel der aan uhhh de de economische kant van het verhaal wordt nu wel strenger naar gekeken. Dus worden wel meer uh vandaaruit gaan ze van kan het überhaupt wel uit he wat wat wat zijn de opbrengsten. (...) Dus het kostenplaatje wordt nu wel beter in beeld gebracht." – Firm B, interview 7, p. 22.

<sup>111</sup> "Nou ja de CFO is vaak van van de centjes. Dus die zal natuurlijk daar iets van vinden of over adviseren." – Firm C, interview 8, p. 1.

<sup>112</sup> "Uhm nou kijk uiteindelijk wil je tuurlijk van een project altijd graag weten van goh welke uhm uhh nou letterlijk uhh wat levert het op." – Firm C, interview 8, p. 8.

<sup>113</sup> "Uhh nou ja dat dat dat doen we denk ik nog wat te weinig uhh maar dat komt dus vanuit de historie he dus dat we zeg maar dat als achtergrond hebben uhh en eigenlijk zeggen we nu van goh uhm je moet kritisch kijken van uhh wat levert het eigenlijk op. Dus je investeert zoveel maar wa.. wat levert het onder aan de streep ook

	"So that is also still the culture that rules here. So very much on the costs and on the payback time and that is actually I think pretty much the main choice that is included in the choice to do or not to do something, that is simply yes what does it yield." <sup>114</sup>
	"Yes, so if you, if I should say what Firm C uses, then it is really on that business case thought yes. So very rational on cost. Or yields." <sup>115</sup>
<b>Firm D</b>	"Well, a proposal just has to meet conditions. So you have to, it is not that we have to fill in a whole paperwork, but you just have to fill in what is your plan, what will it yield and that can also be not monetary value, what will it cost, what is you planning, well bla bla bla bla and then it goes to a kind of operating board and there are representatives from the different countries sitting there together and they ultimately determine yes this we will do this we will not do." <sup>116</sup>
	"Yes Yes Yes. If you want to have a proposal, you always have to have a signature from finance that your calculations are reasonably successful haha." <sup>117</sup>

#### Appendix 4: Evidence-based and opinion-based decision-making by all four firms

Firm	Citation
<b>Firm A</b>	"So the document in which we propose what we are going to make, what do we think it will yield, what can it cost, that is written by strategic planning together with R&D again hey, because it must also be technologically feasible and I put that in the different teams in which we have to report and then a choice is made whether to continue or not." <sup>118</sup>
	"I think okay I have read the story, I understand the big picture I agree. He says yes nice that big picture, but I need to know all the details to say if is also the direction I think it is." <sup>119</sup>
	"No, I would not call it intuitive, I would say there is more looked at what do I think of this direction and do I understand this direction, do I recognize it based on the facts. But

op. Ja die vraag die moet moet nog beter op tafel komen. Dus we doen het wel maar ik denk dat ie nog beter uhh nog explicieter zeg maar op tafel kan komen." – Firm C, interview 8, p. 9.

<sup>114</sup> "Dus dat is ook nog de cultuur die hier heerst. Dus heel erg uhh op de uh op de kosten en op de terugverdientijd en dat is eigenlijk ik denk wel uhh zo'n beetje de voornaamste keuze waar uhh of de wat wordt meegenomen in de keuze om iets wel of niet te doen. Dat is toch wel gewoon ja wat levert het op." – Firm C, interview 9, p. 12.

<sup>115</sup> "Ja dus als je als je moe.. als als ik zou moeten zeggen w.. wat hanteert Firm C dan dan zit het echt aan die business case gedachte ja. Dus heel rationeel op kosten. Of opbrengsten." – Firm C, interview 9, p. 13.

<sup>116</sup> "Nou een voorstel moet gewoon aan voorwaarden voldoen. Dus je moet best wel uhh het is niet dat we een hele papierwerk moeten invullen, maar je moet wel gewoon invullen van uhh uhh wat is je plan, uh wat gaat het opleveren en dat kan ook uh niet uhh monetaire uh waarde zijn, wat gaat het kosten, uhh wat is je planning, uhh nou bla bla bla bla bla en dan gaat het naar een soort operating board en daar zitten vanuit de verschillende landen zitten daar vertegenwoordigers bij elkaar en die bepalen uiteindelijk van ja dit gaan we wel doen dit gaan we niet doen." – Firm D, interview 11, p. 2.

<sup>117</sup> "Ja, ja, ja. Als je als je als je een voorstel wil hebben, moet je altijd eigenlijk wel een handtekeningetje van finance hebben dat jou berekeningen redelijk gelukt zijn haha." – Firm D, interview 11, p. 7.

<sup>118</sup> "Dus het document waarin we voorstellen van wat gaan we maken, wat denk we dat het oplevert, wat mag het kosten, uhhm dat wordt geschreven door strategic planning samen met R&D weer he want het moet wel technologisch ook haalbaar zijn uhhh en ik leg dat voor in de verschillende teams waarin wij moeten rapporteren en dan wordt er een keuze gemaakt of wij door gaan of niet." – Firm A, interview 1, p. 2.

<sup>119</sup> "Ik denk oké ik heb het verhaal gelezen ik snap de grote lijn ik ben ermee akkoord. Hij zegt ja ik.. leuk die grote lijn maar ik moet alle details weten om te zeggen of ik ook.. of de richting ook is die ik denk dat het is." – Firm A, interview 1, p. 12.

	the amount of detail they have on those facts is just less because they know those facts they have been carried out by their people.” <sup>120</sup>
	“What you have to realize is that all the information that is currently on the table is estimates and predictions for the future. So, there is automatically a certain subjectivity in it.” <sup>121</sup>
	“I think that intuition always plays a role. If you ... you have to have a belief in something. It is never completely concrete and hey you have to pursue that and yes then you can also be wrong but if it is only facts, they are never complete.” <sup>122</sup>
	“Depending on the pressure, we have to have a... you have... you cannot always keep... then there will also be... keep analyzing and then there will be... but I do not have a concrete example right now, then also at some point decisions will just be made based on risks.” <sup>123</sup>
	“I think it is quite often somewhat factual, but also that, yes look you cannot afford (financially, AK) to make wrong decisions now.” <sup>124</sup>
	“Okay so that is one. So, the customer feedback, let’s say customer needs, the market potential, the business potential and then you have the technical visibility and that is more on the R&D side. But of course, we also there we work very closely because it is a very close relation between what is really needed and what you can make.” <sup>125</sup>
	“I think it is a little bit of... so the thing is when you go really to high management level, the story is anyways summarized. So it is, they are looking for more the big picture of the whole thing. That is, there is no danger there in that sense. So, it needs to make sense also from a business case argumentation perspective, it needs to make sense in that level.” <sup>126</sup>
<b>Firm B</b>	“In the first phase of pre-study or visibility study, I never know what name is attached to that P, but there we investigate both technical and commercial matters of what is involved. And that is to identify both the specifications as well as the technical and commercial challenges.” <sup>127</sup>

<sup>120</sup> “Nee ik zou het niet intuïtief noemen, ik zou zeggen er wordt meer gekeken naar uh wat vind ik van deze richting en snap ik deze richting, herken ik hem op basis van de feiten. Maar de hoeveelheid detail die ze bij die feiten hebben is gewoon minder, omdat ze weten die feiten die zijn door hun mensen uitgevoerd.” – Firm A, interview 1, p. 15.

<sup>121</sup> “Uh wat je wel moet realiseren is dat al die informatie die op dat moment op tafel zit, dat zijn inschattingen en toekomstvoorspellingen. Uh dus daar zit.. daar zit een bepaalde uh uhm uhh subjectiviteit automatisch in.” – Firm A, interview 2, p. 9-10.

<sup>122</sup> “Ik denk dat intuïtie altijd een rol speelt. Als je.. je moet een geloof hebben ergens in. Het is nooit helemaal concreet en uhh he dan moet je dat nastreven en ja dan kun je ook wel is mis zitten maar uh uh als het alleen maar feiten zijn, die zijn nooit compleet.” – Firm A, interview 3, p. 9.

<sup>123</sup> “Uh afhankelijk van ook de druk moet we een dis.. we.. je heb.. je kunt niet altijd maar blijven.. dan wordt er ook.. blijven analyseren en dan zal der maar ik heb nu even niet een concreet voorbeeld dan zal der ook op een gegeven moment met op basis van risico’s gewoon een beslissingen worden genomen.” – Firm A, interview 3, p. 9.

<sup>124</sup> “Ik denk dat het toch wel uh uh veelal wat feitelijkheid uh.. maar ook dat uh ja kijk je kunt niet veroorloven om nu verkeerde beslissingen te nemen.” – Firm A, interview 3, p. 10.

<sup>125</sup> “Uhm okay so that is one uhm so so the customer feedback, let’s say customer needs, the market potential, the business potential and then you have the technical visibility and that’s more on the R&D side. Uh but of course we also there we work very closely because it’s it’s a very close relation between what’s really needed and what you can make.” – Firm A, interview 4, p. 6.

<sup>126</sup> “Uhm I think I think it’s a little bit of.. so the thing is when you go really to high management level, the story is anyways summarized. So its.. th.. they are looking for more the the the big picture of the whole thing. Uh that’s uh there is no danger there in that sense. So the.. it needs to make sense also uhm form a from a business case argumentation perspective it it needs to make sense in that level.” – Firm A, interview 4, p. 17.

