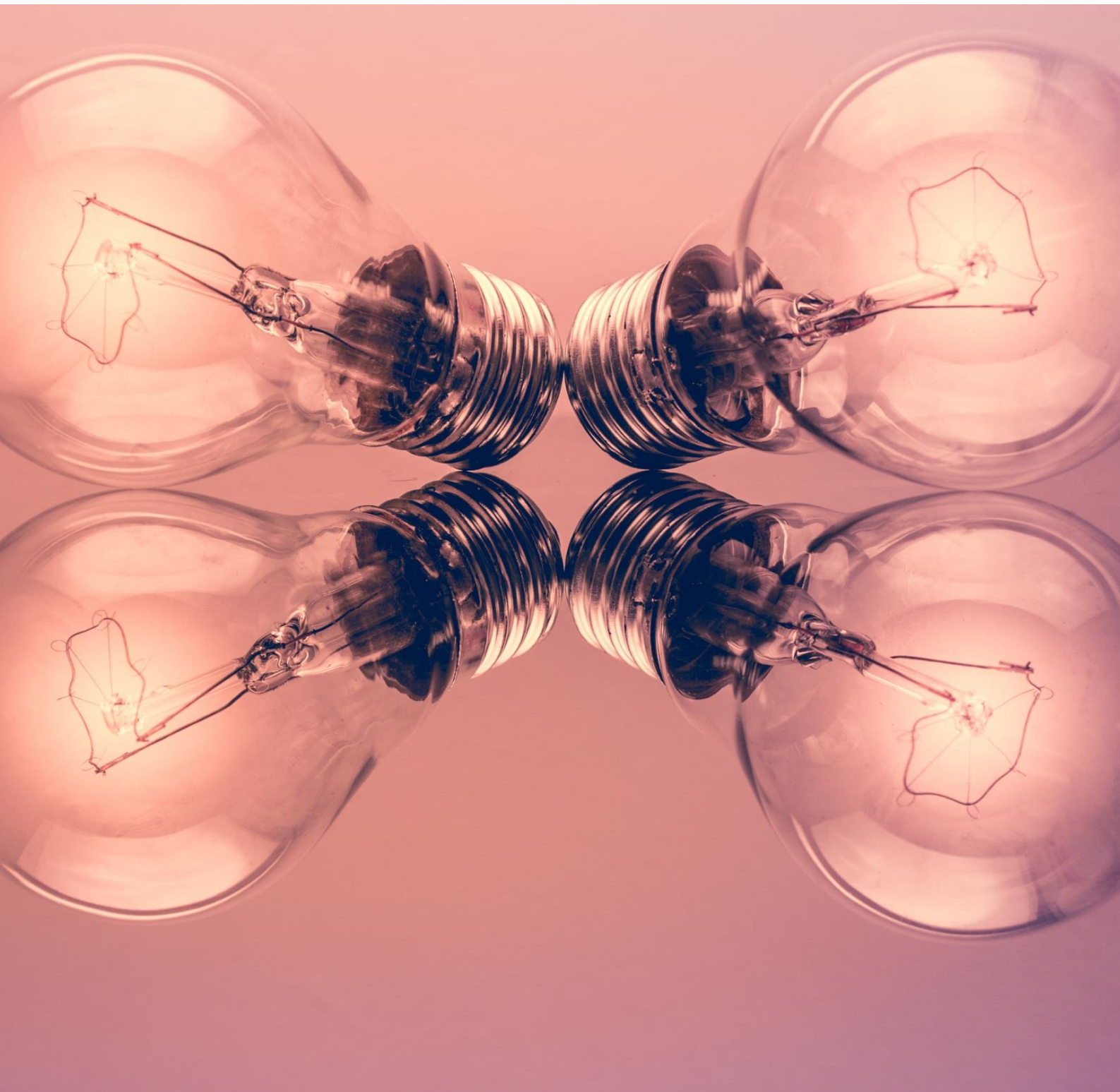# Multimodality and the Business Activity Model

Master thesis by Lotte Nieuwmeijer

Introducing a multimodal perspective on organisations

Author   Lotte (C.A.) Nieuwmeijer
                           5643635
                           c.a.nieuwmeijer@students.uu.nl
                           Master of Business Informatics
                           Department of Information and Computing Science
                           Utrecht University

1st supervisor   Prof. dr. ir. H.A. Reijers
                           h.a.reijers@uu.nl
                           Utrecht University

2nd supervisor   Drs. N.A. Brand
                           n.a.brand@uu.nl
                           Utrecht University

Daily supervisor   Drs. A. Sprokholt
                           Albert.sprokholt@andersonmacgyver.com
                           Anderson MacGyver

Daily supervisor   Drs. T.F. Haijenga
                           Fabian.haijenga@andersonmacgyver.com
                           Anderson MacGyver

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Abstract

Multimodality and the Business Activity Model – Introducing a Multimodal Perspective on Organisations

Introduction: The global economy is characterised by dynamism, customisation and intense competition. In response to this globalisation, organisations recognise the importance of a digital transformation. However, there is a lack of strategic frameworks that help organisations digitally transform. Organisations need practical tools to guide their digital transformation. One of the most important aspects to ensure a successful digital transformation is to create a common and clear vision across stakeholders in the organisation. This research investigated the Business Activity Model, a model used to create a common perspective on business activities in an organisation. The Business Activity Model has been used in practice by Anderson MacGyver for several years. The model emphasises that different types of business activities exist, which have their own organisational and technological requirements. We introduce this perspective on business activities as a multimodal perspective.

Objectives: Two main objectives were formulated for this study. The first objective focused on the redesign of the Business Activity Model to the solve problems at hand. The second objective focused on the definition of the concept of multimodality.

Methods: This study consisted of two phases: A knowledge gathering phase and a design phase. The knowledge gathering phase consisted of three research methods. First, we conducted a multiple-case study. The multiple-case study was used to explore how the Business Activity Model and the multimodal perspective are used in practice. We analysed projects conducted by Anderson MacGyver in which the Business Activity Model was used to support digital transformations. Second, a literature analysis was conducted to gain more insight into traditional strategy theories, digital transformations and the concepts used in the Business Activity Model. Third, expert interviews were used to extract expert knowledge on the Business Activity Model and multimodality. The second phase consisted of two parts. The first part focused on the redesign of the Business Activity Model, for which the design science cycle of Peffers et al. (2007) was used. The second part aimed to formulate a concept definition for multimodality, using Podsakoff's (2016) approach to concept definitions.

Results: The Business Activity Model can be used to classify business activities amongst two dimensions: differentiation and dynamism. This results in the classification into one of four business activity types, called modalities. These modalities represent the strategic focus of the business activity. The Business Activity Model is a conversational tool that allows stakeholders to collaboratively determine the strategic focus of the business activity. When consensus has been reached on the modality of the business activity, it can guide the organisational and technological design of the business activity. The multimodal perspective acknowledges that there exist different types of business activities which require different organisational and technological design.

Acknowledgements

This thesis is part of the final stage of my master's. The field in which I conducted my thesis is the field that made me decide to choose for a university degree in Business Informatics in the first place. It combines the business world with the emerging field of technology and data, two worlds that I feel passionate about. Conducting research at a company that is invested in the topic has not always been easy. Expectations were high and the importance of the topic for the organisation sometimes felt like a heavy weight on my shoulders. However, I believe that my research helps them to be better tomorrow and that is why I am proud of the result that lies in front of you. Through these last eight months, I learned a lot of valuable lessons about myself. I can say that it felt like a bumpy ride, or as Albert would say: an emotional rollercoaster, which I successfully completed.