<sup>127</sup> “In de eerste fase van van pre-study of visibility study ik ik weet nooit welke naam er aan die P hangt maar daar uhh uhh daar onderzoeken we zowel technische als als commerciële zaken van uhh uhh wat wat gaat er

	"Yes it is always a mix, but there is a lot of intuition and that is also because there is a lot of experience with certain types of things." <sup>128</sup>
	"Hey you notice that we have a fairly loose structure, not very budget oriented, yes it is going too far to say we do the things we like that is not what I mean, but yes it can feel that way and that makes it a bit non-committal. I can imagine that there are other organizations that are very strict on their budget and plans and so on and if it is not properly substantiated then they will not start." <sup>129</sup>
	"That, purely, sometimes it is a paper literature study, sometimes with T&O you then work together and research then you are also reasonably on, then you go to develop something into a prototype, we do reasonably within R&D and sometimes we involve people from production to look at can this later be produced this concept. And if you so to say have the first prototypes reasonably well, then in that other phase you very well involve the other departments. So engineering is involved in hey how can you produce it in the factory, but also marketing is involved." <sup>130</sup>
	"Yes, in principle we do return of investment, but that is not the most important thing. Look, when I do a project, before that I try to estimate well I just think it is 500 hours so it is a ton of investment or something hey." <sup>131</sup>
	"Because look, why is it accurate enough whether it costs 100 or 110 euros, yes, it is nice of course and it is certainly important to try to make it 100, but that is not so important for the first return on investment because the market is more uncertain yes? And we think, the product first year you think there are 200 sales, second year 500,000 you name it. And those numbers are much more inaccurate. And I try to estimate and ask the customer or something else." <sup>132</sup>
	"Well it is actually, yes it actually is still a bit of a family business by nature. So, a lot of things then actually go in the hallways. So, it is not really that very structured entrance. So often, then an idea just arises somewhere, but at some point, you have to substantiate that yes how relevant is this and what is actually the yes how much value should we actually attach to this. And then you go look after hey how big do I actually

bij komen kijken. En dat is al om om ja zowel de specificaties als de de technische en commerciële uitdagingen uhh in kaart te brengen." – Firm B, interview 5, p. 2-3.

<sup>128</sup> "Ja het het het is altijd een een uhh mengelmoe maar uh maar der is wel veel intuïtie bij uhh en en dat komt ook wel omdat er heel veel ervaring is met bepaalde type zaken." – Firm B, interview 5, p. 10.

<sup>129</sup> "He je merkt dat wij een vrij losse structuur hebben, uhh niet erg budget gericht, uhm ja ik het gaat te ver om te zeggen we doen de dingen die we leuk vinden z.. dat is niet wat ik bedoel maar maar ja het het zo kan het wel een beetje aanvoelen en daarmee maakt het het ook wel wat vrijblijvend uhh he ik kan me voorstellen dat er andere organisaties zijn die juist heel strikt op die die budget en plannen en zo zitten en als het niet fatsoenlijk is onderbouwd dan beginnen we der niet aan." – Firm B, interview 5, p. 14.

<sup>130</sup> "Dat ku.. puur uhh soms is het papier literatuur studie, soms met uhh T&O werk je dan samen en research dan zit je ook nog redelijk op dan gaat iets uitwerken tot een prototype doen we redelijk binnen R&D en soms betrekken we mensen van productie bij om te kijken van is dit straks te produceren dit concept. En als je zeg maar uhh de eerste prototypes redelijk goed hebt dan ga je in die andere fase daar betrek je heel goed de andere afdelingen bij. Dus wordt engineering bij betrokken van he van hoe kun je het produceren in de fabriek uhh maar ook marketing wordt bij betrokken." – Firm B, interview 6, p. 4.

<sup>131</sup> "Ja return of investment doen we in principe wel, maar dat is niet het allerbelangrijkste. Kijk als ik een project doe, probeer ik voor die tijd af te schatten van nou ik denk gewoon dat het 500 uur is zo het is een ton investering ofzo he." – Firm B, interview 6, p. 17.

<sup>132</sup> "Want uh kijk waarom is nauwkeurig genoeg of nou 100 of 110 euro kost, ja is wel leuk natuurlijk maar vast wel belangrijk tuurlijk probeer je het 100 te maken, maar dat is voor de eerste return investment niet zo belangrijk want de markt is toch onzekerder ja? En denken we zo van nou dat denken we zo van van het product eerste jaar denk je dat er 200 verkopen, tweede jaar 500.000 he noem maar wat. En die getallen zijn veel onnauwkeuriger. En en ik probeer wel af te schatten en aan klant vragen of iets anders." – Firm B, interview 6, p. 18.

	expect that market to be and then we join, well my colleague and I, often join to see how that is, how big then that market is.” <sup>133</sup>
	“Then I think that better wording is currently mainly intuitive, although the economic side of the story is now looked at more strictly. So, there will be more, from there they look at can it be done at all, hey what are the yields. So, the costs are now better visualized.” <sup>134</sup>
	“So, in the past it was really purely intuitive and now more substantiation is expected.” <sup>135</sup>
<b>Firm C</b>	“So if someone somewhere so to say wants something or wants to get something done, then here usually it goes through there (project department, AK), because there can already be looked at gosh, there is then so to say asked what is the project, for what is it necessary, how much money does it cost or making an estimate of how much money it is. So, they can make an estimate gosh have we enough capacity in man and money and time to so to say also do that.” <sup>136</sup>
	“Of course, we have a department so to say that focuses specifically on market developments. (...) So, we have indeed, we follow market developments both purely from the financial figures, but also, we have of course always had close ties with GFK he, for example. GFK is of course an agency that provides a lot of data, but also simply self from the market” <sup>137</sup>
	“So, when it comes to innovation you sometimes have to buy in knowledge and we do that regularly.” <sup>138</sup>
	“And of course, there is also always a kind of well gut feeling, because sometimes you cannot always calculate everything.” <sup>139</sup>

<sup>133</sup> “Uhm nou het is eigenlijk uhh ja dat is het eigenlijk van van nature is nog een beetje een een een familiebedrijf. Dus heel veel dingen gaan dan eigenlijk in de wandelgangen. Dus het niet echt dat heel gestructureerd van uh ingang hebben. Dus vaak dan ontstaat er gewoon ergens een idee uhm maar op een gegeven moment dan moet je dat toch onderbouwen van ja hoe relevant is dit en wat is nou eigenlijk de uhh ja hoeveel waarde moeten we nou eigenlijk hieraan hechten. En dan ga je dus na zoeken van hey hoe uhm hoe groot verwacht ik eigenlijk dat dat dat die markt is en dan dan haken we nou mijn collega en ik hangen dan wel vaak bij aan om te kijken hoe dat dan uhh hoe groot die markt dan is.” – Firm B, interview 7, p. 1.

<sup>134</sup> “Dan denk ik dan uhh betere uhh formulering is dat uhh momenteel voornamelijk nog intuïtief alhoewel der aan uhhh de de economische kant van het verhaal wordt nu wel strenger naar gekeken. Dus worden wel meer uh vandaaruit gaan ze van kan het überhaupt wel uit he wat wat wat zijn de opbrengsten. Uhh dus het kostenplaatje wordt nu wel beter in beeld gebracht.” – Firm B, interview 7, p. 22.

<sup>135</sup> “Dus uhm vroeger was het e.. echt puur intuïtief en nu wordt er wel meer onderbouwing verwacht.” – Firm B, interview 7, p. 22.

<sup>136</sup> “Dus als iemand ergens zeg maar iets wil of iets gedaan wil krijgen uhh dan gaat hier in de regel vaak daar langs want daar kan dan al gekeken worden van goh uhhh daar wordt dan zeg maar doorgevraagd van wat is het project, uhh waarvoor is het noodzakelijk, hoeveel uhh geld kost het of een inschatting maken van hoeveel geld het is uhh dus zij kunnen inschatten van goh uhm hebben we voldoende capaciteit in mens en geld en tijd om zeg maar dat ook te gaan doen.” – Firm C, interview 8, p. 2.

<sup>137</sup> “Wij hebben natuurlijk uhh een een afdeling zeg maar die zich daar specifiek op marktontwikkelingen richt. (...) Dus wij hebben inderdaad we volgen marktontwikkelingen uhh zowel vanuit f.. puurt vanuit de financiële cijfers maar ook wel uhh we hebben natuurlijk altijd wel nauwe banden met GFK bijvoorbeeld gehad he. GFK is tuurlijk een uh bureau wat heel veel data verstrekt, uhh maar ook gewoon zel.. wel zelf vanuit de markt” – Firm C, interview 8, p. 3.

<sup>138</sup> “Dus als het dan over innovatie gaat heb.. moet je soms kennis inkopen en dat dat doen we wel regelmatig.” – Firm C, interview 8, p. 3.

<sup>139</sup> “Uhm uhh en en natuurlijk zit er ook altijd een soort van nou ja gut feeling want soms kun je ook niet al.. altijd alles calculeren.” – Firm C, interview 8, p. 9.

	"It is more in that rationalization side yes. So, it is very strongly financially driven, business case driven yes. (...) That is also the culture that prevails here. So very much on the costs and on the payback time." <sup>140</sup>
	"We do have an organization that keeps an eye on that and then departments can turn to it and that will in most cases also be marketing. So, they ask for example for GFK figures and things like that and based on that they make their decisions yes." <sup>141</sup>
<b>Firm D</b>	"Yes, look I am actually the one who for the most part also by talking to suppliers, looking at the market, determines which innovations we will offer to our customers." <sup>142</sup>
	"Yes, well, then you still have to try to find substantiations that can be related. So, it could be research. Look, not everything can always be fully quantified, but you can, you can still have quite a bit of research with which you have at least a direction." <sup>143</sup>
	"Ultimately, of course, always something, but because you work in a large company and you also have to discuss with each other what you will do when, most decisions are really well substantiated." <sup>144</sup>
	"Yes you also have a duty of care toward everyone and you want to continue to exist as a company, so I will not say that it is not intuition... everyone is ultimately somewhere somewhat intuitive, but yes in the end, especially when it concerns a large project, you really have to substantiate." <sup>145</sup>
	"I think everyone thinks that they are very rational, but I think that there is a lot more intuitive going on. We of course are going to, are making it more and more fact based due to all the processes and things we are doing." <sup>146</sup>
	"So, I think it is increasingly fact based, increasingly rational, but there is still a lot of emotion and intuition in yes." <sup>147</sup>

<sup>140</sup> "Uhm het zit meer in die uh rationalisatie kant ja. Dus v.. en het is heel sterk financieel gedreven. Business case gedreven ja. (...) Dat is ook nog de cultuur die hier heerst. Dus heel erg uhh op de uh op de kosten en op de terugverdiëntijd." – Firm C, interview 9, p. 12.

<sup>141</sup> "Wij hebben wel een organisatie die dat in de gaten houdt en dan kunnen dan afdelingen zich tot toe wenden en dat zal in meeste gevallen ook marketing zijn. Dus die vragen dan bijvoorbeeld van GFK cijfers op en dat soort dingen en op basis daarvan maken ze maken ze hun besluiten ja." – Firm C, interview 9, p. 14.

<sup>142</sup> "Jazeker kijk ik uhh ik ben eigenlijk degene die voor een groot gedeelte ook uh op basis van uhh praten met leveranciers, kijken in de markt, uh bepaalt welke innovaties wij dan aan onze klanten aan gaan bieden." – Firm D, interview 11, p. 1.

<sup>143</sup> "Ja maar goed ik d.. dan moet je nog steeds proberen om onderbouwingen te vinden die wel te relateren zijn. Dus het kan onderzoek zijn. Kijk niet alles is altijd helemaal te kwantificeren maar je kan wel en en uhh je kan toch wel redelijk wat onderzoek hebben uhh uhh waarmee je in ieder geval een richting hebt." – Firm D, interview 11, p. 3.

<sup>144</sup> "Uhm uiteindelijk natuurlijk altijd wel wat uhm maar omdat je in een groot bedrijf werkt en je ook met elkaar derover moet hebben uhh uhh wat je wanneer gaat doen, zijn de meeste beslissingen echt wel goed onderbouwd." – Firm D, interview 11, p. 13.

<sup>145</sup> "Ja je hebt ook een zorgplicht naar naar iedereen toe en je wil graag als bedrijf blijven bestaan, dus ik zal niet zeggen dat het geen intu.. het.. iedereen is uiteindelijk ergens stukje intuïtief, maar je ja uiteindelijk zeker als het om een grote project gaat, moet je echt wel onderbouwen." – Firm D, interview 11, p. 13.

<sup>146</sup> "Uhh ik denk dat iedereen denkt dat die heel erg rationeel is, maar ik denk dat er heel veel uhh intuïtiever doet. We gaan maken het natuurlijk steeds meer fact based door alle processen en dingen die we aan het doen zijn." – Firm D, interview 12, p. 9.

<sup>147</sup> "Dus het is ik denk steeds meer fact based steeds meer rationeel, maar der zit nog wel heel veel emotie en intuïtie in ja." – Firm D, interview 12, p. 9.

#### Appendix 5: The use of top-down roadmaps by Firm A, Firm B and Firm D

Firm	Citation
Firm A	"Strategic planning looks at which products are we making now and in three years' time." <sup>148</sup>
	"From the business unit, that term is three years, so also yes my product is not even formally on a roadmap. It just falls outside. Within R&D it is five years yes so there it is (on a roadmap, AK), but also technologies there we have at least five years, sometimes even longer horizon where we look." <sup>149</sup>
	"When we start thinking about new projects because then you might find a good idea which in the small picture let's say might look, but is based on a different technology that is not one of our key technologies on the roadmap. So, you better drop it at that point and look at other ideas that are more in line with the overall technology strategy of the company." <sup>150</sup>
Firm B	"Yes. Can just be for more years. And I think it works well too." <sup>151</sup>
	"So, and I am more so to say in this case from the bus technology roadmap, I give input to the product roadmaps." <sup>152</sup>
	"And then in the second step you are going to look at is there already something what looks like it, so then you really look at the roadmaps of gosh where would it... for the synergy. Is it possible, can I combine this with something else because that of course gives all (...) that has economies of scale." <sup>153</sup>
Firm D	"Yes, yes and you make it yourself and you make it as a company. So, we sure do that yes. (...) Yes, let's say three to five years, but well it is usually up to three years." <sup>154</sup>
	"Yes, yes so what I said hey so those change flows translate into a roadmap." <sup>155</sup>

<sup>148</sup> "Strategic planning die kijkt naar welke producten maken we nu en over drie jaar" – Firm A, interview 1, p. 1.

<sup>149</sup> "Uhm vanuit de businessunit is die termijn drie jaar dus ook ja mijn product staat formeel nog niet eens op een roadmap. Die valt er net buiten. Uhm binnen R&D is het vijf jaar ja dus daar staat ie wel op uhm maar ook technologieën (??) daar hebben we uhh zeker vijf jaar soms nog wel langere uh horizon waar we kijken." – Firm A, interview 2, p. 17.

<sup>150</sup> "When we start thinking about new projects because then you might find a good idea which in the in the small picture let's say I.. might look but is based on a different technology that is not one of our key technologies on the roadmap. So you better drop it at that point and look at other ideas that are more in line with the overall uhh technology strategy of the company." – Firm A, interview 4, p. 7.

<sup>151</sup> "Ja. Kunnen wel meer jaren gewoon zijn. En dat werkt denk ik ook goed." – Firm B, interview 6, p. 12.

<sup>152</sup> "Dus en ik zit dan meer zeg maar in dit geval vanuit de bussen technologie roadmap geef ik input naar de product roadmaps." – Firm B, interview 6, p. 14.

<sup>153</sup> "En dan in het tweede stap ga je dan kijken naar is er al iets wat er op lijkt dus dan kijk je echt naar de roadmaps van goh waar zou het uhh voor de synergie. Kan het al kan ik dit bij combineren met iets anders want dat geeft natuurlijk alle (...) heeft dat schaalvoordelen." – Firm B, interview 7, p. 19.

<sup>154</sup> "Ja, ja en die maak je zelf en die maak je als bedrijf. Dus dat doen we zeker wel ja. (...) Ja laten we zeggen drie tot vijf jaar. Maar goed meestal is het tot drie jaar." – Firm D, interview 11, p. 15.

<sup>155</sup> "Ja, ja dus wat ik al zei he dus die veranderstromen vertaald zich in een roadmap." – Firm D, interview 12, p. 11.



Appendix 6: The emphasis placed on the use of top-down roadmaps by Firm A, Firm B and Firm D

Firm	Citation
Firm A	"The project is this flexible that then it means... so you have to bring in some people, you may have to let go of other requirements, which can. It is more difficult to drop everything and suddenly develop something completely different, but if you have to, you do that." <sup>156</sup>
	"And every year we adjust that slightly. So, there is, there is a certain basis for innovation projects, you often see that in three years' time it will be on the roadmap and we will not define the successor because we first have to see what will come out of that first release." <sup>157</sup>
	"Those product roadmaps are much more detailed when it comes to product in the market. (...) It is also often clearer because we have much more concrete information about what kind of changes make sense." <sup>158</sup>
	"Yes, yes it is... in the longer term it is, there are a number of things that you have agreed upon and that are also recorded. Is of course at a certain level of abstraction so that you can also move in that part. But the main line is fixed." <sup>159</sup>
Firm B	"Yes. We have the product managers who are ultimately the ones who sweep that together." <sup>160</sup>
	"No, the planning is there, but it is too flexible. We are not sufficiently aware of that you have to stick to data to keep things going." <sup>161</sup>
	"Yes, we want to make them more and more detailed. We are working on that. It is not quite right." <sup>162</sup>
	"Yes, they must be flexible." <sup>163</sup>
	"They are much too flexible." <sup>164</sup>
	"And they maintain the roadmap together. Actually, there is still too little input from the market, but well that is where we are now." <sup>165</sup>

<sup>156</sup> "Zo flexibel is een project dat dat dan.. betekent wel wat dus je moet wat mensen bijschakelen, je moet misschien andere requirements loslaten. Dat kan. Uhm, alles uit je handen laten vallen en opeens compleet iets anders ontwikkelen is moeilijker, maar ja als het moet dan doe je dat." – Firm A, interview 1, p. 22.