First of all, I want to thank my supervisor Hajo Reijers, who introduced me to Anderson MacGyver at the start of this project. Your expertise in business processes, which you passionately teach MBI students about, has led me to approach you to supervise me on this project. You taught me that research is about balancing structured methods with your own creativity. But even more importantly, I learned from you that research is not only about academic expertise but also about personal growth. I would like to thank you for your honest expert opinion and for your listening ear when I needed personal support.

Also, I would like to thank my second supervisor Nico Brand. Thank you for the time you invested in providing my thesis with feedback.

Furthermore, I would like to thank my colleagues at Anderson MacGyver. A special thanks goes to Albert Sprokholt and Fabian Haijenga, my daily supervisors. Albert, thank you for our useful discussions and for sharing your experiences from practice. I would also like to also thank you for always making time to listen to my ideas while asking me critical questions. Fabian, thank you for participation and input in our meetings, even though your agenda is fuller than the agenda of an average person. Although I want to thank all of my colleagues at Anderson MacGyver, I would like to highlight one of them. Crystal, thank you for being not only an expert in my interviews but also for being a friend when I needed it.

Last but certainly not least, I want to thank my family and boyfriend. They always listened to all the presentations I had to prepare, and all the ideas that I have had about the topic of this thesis. A special thanks goes to my boyfriend Jelle, who has been talking about business activities so much in the past half year, that I am convinced that he can start his own consultancy firm by now. Also, I want to thank my sister Laura, whom I spend hours with in the past half year, brainstorming about both our theses.

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1. Introduction

1.1 Context

Nowadays, one of the main topics for organisations is the digital transformation of their organisation, with increased interconnections between products, processes, and services (Bharadwaj et al., 2013). Research shows that business-IT alignment is crucial for the success of digital transformations. Bharadwaj et al. (2013) stress that digital transformations include several aspects, including IT, strategy, processes, capabilities, products and services, and even interfirm relationships. Digital transformations require radical strategic and cultural changes within the organisation (Ismail et al., 2017). Digital transformation emphasises that it is time to rethink the roles of IT strategy and business strategy and fuse them into one digital business strategy (Bharadwaj et al., 2013; Ismail et al., 2017).

Organisations are often not able to offer the flexibility that is required for digital transformation. Reasons for this can include the complexity of IT infrastructures or inflexible business silos (Horlach et al., 2016). A possible reaction to the challenge of digital transformation is the creation of a new digital IT unit. The new digital IT unit acts like a start-up inside the traditional organisation. The new digital IT unit is focused on fast innovation and following market trends. It functions alongside the existing traditional IT unit. This co-existence of IT units is coined as "Bimodal IT", introduced by consultancy firm Gartner (Horlach et al., 2016). According to the bimodal IT approach, digital transformation leads to two different modes of speed:
- The first mode consists of the existing, well-established large core systems and works at a lower speed.
- The second mode consists of a fast customer-facing, business-oriented IT organisation.

1.2 Introduction Anderson MacGyver models

Anderson MacGyver is a company that supports organisations in their digital transformation. According to them, the bimodal IT approach focuses too much on an IT perspective. Moreover, Anderson MacGyver is convinced that the bimodal IT approach is too simplistic and requires more nuance. They believe that digital transformations should be approached on a business level, taking an activity-based perspective on the organisation. They use an Operating Model Canvas (OMC) to create a shared vision of the organisation as a basis for digital transformation (Reijnen et al., 2018). The OMC is a visualisation of an organisation's value propositions, primary and supporting activities, channels and actors.

Anderson MacGyver classifies the primary and supporting activities in the OMC using a model, the Business Activity Model. The main objective for classifying the business activities is to create a common understanding in the organisation about the focus of the business activities. The characteristics of the category in which the business activity is classified are used to make decisions about several aspects of the business activities, such as outsourcing strategies or technological investments. The Business Activity Model is depicted in Figure 1. It measures business activities along two axes: specificity and strategic focus. This results in classification into one of four categories: common, special, distinct and value-add.
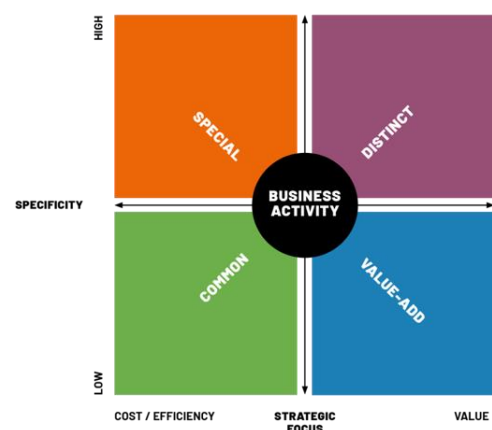
Figure 1: Business Activity Model as designed by Anderson MacGyver

Each category in the Business Activity Model has different characteristics. Distinguishing between types of business activities allows Anderson MacGyver to approach each business activity type in a

different, suitable way. Anderson MacGyver calls this: a multimodal perspective. Anderson MacGyver believes that all organisations can benefit from this multimodal perspective on organisations. Therefore, they suggest introducing the concept of multimodality and the Business Activity Model to the academic field.

1.3   Problem statement

Multimodality is a response to Gartner's *bimodality*. According to AMG, Gartner's bimodality focuses too much on an IT perspective and on the IT organisation to support business strategies. Many examples exist of companies that failed their digital transformation when solely focusing on technology (Ismail et al., 2017). Broader strategic decision areas should be taken into account. Ismail et al. (2017) emphasise that we need practical, strategic frameworks to successfully digitally transform a company. The Business Activity Model that is redesigned in this thesis is a strategic framework used to support digital transformations. It has been used in practice for several years and proved to enable the conversation between stakeholders about business activities. It supports in creating a shared vision across stakeholders in an organisation.

Introducing the concept of multimodality
To introduce the concept of multimodality to the academic field, the concept needs to be clearly defined. Concepts are subject to the question: what are we talking about? A lack of conceptualisation causes conceptual and operational problems (Podsakoff et al., 2016). Yee (2019) argues that concepts help us make sense of the world. They tell us when encountering something new, how we should interact with it. Since multimodality is considered as new concept in the domain of digital transformation, we aimed to define it as a concept.

Introducing the Business Activity Model
Before the concept of multimodality could be introduced to the academic field, we investigated how the Business Activity Model functions in practice. Problems in the model were identified in this research; we proposed a redesign to solve these problems. An example of such a problem is that the concepts in the model were used inconsistently, because the concepts are not clearly defined. The concept of specificity is interpreted differently by the consultants of Anderson MacGyver. Different interpretations can indicate that the concepts are unclear to the user. Another problem is that the concepts of value and cost, which are used on the horizontal axis, are not easily measured. The concept of value is complex, subjective and interpreted differently by each individual.

In conclusion, there is no common understanding on the definitions of the concepts in the Business Activity Model. This results in inconsistent use of concepts, caused by ambiguity in the concepts. Therefore, the first focus of the redesign was to create clear definitions for the concepts that are used in the Business Activity Model. A second problem was that the concept of value allows for subjectivity in the model. The concept was subject to the interpretation of the individual classifying the activities. This results in less reproducible and inconsistent results. Therefore, the second focus of the redesign was to propose alternative concepts that solve the current problems, without changing the intentions of the axes. We defined the intention of the model through expert interviews, of which the results are presented in this thesis. We defined this intention to be able to identify alternative concepts that match the current model. By redesigning the existing Business Activity Model, we aimed to reduce ambiguity and subjectivity in the concepts.