<sup>157</sup> "En elk jaar passen we dat toch iets aan. Dus der staat wel een bepaalde basis staat er wel uhm van innovatieprojecten heb.. zie je sowieso vaak die staat over drie jaar op de roadmap en de opvolger gaan we niet definiëren want we moeten eerst maar is kijken wat er uit die eerste release komt." – Firm A, interview 1, p. 22.

<sup>158</sup> "Die productroadmaps die zijn veel gedetailleerder als het gaat om product in de markt. (...) Hij is ook vaak duidelijker omdat we veel concretere informatie hebben over wat uhh wat voor wijzigingen zin hebben." – Firm A, interview 2, p. 16-17.

<sup>159</sup> "Ja, ja der zit.. op de langere termijn is het wel uh.. zijn een aantal dingen uh die heb je afgesproken uh en wordt ook vastgelegd. Is natuurlijk op een bepaalde abstractieniveau waardoor je binnen dat stuk ook nog uh kanten op kunt, maar de hoofdlijn staat wel vast." – Firm A, interview 3, p. 15.

<sup>160</sup> "Ja. wij hebben de de uhh de de productmanagers zijn uiteindelijk degene die dat bij elkaar uhh wegen." – Firm B, interview 5, p. 8.

<sup>161</sup> "Nee de de de planning staat er wel in, maar die is die is te flexibel. Dat uh.. We zijn onvoldoende uhh uhh uhh ja bewust dat dat je aan data moet houden om om uh de gang derin te houden." – Firm B, interview 5, p. 9.

<sup>162</sup> "Ja die willen we steeds gedetailleerder maken. Dat werken we wel aan. Dat is nog niet helemaal goed." – Firm B, interview 6, p. 12.

<sup>163</sup> "Die moet j.. ja die moeten wel flexibel zijn." – Firm B, interview 6, p. 12

<sup>164</sup> "Ze zijn veel te flexibel." – Firm B, interview 6, p. 24.

<sup>165</sup> "En die onderhouden samen uhh de roadmap i.. ma.. komt eigenlijk nog veel te input.. veel te weinig input van de m.. van de markt eigenlijk op maar goed dat is dan waar we nu staan." – Firm B, interview 7, p. 10.

<b>Firm D</b>	"The intention is that we all work toward it." <sup>166</sup>
	"So, in principle yes the roadmap is what you stick to. Ultimately you can decide together gosh, we will postpone this anyway or we will do this at a later time. Which can." <sup>167</sup>
	"As far as they are there. But you don't have to completely... especially for projects in two- or three-years' time, you don't need to know all the details." <sup>168</sup>
	"Yes, and I think it should be. Especially if you, in the field of innovation, because of course you do not know what is coming. And certainly not hey where the world changes very quickly, you have to be very flexible. So that is why I also think you should have a continuous process to update that. And also, do not be afraid to stop things." <sup>169</sup>

#### Appendix 7: The emphasis placed on the achievement of the firm's long-term goals by Firm A and Firm D

The interviews of Firm A show that the firm is trying to balance the short and long-term goals of the firm.

*"One is we have an existing business and there we actually try to make so much money with it, but not by not putting any more money into it but just getting as much out of it as possible, but by putting just enough money into it so that we actually even in a shrinking market... because these are products of which the market is actually shrinking, we actually want to try to grow. So, my boss actually asks me how can you ensure that you can get the most out of it with as little investment as possible, but not too little. So, he does not want to shrink with the market. And another strategy is that we look for a new market to ensure that if that other market really... that we have a new market."<sup>170</sup>*

*"Yes, in general we try to find a reasonable balance in that."<sup>171</sup>*

<sup>166</sup> "De bedoeling is wel dat we allemaal uh naartoe werken." – Firm D, interview 11, p.15.

<sup>167</sup> "Dus in principe ja de roadmap is wel hetgeen waar je je aan houdt. Uiteindelijk kan je met elkaar beslissen van goh we gaan dit toch uitstellen of we gaan dit wel op een latere moment doen. Dat kan." – Firm D, interview 11, p. 16.

<sup>168</sup> "Voor zover ze der zijn. Maar je hoeft niet uhhhh het helemaal uhh zeker voor projecten over twee of drie jaar dan hoeft je niet alle details te weten." – Firm D, interview 11, p. 16.

<sup>169</sup> "Ja en dat moet het ook zijn denk ik. Zeker als je het op het gebied van innovatie want je weet natuurlijk niet wat er gaat komen. En zeker niet hey waar de wereld heel snel veranderd moet je heel flexibel zijn. Dus daarom vind ik ook dat je dat je een continu proces moet hebben om dat te updaten. En ook niet bang moet zijn om dingen te stoppen." – Firm D, interview 12, p. 11.

<sup>170</sup> "Uhm, een is wij hebben een bestaande business en daar proberen wij eigenlijk zoveel geld mee te verdienen en uhm.. maar niet door er geen geld meer in te stoppen maar gewoon zoveel mogelijk uit te halen, maar door der net genoeg geld in te stoppen zodat wij eigenlijk zelfs in een krimpende markt want het zijn producten waarvan de markt eigenlijk aan het krimpen is willen wij eigenlijk proberen te groeien. Dus mijn baas vraag mij eigenlijk hoe kun je nou zorgen dat je met zo weinig mogelijk investering maar niet te weinig wel het maximale eruit kan halen. Hij wil dus niet mee krimpen met de markt. En andere strategie is waarbij we uhm opzoek gaan dus naar een nieuwe markt uhm om te zorgen dat als die andere markt echt dat we een nieuwe markt hebben." – Firm A, interview 1, p.5.

<sup>171</sup> "Ja over het algemeen proberen we daar een uh redelijke balans in te vinden." – Firm A, interview 2, p. 12.

*"We give them the possibility to really think and do the right balancing of the future versus current."*<sup>172</sup>

Furthermore, as interviewee 1 (Strategic Planner in Firm A) mentioned, the short-term goals (creating revenue) are needed to be able to invest in the future (long-term goals).

*"Anyway, as a business unit that of course just has to ensure that the money comes in, you make the consequences very clear. Then you say yes, but that means that this year we will be selling X fewer of those old devices, old devices where for the next four years the money comes from with which those innovation projects are being payed. So, they somehow get it back. Then we say yes then we will make less money next year, we can also invest less so we will invest less or again in that black and white program, black and white is the old program. But that only continues in even less money in the years after that and at some point, you say yes, so we cannot afford those innovations either. Well you have to do that balancing."*<sup>173</sup>

To ensure a balance between the short-term and the long-term goals, the firm has introduced the PBSC who determines the strategy of the firm and is therefore more focused toward the long-term goals of the firm.

*"But the PBSC determines the strategy of the firm."*<sup>174</sup>

*"They will say yes, listen everyone nice hey those old devices and that money comes out of it, but those new innovations must come."*<sup>175</sup>

The firm has furthermore separated the role of strategic planning and given it the role to safeguard the future.

*"Our role is to safeguard the future."*<sup>176</sup>

Strategic planning safeguards the future by among other things setting the priorities between projects based on the guidance of the PBSC.

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<sup>172</sup> "We give them the possibility to really think and do the right balancing of the future versus current." – Firm A, interview 4, p. 10.

<sup>173</sup> "Maar goed dan maak je als businessunit uh die natuurlijk ook gewoon moet zorgen dat het geld binnen komt uh maak je heel duidelijk de consequenties. Dan zeg je van ja dan.. maar dat betekent dus dat we dit jaar X aantal minder uh van die ouwe apparaten verkopen, oude apparaten waar wel de komende vier jaar het geld uit moet komen waarmee die innovatieprojecten worden bepa.. betaald dus.. Op een of andere manier krijgen ze dat toch terug. Dan zeggen we ja dan gaan we mo.. volgend jaar minder geld verdienen, kunnen we ook minder investeren dus gaan we minder investeren of weer in dat zwart pro.. wit programma, zwart wit is het oude programma. Maar dat gaat alleen maar door in nog minder geld in de jaren daarna en op een gegeven moment zeg je ja dus kunnen we ook die innovaties niet betalen. Nou die ballanceren moet je doen." – Firm A, interview 1, p. 19.

<sup>174</sup> "Maar de PBSC bepaalt het strategie van het bedrijf." – Firm A, interview 1, p. 12.

<sup>175</sup> "Die zullen zeggen ja luister allemaal leuk he die oude apparaten en dat er geld uit komt, maar die nieuwe innovaties moeten er komen." – Firm A, interview 1, p. 18.

<sup>176</sup> "Our role is to safeguard the future." – Firm A, interview 4, p. 9.

*"Well factually I do that. So, I set those priorities, but of course based on the guidance of the PBSC."*<sup>177</sup>

And, when it comes to Firm D, according to interviewee 11 (Head of Digital in Firm D) Firm D is not a mega innovative firm.

*"But we are not a mega innovative company."*<sup>178</sup>

Thus, according to interviewee 11, a lot of their projects are short-term (95-5 percent).

*"But look, we are working on a number of long-term projects and a lot of things are just short-term because we know that in the short-term, we have to remove a number of yes thresholds from our current structure."*<sup>179</sup>

*"The board is working on today's priorities. And hey, so the management is always busy with the priorities of today and they look a little bit at the future. Well, let it be 95-5 but well that is also very logical."*<sup>180</sup>

However, the interviewee also mentioned that at this moment in time the firm has a board that is really focused on the longer-term.

*"So that balance is always... but I think we currently have a board that is really working on the longer term."*<sup>181</sup>

This is in line with interviewee 12 (Head of IT and Innovation in Firm D), who mentioned that the firm has set up a project and portfolio management process to see which projects that contribute best to the firm's strategy (long-term goals) need to be started.

*"We have set up the project and portfolio management process where we look okay which projects should we start at the moment that best contribute to the strategy."*<sup>182</sup>

*"So, we need something hey or a new business model or yes, a new service or well I do not know, or indeed yes a better assortment so we can get more customers. So, I think that there*

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<sup>177</sup> "Nou feitelijk doe ik dat. Dus ik stel die prioriteiten, maar natuurlijk op basis van de guidance van de PBSC." – Firm A, interview 1, p. 19.

<sup>178</sup> "Maar wij zijn geen mega innovatief bedrijf." – Firm D, interview 11, p. 8.

<sup>179</sup> "Uhm maar uhh uhh kijk wij zijn met een aantal lange termijn projecten bezig en een heleboel dingen zijn gewoon korte termijn omdat we weten dat we op korte termijn een aantal ja uh drempels moeten weghalen uit onze huidige structuur." – Firm D, interview 11, p. 9.

<sup>180</sup> "De board is bezig met de prioriteiten van nu. En en de en en he dus het management is altijd bezig met de prioriteiten van nu en die kijken een klein beetje naar de toekomst. Nou laat het 95-5 zijn maar goed dat is ook heel logisch." – Firm D, interview 11, p. 9.

<sup>181</sup> "Dus die balans is is uhh is altijd uh maar ik denk wel dat wij op dit moment een board hebben die echt wel bezig zijn met de langere termijn." – Firm D, interview 11, p. 9.

<sup>182</sup> "Wij hebben het uhh uhh project en portfolio managementproces neergezet waar we kijken oké welke projecten moeten we op dit moment opstarten die het beste bijdragen aan de strategie." – Firm D, interview 12, p. 1.

*is really a need for the short term, yes, I think even more than other companies, right in retail wholesale at the moment. Anyway, you also have to do that longer term.*<sup>183</sup>

#### Appendix 8: The influence of financial result on the prioritization of projects

Firm	Citation
Firm A	"I think the business unit, at least in my business unit it is very clear, existing business where the money comes from goes before new business." <sup>184</sup>
	"Yes, of course it has to do with the business value and what you ultimately... that plays a role." <sup>185</sup>
	"You cannot stand still the line and, in my view, always that is business continuity. In the short-term and always has priority over everything else." <sup>186</sup>
	"Every R&D budget regardless whether it is large or small, it is under pressure from the horizon 1 businesses. So, the businesses in the first... the burning cases at the current customers and maybe not the burning cases but the parts where you can easily score." <sup>187</sup>
Firm B	"Look, we have done it with small product developments, we just know that it costs relatively (little, AK), I can develop it quickly with little manpower and yield a lot. Then it gets a little higher priority." <sup>188</sup>
	"We really have to make sure that we defend our market share and only then (...) really start new products. (...) That is, you are, because a customer you lose, you just give up a very large part of your market share, so that is really not allowed to happen." <sup>189</sup>
Firm C	"No, at least not as far as I have experienced that. Look, of course, one project that is a bit bigger and yield more, there goes almost naturally more attention to. (...) Yes, well that is then sometimes also the financial consideration." <sup>190</sup>

<sup>183</sup> "Dus we moeten iets he w.. wat gew.. of een nieuwe business model of uhm ja een nieuwe dienst of nou weet ik veel wat of of inderdaad ja beter assortiment waardoor we meer klanten kunnen krijgen, dus ik ik denk dat die noodzaak er er echt is wel voor de korte termijn, er.. ja nog meer dan andere bedrijven denk ik juist in de retail wholesale op dit moment. Maar goed je moet ook wel die langer termijn." – Firm D, interview 12, p. 12.

<sup>184</sup> "Uhm ik denk dat uh de businessunit in ieder geval in mijn businessunit is het heel duidelijk uhm bestaande business waar het geld uit komt gaat voor nieuwe business." – Firm A, interview 1, p. 18.

<sup>185</sup> "Ja het.. het heeft natuurlijk te maken met de businesswaarde en wat je uiteindelijk.. da.. dat speelt een rol." – Firm A, interview 3, p. 12.

<sup>186</sup> "Je kunt niet de lijn stil staan en ze.. in mijn ogen altijd uh uh dat is uh uh business continuity. Op korte termijn en die is altijd heeft prioriteit boven al het andere." – Firm A, interview 3, p. 12.

<sup>187</sup> "Every every R&D budget regardless whether its large or small, its under pressure from the horizon 1 businesses. So the businesses in the first.. the burning cases at the current customers and the.. maybe not the burning cases but the the the parts where you can easily score." – Firm A, interview 4, p. 9.

<sup>188</sup> "Kijk wij hebben wel is gedaan bij kleine productontwikkelingen weten we gewoon van nou kost relatief kan ik het snel ontwikkelen met weinig mankracht en levert veel op. Dan krijgt ie wel iets hogere prioriteit." – Firm B, interview 6, p. 19.

<sup>189</sup> "Wij moeten echt zorgen dat we ons marktaandeel verdedigen en dan pas uh (...) echt aan nieuwe uhh producten beginnen. (...) Uhm dat is ben je want een klant die verliest geef je gewoon gelijk gewoon g.. een heel groot gedeelte van je marktaandeel gewoon op dus dat dat mag gewoon echt niet gebeuren." – Firm B, interview 7, p. 12.

<sup>190</sup> "Nee tenminste niet voor zover ik dat uhh mee heb gemaakt. Uhm kijk tuurlijk zal het ene project wat groter is en meer oplevert uhh.. uhh daar gaat haast soort van natuurlijk meer meer aandacht naar uit. (...) Ja nou dat is dat is dan soms toch ook wel de financiële afweging." – Firm C, interview 8, p. 12

	"And until then it really is what we agreed on when it comes to making money at the bottom of the line so to say the loss and profit account." <sup>191</sup>
<b>Firm D</b>	"Yes, actually about the axles really simple what does it yield, what does it cost." <sup>192</sup>
	"And I see that it is still a difficult one, you have to make sure that you fight the projects that will make the most money." <sup>193</sup>

#### Appendix 9: Portfolio mindset of all four firms

<b>Firm</b>	<b>Citation</b>
<b>Firm A</b>	"Well I think I know most innovation projects because I know all of my colleagues who all do strategy. So I know what they are doing, which way they are going, what discussions are going on, but I am not involved in terms of content for all strategy projects no. (...) I can find it because there is a midterm plan that contains everything they are going to do and also what we are going to do." <sup>194</sup>
	"So, there are different alignment teams to keep an eye on who does exactly what." <sup>195</sup>
	"So, I am involved from start to finish." <sup>196</sup>
	"In Japan (where the parent company of Firm A is situated, AK) they do take a decision on a different level, but mostly based on all the details. So, there they really want to know everything." <sup>197</sup>
	"I also have to take into account that if the strategy of the company is that we go in a certain direction that also all organizations, all our sales offices develop themselves thereto." <sup>198</sup>
	"But the let's say the integral strategy, that continuously plays a role. It is not only the question of can you make a product that has certain properties, but it is above all the question of yes okay what is the world like, including our own company." <sup>199</sup>
	"But one of the things that is very important in Japan is the togetherness, consensus and the result of that is that very little information is filtered in that path up." <sup>200</sup>

<sup>191</sup> "En uhh tot die tijd is het echt zo van uhh wat we afgesproken uhh als het gaat om het geld verdienen onderaan de streep zeg maar de de verlies en winst rekening.. regeling of rekening." – Firm C, interview 10, p. 13.

<sup>192</sup> "Uhh ja eigenlijk over de assen uhh uhh echt heel simpel wat brengt het op, uh uh wat kost het." – Firm D, interview 11, p. 10.

<sup>193</sup> "En ik z.. ik zie wel dat dat nog steeds een lastige is daar moet je wel voor zorgen dat dat je ja d.. uhh het vechten tegen de de projecten die het meeste geld gaan opleveren." – Firm D, interview 12, p. 12.

<sup>194</sup> "Nou ik denk dat ik de meeste innovatieprojecten wel ken omdat ik mijn collega's die allemaal stra.. strategy doe die ken ik allemaal, dus ik weet wat ze aan het doen zijn, welke kant ze op gaan, welke discussies er lopen, maar ik ben niet inhoudelijk betrokken bij alle strategy projecten de... nee. (...) Ik kan het wel vinden want er is een uh een midterm plan waar alles in staat wat ze gaan doen en ook wat wij gaan doen." – Firm A, interview 1, p. 2.

<sup>195</sup> "Uhm dus er zijn verschillende alignment teams om wel in de gaten te houden van wie doet nou precies wat." – Firm A, interview 1, p. 3.

<sup>196</sup> "Dus ik ben van begin tot eind betrokken." – Firm A, interview 1, 4.