As a result of this section, we defined two objectives for this thesis:
1. Redesign the Business Activity Model
2. Define multimodality as a concept

1.4 Main objectives and sub-questions

We used the objectives formulated in section 1.3 as main research objectives. These two objectives were split into four sub-questions. For each sub-question, the desired outcome was formulated which answers the sub-question.

1.4.1 Main objectives

We formulated the following objectives as main objectives for this research:
1. Redesign the Business Activity Model
2. Define multimodality as a concept

1.4.2 Sub-questions

S-Q 1. **How are multimodality and the Business Activity Model currently used?**

We used the first sub-question to explore the concept of multimodality and the Business Activity Model. We analysed how multimodality and the Business Activity Model are used in practice. We decided to start this research by exploring the practical application of the concept to get a clear understanding of which concepts are used and how they are used. Existing project documentation of seven projects was analysed in a multiple-case study. Additionally, information gathered through expert interviews was used to describe the use of multimodality and the Business Activity Model in practice.

Research methods: Multiple-case study and Expert interviews.
Outcome: A Multiple-case study report with a description of the concept of multimodality and the concepts used in the Business Activity Model in practice.

S-Q 2. **What is currently known in the literature about the concepts in the Business Activity Model?**
   a. What is currently known in the literature about digital transformations and existing approaches to guide this digital transformation?
   b. What is currently known in the literature about different perspectives to look at organisations?
   c. What is currently known in the literature about sources of a firms' competitive advantage?
   d. What is currently known in the literature about the strategic orientation of business activities?

We researched the concepts that are used in the Business Activity Model to gather knowledge about their underlying theories. The goal of this sub-question was to create an understanding of the concepts that are used in the Business Activity Model. We used this theoretical background to redesign the Business Activity Model in S-Q 3.

Research method: Systematic literature review.
Outcome: A literature analysis.

S-Q 3.   **How can the Business Activity Model be redesigned?**

To redesign the Business Activity Model, we used the design science cycle as proposed by Peffers et al. (2007). We started with problem identification, building upon the case study, expert interviews and our findings from the literature. We defined objectives for our redesign, based on the problems we identified in the problem identification. We used the outcomes of S-Q1 and S-Q2 to redesign the existing Business Activity Model. The steps of the design science cycle and their corresponding research methods are explained in more detail in Chapter 2.

Research method: Design science cycle formulated by Peffers et al. (2007).
Outcome: A redesign of the Business Activity Model.

S-Q 4.   **How can multimodality be defined?**
      a.   What are the characteristics of multimodality?
      b.   What identified characteristics of multimodality are necessary to define the concept?
      c.   How can the intention of the concept be defined?
      d.   How can the extension of the concept be defined?

Podsakoff (2016) argues that a concept is crucial to the question: what are we talking about? A lack of conceptualisation makes it difficult to distinguish the concept from similar concepts. To answer this sub-question, we used Podsakoff's approach to define a concept. The sub-questions 4a, 4b, 4c and 4d were formulated by following the steps in Podsakoff's approach. The goal of the concept definition was to provide a clear, concise, understandable, unambiguous definition of multimodality. The definition should explain what the concept entails and with what goal it is applied.

Research methods: Podsakoff's concept definition approach (2016).
Outcome: A concept definition of multimodality.

To summarise, the outcomes of sub-question 1 and 2 were used as input to answer sub-question 3 and 4. The outcomes of sub-question 3 and 4 were used reach the main objectives.

1.5   Relevance

1.5.1   Scientific contribution

The scientific contribution of this thesis is the introduction in the academic field of a multimodal perspective on organisations. It introduces the concept of multimodality in the domain of digital transformation. It provides a model, the Business Activity Model, to support this multimodal perspective on business activities. It combines different existing theories about strategy, digital transformations and activity-based perspectives.

This model is different from other scientific models because it focuses on the classification of individual business activities. The Business Activity Model is used to create a common understanding of each business activity. This understanding can be used as a basis to decide on a future focus of the business activities. It supports decision making on how to design the organisational and technological aspects of the activity. For example, it can guide in decisions on sourcing, design of IT landscapes, ways of working within teams, etc.

1.5.2 Practical contribution

There are two practical contributions of this thesis. First, it provides clarity for Anderson MacGyver's consultants and clients. This thesis provides a clear definition for the concept of multimodality. This definition can be used to explain the concept in projects or in other practical applications of the concept. The redesign of the Business Activity Model can be used in practice, without the problems occurring in the current application.

Second, other organisations can use this multimodal perspective as starting point for their own (digital) transformation. The Business Activity Model, as explained in this thesis, can help an organisation make decisions about the future strategic focus of their business activities. This enhances communication and understanding about the business activities among stakeholders.

1.6 Scope

Multimodality and the Business Activity Model are currently applied in the context of digital transformations. It is the environment in which the Business Activity Model has been developed, and the environment in which Anderson MacGyver operates. The need for communicational frameworks that support the digital transformation of companies was the reason for developing the Business Activity Model.

However, the concept of multimodality and the Business Activity Model are not limited to the scope of digital transformations. It can also be applied in general transformations of an organisation. Multimodality and the Business Activity Model are used to create consensus about the business activities of a company and their corresponding characteristics. This classification can later be used to make decisions on multiple strategic scenarios. At Anderson MacGyver, these decisions are often part of the digital transformation of an organisation. Therefore, we introduce multimodality and the Business Activity Model in the context of digital transformation. Usage outside the scope of digital transformation does not change the application of multimodality and the Business Activity Model.

This thesis was written as part of an internship at Anderson MacGyver. Therefore, we had access to their project documentation and IP.

1.7 Thesis Outline

The rest of this thesis is structured as follows: Chapter 2 explains the research methods used to answer the sub-questions introduced in section 1.4.2. Chapter 3 presents a case study report on how multimodality and the Business Activity Model are used in practice. It contains an analysis of project documentation and the results of conducted interviews about the case study projects. Chapter 4 explains the theoretical background of the concepts in the Business Activity Model in a literature analysis. It elaborates on digital transformations, different perspectives on organisations, and the concepts on the axes of the Business Activity Model, specificity and strategic focus. Chapter 5 presents the results of the expert interviews conducted during this research. In chapter 6, we focus on the results of the redesign of the Business Activity Model. Chapter 7 presents our concept definition of multimodality. Chapter 8 discusses the results of this research. Finally, we present our conclusion in chapter 9.

2. Research methods

As introduced in chapter 1, the main objectives of this thesis were to:
1. Redesign the Business Activity Model
2. Define multimodality as a concept

In Figure 2, the phases of the research are depicted. Phase 1 consisted of the multiple-case study including the first round of expert interviews, the analysis of existing literature and the second round of expert interviews. Phase 2 contained the empirical parts of this thesis: the redesign of the Business Activity Model and the concept definition of multimodality.
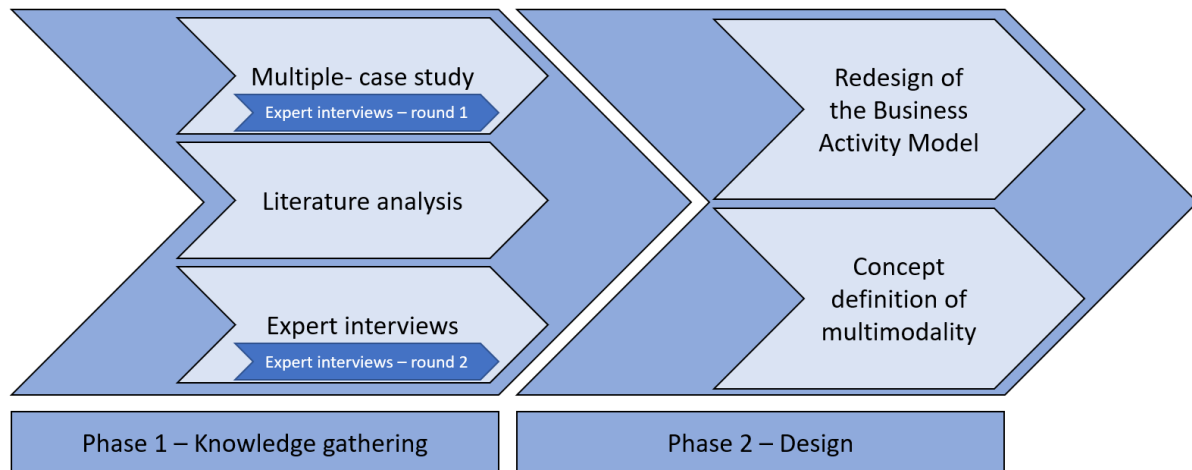
Figure 2: Thesis outline

2.1 Phase 1 – Knowledge gathering

Multiple-case study

First, we conducted a multiple-case study to get a clear understanding of how the concepts of multimodality and the Business Activity Model are used in practice.

A multiple-case study was chosen over a single case study. A multiple-case study includes the study of more than one case. This proves to be beneficial to understand the differences and similarities between cases (Gustafsson, 2017). Also, it allows identifying differences within and across each situation. Moreover, including multiple cases provides a more convincing theory while suggestions are more intensely grounded in several empirical projects.

The objective of the multiple-case study was threefold. The first objective was to create a clear understanding of the concept of multimodality, which could be used to formulate a definition. The second objective was to identify the intention of the axes in the Business Activity Model. The third objective focused on identifying problems in the use of the Business Activity Model.

The case study was conducted on existing documentation of the historical projects of Anderson MacGyver. The projects were all conducted between 2017 and 2021. We performed the multiple-case study by analysing project documentation. Extra information about the cases was gathered by conducting expert interviews, which are explained below.

The cases are explained in detail using a within-case analysis, regarding their context and objectives of the project. A within-case analysis focuses on the details of a single case. In a multiple-case study, a cross-case conclusion can be drawn from multiple single cases to identify patterns and variations (Yin, 2018). We used a cross-case analysis to identify a pattern in the classifications. Then, we highlighted some business activities in-depth, to research salient cases. The results of the multiple-case study were

also used as input for the problem identification in phase 2 of this research. The multiple-case study was used to answer sub-question 1: *How are multimodality and the Business Activity Model currently used?*

Literature analysis

The second research method used is a systematic literature review to analyse the existing literature. We conducted it to understand the theoretical background of the concepts in the Business Activity Model. The literature analysis explains theories about digital business transformations, different perspectives on organisations, and theory behind the concepts used in the Business Activity Model. We created a long list by entering keywords in search engines. When a relevant paper was identified, we snowballed forward and backward to search for other relevant papers. In total, we selected 63 items for our longlist. A sample of this longlist and additional information on the approach can be found in Appendix A1. We analysed the 63 items on the longlist by reading their abstracts and conclusions. Based on these abstracts and conclusions, we shortened this list to 22 scientific works that were considered relevant for the literature analysis, publication dates ranging between 1996 and 2019. We rated each item on the long list a number from 0 to 3, indicating its perceived relevance for the literature analysis. The items that were rated with a score of 3, were all included in the literature analysis. This resulted in the inclusion of 20 items. We examined the items with rating 2 again and concluded that 2 of them were relevant to include. The literature analysis was used to answer sub-question 2: *What is currently known in the literature about the concepts in the Business Activity Model?*

Expert interviews

We conducted two rounds of interviews to gather information about the Business Activity Model as input for our design phase. All interviews were conducted as semi-structured interviews. Interview protocols including the interview questions can be found in Appendix C3 and C4.
- **Round 1:** As explained above, the first round of interviews was used to gather additional information about the case study projects. However, we also used the interviews to ask the experts about the intention of the axes in the Business Activity Model and difficulties in the use of the Business Activity Model. The results of the questions about the case study projects are presented in our case study report in chapter 3. The results of the questions about the intention of the axes and the difficulties in the practical use are presented in chapter 5.1.
- **Round 2:** The second round of interviews was used to gather knowledge on the concept of multimodality. We gathered characteristics of multimodality by asking the experts different questions about the concept. These characteristics were used as input for our concept definition. We also used the interviews to ask the experts about the intention of the axes in the Business Activity Model and difficulties in the use of the model.

An overview of the conducted interviews is depicted in Figure 3, to clarify the different and shared objectives of the interviews. It also explains where the results of the interviews are presented.

Figure 3: Overview of conducted interviews – round 1 and 2

2.2 Phase 2 - Design

2.2.1 Redesign of the Business Activity Model

To redesign the Business Activity Model, we adopted the phases of the design science research methodology of Peffers et al. (2007). This methodology consists of the following phases:

1. Problem identification
2. Objectives for a solution
3. Design and development
4. Demonstration and evaluation
5. Communication

The steps of the redesign phase can be seen in Figure 4. In Step 1, theoretical and practical problem(s) were identified. We used three sources of input for the problem identification:

1. Results from the multiple-case study
2. Results from the literature analysis
3. Results from the expert interviews

In step 2, we defined the objectives for a redesign of the model, building upon the problem identification in step 1. Step 3 consisted of design and development of the solution. We used three different sources of input to design the solution. In step 4, we conducted two kinds of workshops to demonstrate and evaluate our redesign for the Business Activity Model. In step 5, we communicated the Business Activity Model through a written document, this thesis.

We used the design science cycle as proposed by Peffers et al. (2007) because it focuses on developing an artefact. In this case, the artefact is the Business Activity Model. It creates and evaluates artefacts that aim to solve organizational problems. We used the design science cycle as research method to answer sub-question 3: *How can the Business Activity Model be redesigned?*
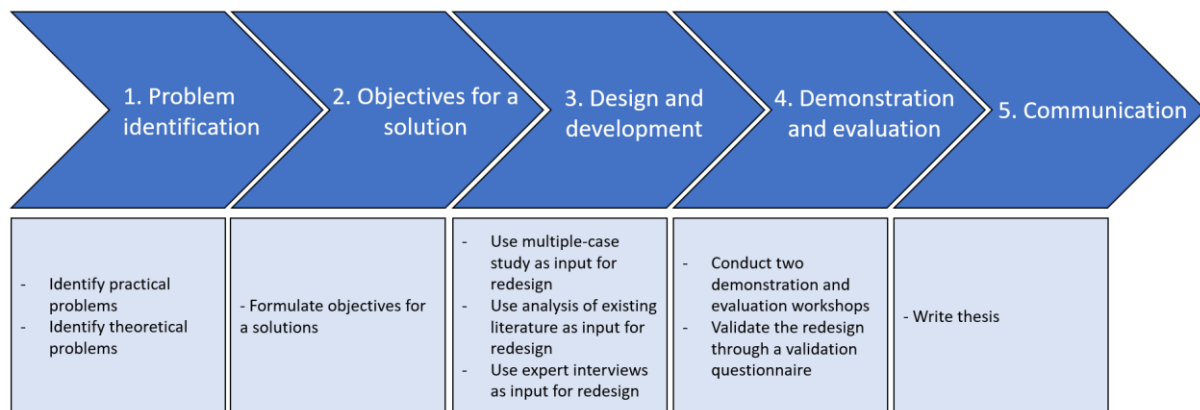
Figure 4: Process of redesign of the Business Activity Model