<sup>197</sup> "In Japan uhm nemen ze wel een beluit op een ander niveau, maar veelal op basis van alle details. Dus daar willen ze echt alles weten." – Firm A, interview 1, p. 11.

<sup>198</sup> "Ik moet er ook rekening mee houden dat dat als de strategie van het bedrijf is dat we een bepaalde kant op gaan dat ook alle organisaties, al onze saleskantoren zich daarheen ontwikkelen." – Firm A, interview 2, p. 4.

<sup>199</sup> "Uhm maar de de zeg maar de de integrale strategie die uh speelt continu een rol. Het het is niet alleen de vraag van kun je een product maken wat bepaalde eigenschappen heeft, maar uhh het is vooral de vraag van ja oke hoe hoe zit de wereld in elkaar, waaronder ons eigen bedrijf." – Firm A, interview 2, p. 5.

<sup>200</sup> "Uhm maar een van de dingen die in Japan heel erg belangrijk is is de uhm gezamenlijkheid consensus en de gevolg daarvan is dat uhm uhm der wordt heel weinig informatie gefilterd in dat pad naar boven." – Firm A, interview 2, p. 18.

	"Well the PBSC (strategy department at parent company level, AK) was actually founded to try to create a line in all those business units that act more or less autonomously. And well that is immediately taken very broadly in Japanese. That goes immediately about technologies, about markets, about products, about competitors and well everything is included. But in any case, to make an attempt to create an overall picture." <sup>201</sup>
	"Yes, of course I know what is going on in my own area of responsibility and the interactions between projects, but I also know the other projects. (...) I am also familiar with other projects from other business units." <sup>202</sup>
	"And the more early phase project it is, the more involvement from our side (strategic planning, AK) and if it is an established project or yes let's say a project in the later stage of the technology development cycle, then of course our effort in there is less." <sup>203</sup>
	"So, the potential conflicts and so they will be spotted there because in this team of let's say the management team of the whole Firm A, you also have representatives from each business lines." <sup>204</sup>
<b>Firm B</b>	"I am aware of all projects involving product technology." <sup>205</sup>
	"Yes, well we all have lists that everyone can see of these projects are there, but if you do not even look at it then you will not see them." <sup>206</sup>
	"Yes, that is difficult, because we do not have a formal strategy." <sup>207</sup>
	"From beginning to end. I would say from idea to hey until it is actually delivered to the customer." <sup>208</sup>
	"Yes, in principle, we simply manage the entire project. Not knowing all the details, but you are trying to keep your project team together." <sup>209</sup>
	"Then we also make a project charter as it is called. There it is also explained very briefly of what is the project hey, what are the objectives, how much will it cost, what will it yield, what is the lead time and there you have a project charter for." <sup>210</sup>

<sup>201</sup> "Nou de PBSC is eigenlijk opgericht om te proberen om al die businessunits die min of meer autonoom acteren omdat toch een lijn in te creëren. En uhh nou dat wordt gelijk erg breed getrokken op zijn Japans. Dat gaat gelijk over technologieën, over makten, over producten, over concurrenten en nou alles wordt erbij gehaald. Maar in ieder geval een poging te doen om daar een totaalbeeld in te scheppen." – Firm A, interview 2, p. 23.

<sup>202</sup> "Ja natuurlijk weet ik wat er in mijn eigen uh verantwoordelijkheidsgebied uh speelt en de interacties tussen projecten maar ik ik ken ook de andere projecten. (...) Ik ben ook bekend met andere projecten uit andere businessunits." – Firm A, interview 3, p. 1-2.

<sup>203</sup> "And the the the mo.. more early phase project it is, the more involvement from our side and if it is an established project or ja let's say an project in the later stage of the technology development cycle than of course our effort in there is less." – Firm A, interview 4, p.1.

<sup>204</sup> "So the the potential conflicts and so they will be spotted there because in this in this team of let's say the management team of the the whole Firm A, you also have representatives from each business lines." – Firm A, interview 4, p. 4.

<sup>205</sup> "Ik ben op de hoogte van alle projecten waar uhh uhh product techniek bij uh is." – Firm B, interview 5, p. 1.

<sup>206</sup> "Ja goed we hebben allemaal wel lijstjes dat die iedereen kan zien van deze projecten spelen er. Maar als je der niet eens naar kijkt dan dan zie je ze ook niet." – Firm B, interview 5, p. 2.

<sup>207</sup> "Uhm ja de de v.. g.. d.. da dat is lastig want wij hebben geen f.. formeel uit afgesproken strategie." – Firm B, interview 5, p. 8.

<sup>208</sup> "Van begin tot eind. Van idee tot en met he tot dat het echt geleverd wordt naar de klant zou ik zeggen." – Firm B, interview 6, p. 1.

<sup>209</sup> "Ja in principe leiden wij gewoon het hele project. Niet alle details weten maar je je probeert wel is waar je projectteam bij mekaar te houden." – Firm B, interview 6, p. 3.

<sup>210</sup> "Dan maken we ook een een uh projectcharter zoals dat heet. Daar straak ook uitgelegd heel kort van wat is het project he, wat zijn de doelstellingen, uhh hoeveel gaat het ongeveer kosten, wat levert het op, wat is ongeveer de doorlooptijd en daar heb je een projectcharter voor." – Firm B, interview 6, p. 5.

	"In itself you know of other projects at main level a little what the objectives are and what is going on." <sup>211</sup>
	"Well they do have a bit of a picture of what is going on, but I think it is always underestimated how much time it takes to complete a project. Because, for example, look if we are supposedly ready here in R&D, but then we are not ready yet, because then all kinds of problems will come in production." <sup>212</sup>
	"But yes, I do remember that tooling sometimes seems to be more important there than what it is trying to accomplish so to speak. So, it is a bit of a paper illusion or something." <sup>213</sup>
	"From time to time, we have no idea what is happening at R&D. We just do not have time management. No need to write hours on projects. (...) So, in the end what it says is an estimate at best. (...) Actually, I do not think anyone really has a complete overview of what we are doing." <sup>214</sup>
<b>Firm C</b>	The big projects, there we (the management board, AK) sort of have hey we also follow them. Of gosh are we on track, do we still have enough finances to continue, how about capacity. So, we follow that in outline. Yes, a lot of small things, of course that just goes organic, so to say from the organization. And I myself yes, you cannot be aware of everything down to the last detail." <sup>215</sup>
	"Our management board is for the big projects for operations" <sup>216</sup>
	"But in the commercial column, for example, they have developed a new strategy for commerce and there they have so to say also, there are projects underneath and they follow all that. So, they have an overview." <sup>217</sup>
	"In detail yes very deep level of detail no, but in main lines yes, yes that is right yes. So, I know that it plays and yes, I also have to, because the (scrum, AK) teams are working on it." <sup>218</sup>
	"Well the big projects are yes. Because also for those applies if there is a large project, it often also passes the board. (...) So, they follow the strategy yes, yes." <sup>219</sup>

<sup>211</sup> "Op zichzelf weet je van andere projecten op hoofdniveau wat een beetje het doelstellingen zijn en wat wat er speelt." – Firm B, interview 6, p. 7.

<sup>212</sup> "Nou ze hebben wel een beetje beeld wat er speelt maar ik denk altijd onderschat wordt hoeveel tijd het komt om een project af te ronden. Want, bijvoorbeeld kijk als wij zogenaamd hier klaar zijn op R&D maar dan zijn we nog niet klaar, want dan komen allerlei prod.. problemen in productie." – Firm B, interview 6, p. 16.

<sup>213</sup> "Uhm maar ja ik weet niet goed ik weet nog d.. dat daar lijkt af en toe het het de tooling belangrijker dan wat het probeert te bewerkstelligen om dat zo maar te zeggen. Dus uhh uhh het is een beetje papieren illusie ofzo zeg maar." – Firm B, interview 7, p. 8.

<sup>214</sup> "Wij hebben g.. af en toe geen idee wat er op de R&D gebeurd. We hebben we hebben gewoon geen time management. Uhh hoeven geen uren te schrijven op projecten. (...) Dus uhh uiteindelijk is wat daar staat is een.. is een op zijn best een schatting te noemen. (...) Eigenlijk heeft volgens mij niemand echt een totaaloverzicht van wat we aan het doen.. wat wat eigen aan het doen is." – Firm B, interview 7, p. 8.

<sup>215</sup> "De grote projecten uhh die daar hebben wij soort he die die volgen we ook. Van goh uhhh liggen we op koers uhhh hebben we nog genoeg financiën om het uhh voort te kunnen zetten, hoe zit het met de capaciteit. Dus dat volgen we op hoofdlijnen. Uhm ja heel veel kleine dingen da dat gaat natuurlijk gewoon van organisch zeg maar vanuit de organisatie. Uhh en en ik zelf ja je kunt niet van alles tot op de laatste detail op de hoogte zijn." – Firm C, interview 8, p. 4.

<sup>216</sup> "Ons directie is wel voor de grote projecten uhh voor operations." – Firm C, interview 8, p. 6.

<sup>217</sup> "Maar in de commerciële kolom hebben ze bijvoorbeeld een uhh uhh een nieuwe strategie voor de commercie ontwikkeld en daar hebben zij zeg maar ook uh daar liggen projecten onder uhh en dat volgen ze allemaal. Dus ze hebben zeg maar een overzicht." – Firm C, interview 8, p. 6.