Step 1.   Problem identification

First, problems in the current Business Activity Model were identified. These problems were used to formulate objectives for the redesign of the model. We distinguished between two types of problems:

- **Practical problems:** Problems identified from practice, experienced in the application of the Business Activity Model. We identified these practical problems from our multiple-case study and expert interviews. We used these practical problems as input for the redesign of the Business Activity Model.
- **Theoretical problems:** Problems identified in the literature. We identified theoretical problems, where the model does not comply with theory on the concepts. We used these theoretical problems as input for the redesign of the Business Activity Model.

Step 2. Objectives for a solution

Building on the results of the problem identification, we determined the objectives for a redesign of the Business Activity Model.

Step 3. Design and development

Methodological triangulation was used for the design phase. Methodological triangulation uses more than one kind of method to substantiate the design and development of the artifact. This increases validity, understanding of the topic, confirmation of findings, and more comprehensive data (Bekhet & Zauszniewski, 2012). We used the following three sources of input for our design:

- **Multiple-case study:** We used the knowledge from our multiple-case study as input for our redesign. We analysed the practical use of the model so that we understand the intention of the model. This intention was used to identify other possible dimensions for our redesign.
- **Literature analysis:** We aimed to solve the identified theoretical problems from step 1 using the knowledge from the literature analysis.
- **Expert interviews:** We used the expert interviews to formulate the intention of the axes in the Business Activity Model. Defining the intention of the model allowed us to explore alternatives for the concepts that could be used to propose a redesign.

Step 4. Demonstration and evaluation

To validate the redesign, two different workshops were conducted. The goal of the workshops was to demonstrate and evaluate the redesign of the Business Activity Model. We designed two workshops, targeting two different groups of experts. More information about the workshops and their methods is presented in Table 1. After the workshops, the participants were asked to fill in a questionnaire containing statements about the redesign. The statements are based on evaluation criteria, which are also presented in Table 1. We used a 5-point Likert scale to assess the statements. The questionnaire with the statements can be found in Appendix F.

Table 1: Overview of validation workshops

Workshop	1	2
Target group	Anderson MacGyver consultants.	Practitioners in the field of Digital Transformations and Enterprise Architecture.
	The target group of the first workshop were the subject-matter experts that have been working with the Business Activity Model for years. They are considered subject matter experts as they have most experience with the model. They were asked to give their expert opinion through a questionnaire with statements about the redesign.	We demonstrated the redesigned Business Activity Model to experts outside of Anderson MacGyver. We captured their opinion on the redesign by using a questionnaire containing multiple statements with underlying validation criteria. This extra demonstration and evaluation workshop outside Anderson MacGyver was included to reduce bias in the research validation.
Evaluation method	We demonstrated and evaluated the model through a combination of demonstration and simulation, as proposed by Sonnenberg and Vom Brocke (2012). During the workshop, we presented the results of our	We demonstrated and evaluated the redesign through a demonstration workshop as proposed by Sonnenberg and Vom Brocke (2012). This included demonstrating the results of this research. We explained what

	research and our redesign of the Business Activity Model. The consultants were asked to classify five artificial business activities according to the redesigned model, as part of the simulation. We used Mentimeter to let the consultants to rate the business activities. After the workshop, we sent the questionnaire to the experts to evaluate the results.	multimodality entails and how the Business Activity Model is used to create common understanding and how it supports decision making. Then, we classified four artificial business activities according to the redesigned model, to demonstrate the use of the model in a practical setting. Because the workshops were conducted individually, we discussed the classification verbally. At the end of the workshop, we asked the expert to fill in the questionnaire.
Evaluation criteria	We used the following evaluation criteria to validate our results: - Operationality - Ease of use - Effectiveness - Fidelity with real-world phenomenon Adopted from Sonnenberg & Vom Brocke cited in (Sonnenberg & Brocke, 2012, p. 393) The motivation for choosing these evaluation criteria can be found in Appendix F1	For the validation of the results, we used the following evaluation criteria: - Effectiveness - Ease of use - Usefulness - Understandability Adopted from Sonnenberg & Vom Brocke cited in (Sonnenberg & Brocke, 2012, p. 393) Reasons for choosing these evaluation criteria can be found in Appendix F2.

Step 5.   Communication

This thesis was used as the final step of the design science cycle, the communication.

By completing the final step of this research method, we answer the third sub-question: How can the Business Activity Model be redesigned? Therefore, we also reach our first main objective: Redesign the Business Activity Model.

2.2.2   Concept definition of multimodality

Podsakoff (2016) cites Gerring (2012) when stating that concepts are indispensable to the question: What are we talking about? A lack of conceptualization causes conceptual and operational problems. Conceptually, a lack of clarity makes it difficult to distinguish the concept from similar concepts in the field. Operationally, a lack of clarity can cause a mismatch between the concept and measures or manipulations of it, resulting in construct validity. In this research, we used Podsakoff's approach to concept definition. The process steps of formulating a concept definition are depicted in Figure 5. In step 1, multiple sources were used to gather characteristics that describe multimodality. Step 2 was used to organise the identified characteristics and determine which are necessary to define the concept. In step 3, we created a concept definition for multimodality. Step 4 was used to refine the definition with the help of subject-matter experts. We used Podsakoff's method for the formulation of a definition because it is clear and concise. It describes each step in the formulation in-depth. This research method, the approach to concept definition was used to answer sub-question 4: *How can multimodality be defined?*
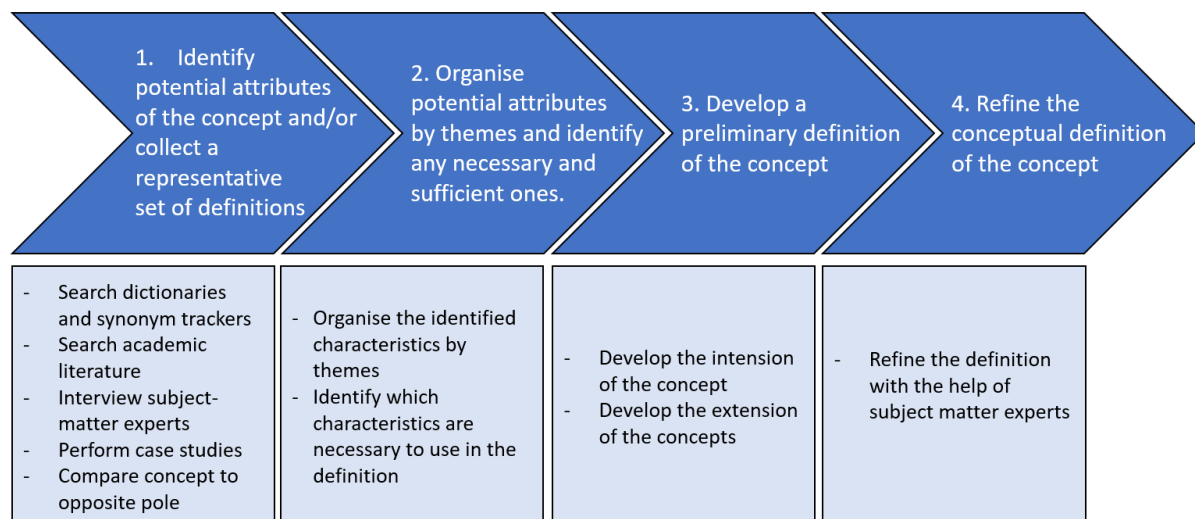
Figure 5: Process of concept definition of multimodality