<sup>218</sup> "Op detail ja heel diep detail niveau niet, maar op de grote lijnen ja, ja dat klopt wel ja. Dus ik weet dat het speelt en ja dat moet ook wel want uh de teams die zijn er nou mee bezig." – Firm C, interview 9, p. 5.

<sup>219</sup> "Nou de grote projecten zijn dat wel ja. Want ook daarvoor geldt als er een groot project is, dan passeert het vaak ook wel het bestuur. Dus die volgen de strategie ja, ja." – Firm C, interview 9, p. 7.



	"I think I do know a lot. (...) And I am really in the flywheel between policy and the operation, so that means that I also need to know." <sup>220</sup>
<b>Firm D</b>	"Because in the end it must fit in with the strategy of the parent company." <sup>221</sup>
	"I know enough about the projects that are important to me and when it comes to other projects, I often know in which direction we want to go." <sup>222</sup>
	"And we are also trying to make it more and more transparent, so we are increasingly better describing which projects are running and where they may have brackets, but I will be very honest, traditionally we are a pretty silo (oriented, AK) company." <sup>223</sup>
	"In principle, they (the parent company, AK) can know everything. We are very transparent. And that will also have to, because a lot... and we also do a lot of projects together with them." <sup>224</sup>
	"So, we just had that session with the business analysts to see okay hey well what is running, how are those projects going and what would we like to add in the coming year because our fiscal year starts on 1 October. (...) And the portfolio committee is of course such a role where you want to actively follow that. So, I am also on the most important projects myself in the steering committee. So that is another source of information." <sup>225</sup>
	"Well that could be better. We, when I came in here, I have been here for two years, what was one of my yes surprises or findings that the project management maturity is very low." <sup>226</sup>
	"Yes. Yes, and they (the parent company, AK) also have so to say a kind of portfolio management process and they now also have... they also work there with objectives and key results, and that is all coordinated. They also know exactly what we do locally and not." <sup>227</sup>
	"In systems. We have so to say a few ways to so to say indicate what we are doing and one of those things is if we so to say do local projects that cost more than two tons, well that is of course soon with IT, then there is also a kind of information process where they can see okay they are doing that, so that they know that indeed." <sup>228</sup>

<sup>220</sup> "Ik denk dat ik wel veel weet. (...) En ik zit echt in in in het vliegwiel tussen beleid en en en de operatie, dus dat betekent dat ik het ook wel moet weten." – Firm C, interview 10, p. 7.

<sup>221</sup> "Want het moet uiteindelijk wel passen bij de strategie van het moederbedrijf." – Firm D, interview 11, p. 2.

<sup>222</sup> "Uhm de projecten die voor mij belangrijk zijn daar weet ik voldoende van en van andere dingen weet ik vaak welke richting we op willen gaan." – Firm D, interview 11, p. 4.

<sup>223</sup> "En we proberen het ook steeds meer transparant te maken dus we uhh uhh we zijn steeds beter aan het beschrijven uhh welke projecten er allemaal lopen en waar die uhh eventueel uh haakjes hebben, maar ik zal heel eerlijk zijn van oudsher zijn wij een behoorlijk silo bedrijf." – Firm D, interview 11, p. 5.

<sup>224</sup> "In principe kunnen zij alles weten. Uhhh wij zijn heel transparant. Uhm en het zal ook moeten want heel veel.. en we doe ook heel veel projecten samen met hun." – Firm D, interview 11, p. 5.

<sup>225</sup> "Een hebben we dus net die sessie gehad met de business analisten om te kijken van oké he wat loopt er nou, hoe gaan die projecten en wat zouden we nog willen toevoegen het komende jaar want ons fiscale jaar begint op 1 oktober. (...) En de portfolio comité is natuurlijk wel zo'n rol waar je dat actief wil volgen. Dus ik zit ook in de van de belangrijkste projecten zelf in de stuurgroep. Dus dat is ook nog een informatiebron." – Firm D, interview 12, p. 6-7.

<sup>226</sup> "Nou dat dat dat dat zou beter kunnen. Wij uhh toen ik hier binnen kwam, ik zit hier zelf twee jaar, uhh wat een van mijn uhh ja verbazingen of bevindingen wel dat de project management maturity heel erg laag is." – Firm D, interview 12, p. 7.

<sup>227</sup> "Ja. Ja en zij hebben ook een zeg maar een soort uhh portfoliomanagement proces en ze hebben nu ook een uhh ze werken daar ook met objectives en key results, en daar dat is allemaal wel op elkaar afgestemd. Ze weten ook precies wat wij lokaal doen en niet." – Firm D, interview 12, p. 8.

<sup>228</sup> "In systemen. Wij z.. wij wij wij hebben zeg maar een paar uhh paar uhh m.. manieren om zeg maar aan te geven waar we mee bezig zijn en een van de dingen is als wij zeg maar lokale projecten doen die meer dan twee ton kosten, nou dat is natuurlijk al snel met IT dan dan is er ook een soort informeringsproces waar zijn kunnen zien oké dat zijn ze aan het doen zodat ze dat wel weten inderdaad." – Firm D, interview 12, p. 8-9.

#### Appendix 10: The influence of wanting or needing more information/details and the incorporation of multiple perspectives in portfolio decision-making on the decision-making speed

Firm	Citation
Firm A	"Sometimes it happens that I first have to coordinate with my colleagues from PPP and they then have yes, you know then, every person you add to a decision is also an extra opinion. (...) So, there are a few of them that I think well this can be done faster." <sup>229</sup>
	"Where you see it going wrong is when the senior management does not have this intuitive character. And so is more on the let's say on the managing side of things. And then it makes it very difficult to actually explain new projects because it is this vicious circle of okay you want more information about something that is there, so we have to start making more of these estimates to underpin something that is you know at the end of the day is a, has a big component... intuition... depends how you look at it. It is for sure that, so the guys deciding intuitively and faster they move faster also. But they do not necessarily move with the same quality, which you also need especially for existing business but also for new one. So you need that I think you need a proper balancing in this management team of you know guys safeguarding the quality of the analysis and okay did you look at that, did you miss that, go back do another homework and the guys who are saying okay now we know. So now we stop and we decide." <sup>230</sup>
Firm B	"We have a lot of trouble taking decisions. And they can sometimes be endlessly revoked in many places. So, a decision what really stands and applies to the company, that is not easy." <sup>231</sup>
	"Look, for example a decision of how, for example, a new type of product should look in a certain type of market, that can take a long time." <sup>232</sup>
	"So, it depends a bit on the size of the question, because sometimes is that very directly the answer. Then, it is in itself quick to handle." <sup>233</sup>

<sup>229</sup> "wil het wel is gebeuren dat ik eerst moet afstemmen met mijn collega's van PPP en die hebben dan.. ja weet je dan dan.. elk persoon die jij bij een besluit toevoegt is ook een extra mening. (...) Dus, der zitten er wel een paar bij dat ik denk nou dit kan sneller." – Firm A, interview 1, p. 17.

<sup>230</sup> "Where you see it going wrong is when the senior management does not have this intuitive character. And uh so is more on the on the let's say on the managing side of things. Uhm and then it makes it very difficult to to actually explain new projects because uh it's this vicious circle of uh okay you want more information about something that's there, so we have to start making more of these estimates to underpin something that's you know at the end of the day is a is a uhm.. Has a big component.. intuition.. Depends how you look at it. Its uhm for sure it it jah that.. so the guys deciding uh intuitively and faster they move faster also. But they don't necessarily move with the same quality, which you also need uh f.. especially for existing business but also for new one. So you need that that I think you need a proper balancing in this management team of of uh you know guys safeguarding the quality of the analysis and okay did you look at that, did you miss that, go back do another homework and the guys who are saying okay now we now we know. So now we stop and we decide." – Firm A, interview 4, p. 17-18.

<sup>231</sup> "We hebben der erg veel moeite mee met besluiten nemen. En die uh die kunnen soms eindeloos herroepen worden op op allerlei plekken. Dat uh.. dus een een besluit wat echt staat en voor het bedrijf geldt dat dat valt niet mee." – Firm B, interview 5, p. 9.

<sup>232</sup> "Kijk bijvoorbeeld een beslissing van hoe moet bijvoorbeeld een nieuwe type product eruit zien in een bepaald type markt. Dat kan heel lang gaan duren." – Firm B, interview 6, p. 23.