Step 1.   Identify potential attributes of the concept and/or collect a representative set of definitions

Podsakoff et al. (2016) propose seven sources to identify attributes of the concept. They state that the number of sources required to define the concept depend on the breadth and depth of the discussion in the extant literature. For concepts not explicitly defined yet, they advise to use at least some inductive, qualitative techniques (Podsakoff et al., 2016). We used five of the seven methods proposed. For each method we used, we explain why that particular method is chosen.

In this research, we included the following methods:
- **Search dictionaries and synonym trackers:** We used dictionaries and synonym trackers to gather a primary set of characteristics about multimodality in other contexts. We chose this method because it allowed us to include the definitions of the concept that were not available in the academic field.
- **Search academic literature:** We searched the literature for multimodality in other disciplines. Multimodality does not exist in the domain of strategic management or digital transformations yet. For that reason, we searched for literature about multimodality in other domains. We chose to use this method because we wanted to explore how the concept is used in other disciplines.
- **Interview subject-matter experts:** We used the expert interviews from the knowledge gathering phase to capture the experts' perspective on the concept. Six consultants were interviewed in the second round of interviews for the purpose of identifying characteristics of multimodality. We selected these six consultants because of their expertise in the subject and involvement in other scientific activities within AMG.
- **Perform case studies:** The multiple-case study of phase 1 was used to identify characteristics and applications of multimodality. We chose to use this method because it identifies and explains the practical environment of the concept.
- **Compare concept to opposite pole:** Bimodality was used as the negative pole to identify underlying attributes. Comparing the concept to its negative pole helped identify distinctive differences between the concepts. We chose to use this method because multimodality has been developed as an answer to Gartner's bimodality. Comparing the two concepts could clarify the differences.

The remaining two methods: (1) Focus groups and direct observation, and (2) examine operationalisations of the concept were left out of scope. We did not include these two methods due to time constraints. Focus groups and direct observation required a project in a natural setting, in real-

time. There were no projects available for observation during this phase of the research. Examining operationalisations of the concept focuses on identifying questions, items or observations to measure the concept. Currently, the Business Activity Model is used to operationalise the concept of multimodality. In this research, we aimed to redesign the Business Activity Model. We excluded this method because the Business Activity Model was not yet redesigned and would not represent reliable operationalisation. We considered the used methods as sufficient for the purpose of defining the concept.

Step 2. **Organise potential attributes by themes and identify any necessary and sufficient ones**

Step 2 consisted of organising the attributes identified step 1 by themes and determine what characteristics were necessary to define the concept. A complete list of identified characteristics was created and organised by themes. We decided which characteristics of the concept should be included in the definition. The inclusion and exclusion of characteristics was validated by experts in step 4 of the approach.

Step 3. **Develop a preliminary definition of the concept**

A preliminary definition of the concept was developed in step 3. The definition of the concept should include what multimodality entails and why it is applied. In other words, by explaining the content and application, we defined the intention and extension of the concept.

Step 4. **Refine the conceptual definition of the concept**

Subject-matter experts were asked to provide feedback on the definition to be able to refine it. Also, we asked them to validate the decisions made on inclusion or exclusion of characteristics.

By finishing step 4, we finalised the concept definition of multimodality. This definition represents the outcome of sub-question 4, and reaches our second and final main objective: Define multimodality as a concept.

2.3   Threats to validity

Yin (2018) explains four threats to validity, together with descriptions and tactics to reduce the threats. We adopted the definition of the threats introduced by Yin (2018), and explain how we planned to mitigate the threats in Table 2. We formulated these possible threats before conducting this research, to reduce the risk of possible threats.

Table 2: Threats to validity

Threat	Description	Tactic to mitigate
Construct validity	Identifying correct operational measures for the concepts being studied	1. Redesign of the Business Activity Model **Risk:** The risk of this threat is that we do not use correct input for the redesign. **Tactic to mitigate:** We reduce this threat by using multiple sources of input, as proposed by Yin (2018) to mitigate the construct validity in the redesign. 2. Concept definition of multimodality **Risk:** The risk of this threat is that the method does not fit the goal of defining the concept. **Tactic to mitigate:** We follow the established research method defined by Podsakoff et al. (2016) to make sure that we use the correct measures and methods to define the concept. We make sure the concept definition is reviewed by subject-matter experts to ensure its correctness.
Internal validity	Seeking to establish a causal	1. Redesign of the Business Activity Model

	relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships	**Risk:** The risk with regards to the case study is that we assume incorrect relations between classification of the business activity and arguments for the classification when arguments are not available in the documentation. **Tactic to mitigate:** The internal validity threat to the case study can be found in the causal relationship between the classification of an activity and the reason why it is classified there. Most of the projects used in the case study have an extra document presenting the arguments for the classification, mitigating the threat of spurious relationships. If this document is non-existent, we conduct extra interviews to provide the missing explanations. 2. Concept definition of multimodality **Risk:** Use characteristics that are not necessary in the definition of the concept. **Tactic to mitigate:** The inclusion and exclusion of characteristics is reviewed by multiple experts in the refinement phase. If any crucial characteristics are missing, or non-important characteristics are included, the concept can be redefined.
External validity	Showing whether and how findings can be generalised	1. Redesign of the Business Activity Model **Risk:** The risk of this threat is that cases cannot be generalised outside the case study. Moreover, input can be biased because input sources all originate from one organisation (Anderson MacGyver). **Tactic to mitigate:** We mitigate this threat by using case studies from different organisations, in different industries, conducted at different moments in time by different teams of advisors (ecological validity). As Yin (2018) suggests, generalisations can be made easier when the case study is replicated among three or four different cases. In our research, we use seven cases to mitigate this threat. The second threat cannot be mitigated in the design phase because expert knowledge is required to redesign the model. Since the model is only used by Anderson MacGyver, all knowledge about the model can be found within one organisation. It can be partly mitigated by using multiple sources of input such as existing literature in addition to using these expert opinions. The threat to external validity in demonstration and evaluation is mitigated conducting a second workshop targeting experts outside Anderson MacGyver to evaluate the redesign (population validity). 2. Concept definition of multimodality **Risk:** The definition of the concept cannot be generalised **Tactic to mitigate:** The threat of external validity is not considered high in this concept definition. The concepts used to define the concept are not industry-specific and considered organisation-generic and can therefore be generalised among industries and organisations (ecological validity).
Reliability	Demonstrating that the operations of a study can be repeated with the same results	**Risk:** The risk for both the redesign of the model and the concept definition are that the research cannot be repeated in the same way, with the same results. **Tactic to mitigate:** We reduce this threat by using protocols for research methods where necessary, to allow the study to be repeated in the same way. We explain in detail how the research is designed and conducted. We also reduce the threat to reliability by always using more than one source of input (multiple experts, multiple methods) to provide information.