<sup>233</sup> "Dus het hangt een beetje af van de omvang van de vraag. Uhh want soms is het dat heel direct het antwoord dan is het op zich wel snel af te handelen, maar uh.. Klacht van het veld dat is in mijn interpretatie, maar wat ik dan hoor zeg maar van uh van andere Firm B kantoren uh in andere landen dat het dat dat ze vinden dat het dat de reacties te langzaam zijn. Ook van een aantal uh OM grote klanten eigenlijk ook ja. Uhm

<b>Firm C</b>	"So that and then well yes depending on the impact it then has, look if it is big and then you have to go and see gosh and what does it now, then you have to investigate. So, depending on how quickly you then so to say can do that research and have the information together so that you can make that new decision, yes that is the limiting factor." <sup>234</sup>
<b>Firm D</b>	"Yes, but usually you are already working on something so you do not have to do a lot of research anymore. Look if really suddenly something happens, then you really need to do research." <sup>235</sup>
	"Yes, yes so it is, no I have to say if we work well together, it goes very well and very quickly. Then it is possible." <sup>236</sup>

#### Appendix 11: The level of centralization and decentralization of all four firms

	Who comes up with (new) project ideas?	Who approves (new) project ideas?	Who sets the priorities between projects?	Are lower levels of management able to make decisions independently?	Does the top-management set guidelines?	Are decisions at higher levels made in consultation with lower levels of management?
<b>Firm A</b>	Strategic planner and R&D together, except when it comes to entering new markets. Then the senior management or the PBSC	By the project management team and then at firm level. Big strategic projects also need the approval of the PBSC	Actually by strategic planner, but ultimo by the board. Priorities set can be overruled by the PBSC	The firm works with mandates (mainly within the R&D department)	The PBSC sets guidelines. These guidelines are not 100 percent black constraints	Priorities are set in consultation with lower levels of management and guidelines can be challenged by lower levels of management
<b>Firm B</b>	Can come from everywhere. Both inside and outside of the firm, both top-down and bottom-up. The R&D manager is ultimately the one who writes down the projects the	Horizon 2 and 3 projects need the approval of the Dragons Den	Manager R&D, but sometimes extra projects that have top-priority are "pushed in" by for example production but also by the top-management or even shareholders.	Bigger decisions need the approval of the management team	From the top-management the message is that customer problems are priority number one	The list of projects done by the firm and the prioritization of projects is in consultation with lower levels of management

uhh dus dan koppelen eigenlijk als dan te complexe vraag is, dan koppelen we eigenlijk niet terug dat we met de vraag bezig zijn." – Firm B, interview 7, p. 24.

<sup>234</sup> "Dus dat uhh en dan uh nou ja afhankelijk van de impact die het dan heeft, kijk als het groot is en da dan moet je toch gaan kijken van goh en wat doet dat nu, dan moet je even onderzoeken. Dus uhh afhankelijk van hoe snel je dan zeg maar die dat onderzoek kunt doen en de in de informatie bij mekaar hebt.. Uhh zodat je dat nieuwe besluit kunt nemen, ja dat is dan de beperkende factor." – Firm C, interview 8, p. 18.

<sup>235</sup> "Ja uh ja maar meestal uh ben je al met iets bezig dus hoeft je niet zo heel veel onderzoek meer te doen. Kijk als er echt pats boem iets gebeurd, dan moet je echt onderzoek doen." – Firm D, interview 11, p.

<sup>236</sup> "Ja, ja dus het is nee ik moet zeggen als je nee als we als we goed samenwerken, gaat het heel goed en heel snel. Dan kan het wel." – Firm D, interview 12, p. 14.

	firm is going to do		Finally, conflicts between projects are resolved in the Dragons Den			
<b>Firm C</b>	Can come from everywhere. Both top-down and bottom-up, but in the present most ideas come from the head office and in some cases from an external party	Projects that exceed a certain amount have to be approved by the board and sometimes even the supervisory board	N.D.	There is a culture of telling lower levels of management what to do. Lower levels of management are able to make project-related decisions that fall within their areas of responsibility	N.D.	Lower levels of management are able to express their opinion before and after decisions are made by the board
<b>Firm D</b>	A lot of ideas for new projects come from the parent company (is not an obligation) and other ideas come from the Head of Digital and the Head of IT and Innovation	The approval of the parent company is needed for innovations that exceed a certain amount and money is needed from the parent company	N.D.	People within the firm are able to make decisions fairly independently, but in general the portfolio committee is the one who makes project portfolio decisions	The project and portfolio management process set up serves as a guideline for further project-related decision-making	N.D.

#### Appendix 12: The flexibility of the budget of all four firms

Firm	Citation
<b>Firm A</b>	"No. No fixed budget. And that budget ... yes what is fixed? Because it has changed quite a bit in the past haha six months what I can spend, but in principle it is fixed. (...) In principle it should be handled within the budget what we have." <sup>237</sup>
	"So, this means that the budget can fluctuate from one to another depending also on how the business is doing, how other business lines are doing and where the need is and so on. So, I would say there is a certain budget assigned to the large format graphics projects. Within those we decide how to use it and what is the most optimum, what kind of projects we should make, when and how much. (...) So, it fluctuates a little bit from year to year." <sup>238</sup>

<sup>237</sup> "Nee. Nee vast budget. En dat budget.. ja wat is vast? Want het is de afgelopen haha zes maanden redelijk wat gewijzigd. Uhh wat ik mag besteden maar uhh in principe is het vast. (...) In principe moet het uhh uh binnen het budget afgehandeld worden wat we hebben" – Firm A, interview 3, p. 11.

<sup>238</sup> "So this means that the the budget can fluctuate from one to another depending also on how the business is doing, how other business lines are doing and where the need is and so on. Uhm so I would say there is there is a certain budget assigned to the large format graphics projects. Within those we decide how to use it and what's the most optimum, what kind of projects we should make, when and how much. (...) So it fluctuates a little bit from one year to.. from year to year." – Firm A, interview 4, p. 11.

<b>Firm B</b>	"No, well, as said, we are not doing very strict on budget hey, so, and the company is doing reasonably well." <sup>239</sup>
	"Hey you notice that we have a fairly loose structure, not very budget oriented." <sup>240</sup>
<b>Firm C</b>	"It is just fixed and when it runs out it is not like gosh we stop. (...) Then a new consideration has to be made, well yes if it is very promising and there are good reasons why say something is running out of budget, well then you can of course go on and broaden that. There will also be projects of which you say well I have adjusted the budget and it is less. So that runs a bit against each other, but in principle you just want to, yes budget is budget." <sup>241</sup>
	"Yes, that is actually also that follows a traditional way of budgeting here. And that is yes during the budget rounds, it is actually already determined which projects will be done in the coming period and with that also the budget is determined." <sup>242</sup>
	"Not. They are actually fixed. (...) Yes flexible yes no are not flexible no, no. Always exceeded but are not flexible." <sup>243</sup>
<b>Firm D</b>	"No no. We have a kind of mid-term plan. Then you plan three to five years ahead. Well, in fact, we always do a very detailed planning for the next financial year and we can then appoint items and ultimately we as Firm D Netherlands must make one proposal." <sup>244</sup>
	"Yes we have so to say, with us it is very important that you can capitalize or activate your IT projects hey and so it is very important to us, we have a large hijacking pot in the Netherlands and part of that hijacking pot is therefore reserved for IT projects. And that is also the pot that we manage in that portfolio management committee." <sup>245</sup>

<sup>239</sup> "Nee nou ja dat ja .. w.. zoals gezegd wij doen niet heel strikt aan aan budget he dus uhh en en het bedrijf gaat het redelijk voor de wind." – Firm B, interview 5, p. 13.

<sup>240</sup> "He je merkt dat wij een vrij losse structuur hebben, uhh niet erg budget gericht." – Firm B, interview 5, p. 14.

<sup>241</sup> "Het staat gewoon vast en als die op raakt dan is het uh.. nou het is niet zo van goh we stoppen.. (...) dan moet er een nieuwe afweging gemaakt worden uhh nou ja als het heel veel belovend is en der zijn goeie redenen aan te wijzen waarom zeg maar iets uit uhh zeg maar uit budget loopt, nou ja dan kan je natuurlijk door gaan en wat.. en dat ook verruimen. Zo zullen der ook projecten zijn waarvan je zegt nou ja ik heb het budget afgestemd en uhh het is wat minder. Dus dat loopt wel een beetje tegen mekaar weg uhh maar in principe wil je tuurlijk gewoon graag wel uhh ja budget is budget." – Firm C, interview 8, p. 10.

<sup>242</sup> "Uhm ja das eigenlijk toch ook wel dat volgt wel een een traditionele manier van budgetteren hier. En dat is uhm dat er ja tijdens het budgettrondes worden der eigenlijk al wel vastgesteld welke projecten der de komende tijd gedaan uhh gaan worden en daarmee ook wordt het budget vastgesteld." – Firm C, interview 9, p. 8.

<sup>243</sup> "Niet. Die zijn eigenlijk vast. (...) Ja flexibel flexi.. ja nee zijn niet flexibel nee, nee. Worden altijd overschreden maar zijn niet flexibel." – Firm C, interview 10, p. 5.

<sup>244</sup> "Nee, nee. Wij hebben zeg maar een een een soort mid-term plan he dan plan je drie tot vijf jaar vooruit. Nou uhh uhh en eigenlijk doen we steeds voor het volgende boekjaar een heel gedetailleerde planning en daarin kunnen we dan uhh uhh posten benoemen en uiteindelijk moeten wij als Firm D Nederland één voorstel maken." – Firm D, interview 11, p. 6.

<sup>245</sup> "Ja we hebben zeg maar uhh bij ons is het heel belangrijk dat je IT projecten kan je kapitaliseren of activeren he en uhh dus het is voor ons heel belangrijk uhh wij hebben zeg maar een grote kapingspot in Nederland en een deel van die kapingspot is dus gereserveerd voor IT projecten. En dat is ook de pot die bij wij beheren in dat protfolio management comité." – Firm D, interview 12, p. 4.