In the next chapter, we present our case study report. We start with presenting the case study report because of the practical nature of the topic of this thesis. A thorough understanding of the practical application of the concept was required before the rest of the research could be conducted.

3. Case study

In this chapter, we present the results of the multiple-case study. First, we give a short general explanation of the concept of multimodality and how it is used in projects at Anderson MacGyver together with an explanation of the Business Activity Model. We provide this information to increase the understandability of the case studies. In Table 3, we provide an overview of the seven projects that were analysed in this case study, including context information about the organisations. Then, we expand on the individual cases using a within-case analysis. For this within-case analysis, we reviewed project documentation. Additionally, we interviewed consultants involved in the projects to gather information on how and why multimodality was used in the project. Section 3.4 presents the results from our cross-case analysis. In section 3.5, we highlight some business activities that stood out in our analysis. Section 3.6 is used to mention additional general findings.

3.1 Explanation of multimodality and the Business Activity Model

Multimodality is used to create a common understanding of the focus of a business activity. It classifies a business activity into one of four business activity types, modalities. These modalities all have their own underlying characteristics, which can be used to determine organisational and technological requirements. This means that different business activity types require different teams, different ways of working and different technological support. To classify business activities into these modalities, Anderson MacGyver uses the Business Activity Model, which is depicted in Figure 6. It classifies business activities using 2 dimensions. The first dimension, the vertical axis, determines whether a business activity is specific or generic. The second dimension, the horizontal axis, determines whether a business activity is focused on cost-efficiency or whether it is focused on creating value for customers.

The Business Activity Model is used during projects to classify business activities of an organisation. Together with the client, Anderson MacGyver colours the business activities at the start of the project. Before colouring the business activities, activities are visualised on an Operating Model Canvas (OMC) (Reijnen et al., 2018). An example of an OMC can be seen in Figure 7. This OMC has been anonymized and adapted to prevent recognition of the organisation in focus. This means that some activities might be coloured in a different colour than originally. Anderson MacGyver uses an OMC to visualise all the business activities an organisation performs.
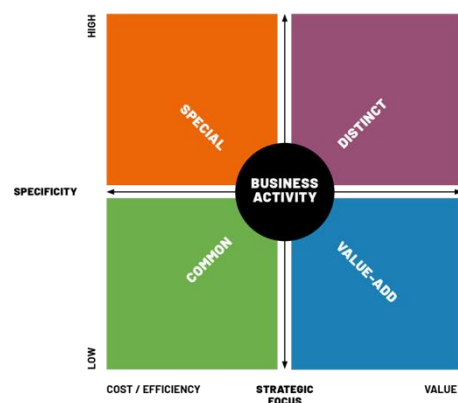
Figure 6: Anderson MacGyver's Business Activity Model
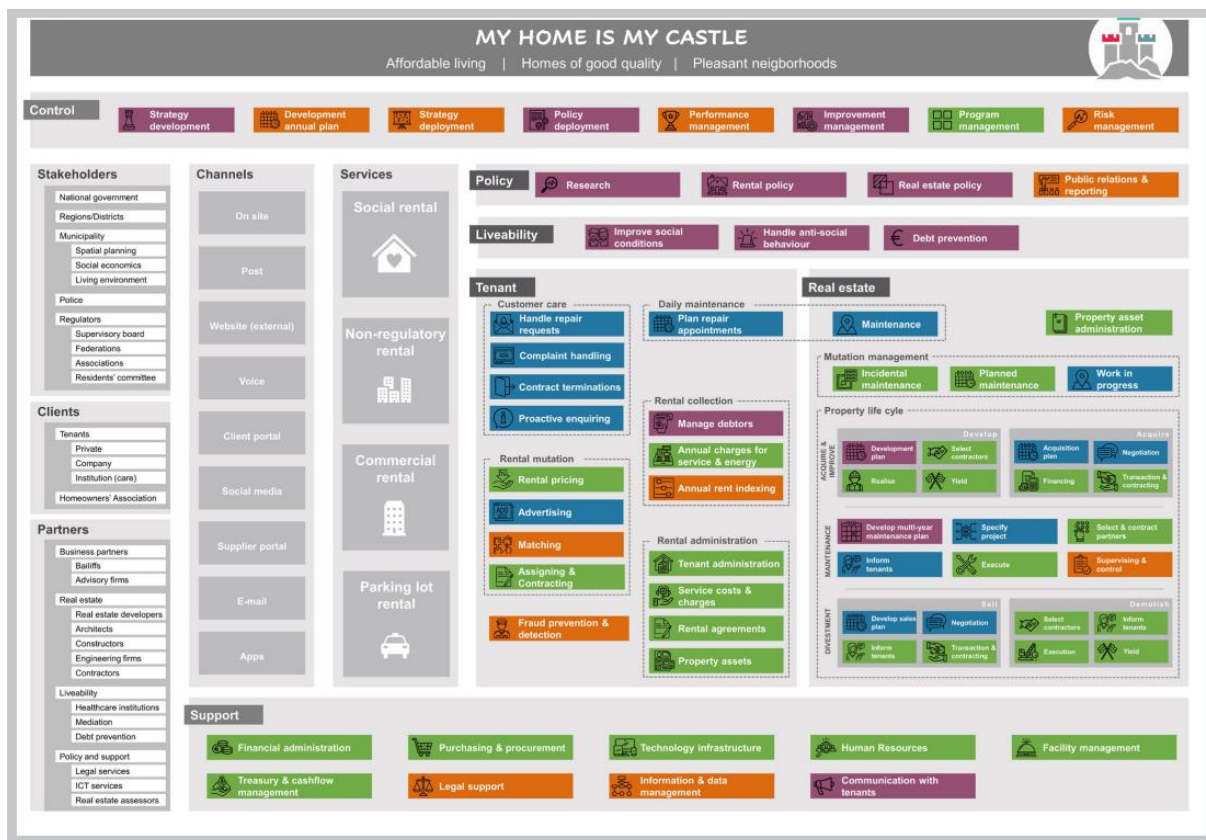
Figure 7: Example of an Operating Model Canvas with multimodal business activities

3.2 Case study overview

In this case study, seven different projects in which multimodality was used were analysed. The cases are anonymised, but an overview of the sector and size of the organisation is provided in Table 3.

Table 3: Case study overview

Case #	Company	Sector	Number of Employees (rounded by 100)
1	A	Media	4900
2	B	Gas and renewable energy	2800
3	C	Government institution	1700
4	D	Housing corporation	600
5	E	Maritime service	300
6	F	Industry service	4500
7	G	Gas and renewable energy	2800

For each case, available documentation on the classification of the business activities was analysed. In addition, we conducted interviews with project consultants involved in the project. For case 4, there was no documentation available on the classification. Therefore, we conducted one extra (unstructured) interview with the project consultant to extract information about the argumentation behind the classification of the business activities.

3.3 Within-case analysis

This section presents the within-case analysis of the seven cases we studied. It discusses the project status, project assignment, reasons for using multimodality in the project and the insights it provided. We also asked the consultants whether they used a current perspective (as-is analysis) or a future perspective (to-be analysis).

3.3.1 Case 1 – Company A

Interviewee experience: 31 years, senior consultant

Project status: Completed project

Project assignment: Redesign of the IT organisation. The reason for this redesign was twofold:
1. Digitalisation was not going fast enough.
2. Business-IT alignment needed to be improved.

With those two underlying reasons, Anderson MacGyver had to redesign the client's IT organisation on an organisational level.

Reason for using multimodality: Modalities were added to the business activities of the client in order to cluster activity domains. Activities that were classified with the same colour were logically clustered together into activity domains. According to the interviewee, in order to cluster on a domain level, colours had to be determined on a business activity level first. An understanding of the business activities and their focus was needed before the clustering on the domain level could take place.

Insights provided by multimodality: The multimodal colours of the activities and the domains were used to formulate departments within the client organisation. Thus, the modalities facilitated the formulation of these departments. The departments all needed to be organised and governed differently. The multimodal colour helped determine the design of the departments should look like and in which way the departments should be governed and managed.

Current or future perspective for the colours of modalities: Future perspective

3.3.2 Case 2 – Company B

Interviewee experience: 12 years, medior consultant

Project status: Completed project

Project assignment: The project assignment was to redesign the Belgian IT organisation. In order to design an IT organisation that matched the Dutch IT organisation, an understanding of business operations was required. Therefore, an OMC of the Belgium part of the organisation was created and modalities were added. The official formulated assignment of the project was as follows:
- Design a Business Technology Organisation Unit, in accordance with the function model and design principles of existing units.
- Prepare an implementation plan.

Reason for using multimodality: Modalities were added to the OMC because the Anderson MacGyver consultants wanted to understand the nature of the business activities. This knowledge was later used in strategic workshops to decide on the future direction of the business activities. The colours that were assigned to the business activity indicated the desired strategic direction of the business activity. For example: When data analysis is classified as purple, it indicates a different strategic direction than if it were classified as orange. Modalities were used in this project to sharpen that strategic direction.

Insights provided by multimodality: Modalities were later in the project used to formulate teams and departments. The colours of the modalities allowed to formulate teams and departments consisting of matching colours. The colour assigned to the business activity has implications for the way of managing a team or department. An example is that purple activities often require an agile way of working. The colours, and their matching characteristics, were used to define the way of working within a department as well as for selecting a team that fits the colour and this way of working. In conclusion, multimodality was used to create an organisational design, allowing to logically order departments and teams.

Current or future perspective for the colours of modalities: Future perspective

3.3.3   Case 3 – Company C

Interviewee experience: 40 years, senior consultant
Project status: Completed project
Project assignment: The project assignment was to formulate a sourcing strategy for their business activities. Contracts with suppliers were expiring and had to be retendered. The client organisation asked Anderson MacGyver to advise on how IT domains had to be organised and what activities were suitable for sourcing. Part of the assignment was to subdivide activity domains so that they could be outsourced together. The goal was to reduce the number of suppliers. Formulation of new subdivisions had to ensure that clusters could be made, which could then be outsourced to suppliers.
Reason for using multimodality: Modalities were used to understand what activities the client organisation performed. The Business Activity Model was used as a basis for identifying differences and similarities between business activities. This allowed for subdivision of the domains before outsourcing them. Business activities with the same multimodal colour were clustered into domains. The characteristics of the multimodal colours, and therefore the characteristics of the domain, were provided to the sourcing suppliers.
Insights provided by multimodality: First, the modalities were used to understand the business activities of the organisation. To understand the differences between them and to determine what clusters could be made. The colours were also used as specifications for the sourcing partner.
Current or future perspective for the colours of modalities: Current perspective

3.3.4   Case 4 - Company D

Interviewee experience: 40 years, senior consultant
Project status: Completed project
Project assignment: Creating an OMC and add a multimodal analysis. The initial idea was to use the OMC with modalities for broader themes in the organisation. Examples of such themes include: How do we want to approach sourcing? How do we want to organise application development? However, solving these issues was not part of this project.
Reason for using multimodality: Because the entire project was focused on creating an OMC, there was no obvious reason to use multimodality besides the fact that it was part of the assignment. The idea was to eventually use the OMC and the modalities as input for application rationalisation or the client's sourcing strategy. To make decisions on a strategic level, the OMC and modalities could prove helpful in the future.
Insights provided by multimodality: Besides creating a clear understanding about the organisation, there is no knowledge about what insights multimodality provided for the client. Anderson MacGyver's advice to the client was to formulate a sourcing strategy based on the modalities.
Current or future perspective for the colours of modalities: Current perspective

3.3.5   Case 5 – Company E

Interviewee experience: 25 years, senior consultant
Project status: Project is still in progress. The part of the project where the OMC was created has been completed. The follow-up project has recently started.
Project assignment: The assignment in the project was to solve three problems:
1. The client had a customised IT solution in the middle of their application landscape. They wanted to get rid of this customised solution.
2. The client had a few business processes that did not perform optimally. Especially their purchase-to-pay process was an issue. That process had to be optimized.
3. The client was divided into two divisions that used the same systems. The client felt like the divisions were hindered by using these systems together. There was a demand for more flexibility, so growth within the divisions could be better supported.

The assignment formulated by the client was, therefore: How can we achieve these objectives, with a compact set of systems? The focus of this project was to think along with the customer about their IT

landscape. In the follow-up project, Anderson MacGyver will help the customer select partners and implement the selected technological solutions.

Reason for using multimodality: To deliver a solid IT landscape, thorough understanding of the company of focus is required. To understand the business activities performed by the client, and their requirements, multimodality was used. Multimodality was also used to show the organisation the differences, but more important the similarities, between the divisions. It helped identify the business activities that are executed generically, which indicates that divisions could share systems used to support the business activity. Multimodality was also used to discover which of the business activities that the client performed were unique and thus required more IT investment.

Insights provided by multimodality: Multimodal colours allowed to select appropriate technological solutions, which could support the activity.

Current or future perspective for the colours of modalities: Future perspective. The future perspective was later used to match their current application landscape. This indicated the gap that needed to be bridged to get to the future IT landscape.

3.3.6   Case 6 – Company F
Interviewee experience: 15 years, senior consultant

Project status: Project is still in progress. The part of the project where the OMC was created has been completed.

Project assignment: The project assignment was to renew the client's IT landscape. Anderson MacGyver approached this by using four streams:
1. Deliver a new information landscape.
2. Migrate the back-log of acquisitions and create a script for future acquisitions.
3. Getting rid of current IT issues.
4. Organise IT: policies, portfolio, processes and organisation.

Reason for using multimodality: The client has many subdivisions. Some subdivisions never communicated before the start of the project. These divisions all used different solutions to their own problems and all used different ways of working. To bridge that gap, Anderson MacGyver created an OMC of the organisation. Multimodal colours were added to the OMC to identify the similarities between the subdivisions. This allowed the consultants to determine the business activities that worked generically, which indicated that the activities can share systems. Eventually, multimodality influenced decisions in the standardisation of the client's IT landscape.

Insights provided by multimodality: Multimodality was used to find technological solutions that could support the client's business activities. Business activities that were classified as generic, qualified for market solutions. Based on the multimodal analysis, Anderson MacGyver advised the client to reduce customised solutions in most of the activities. The modalities were also sent to the suppliers of the technological solutions to indicate the requirements for the applications.

Current or future perspective for the colours of modalities: Future perspective

3.3.7   Case 7 - Company G
Interviewee experience: 12 years, medior consultant

Project status: Project completed

Project assignment: The client was working on an internationalisation strategy. To be able to formulate such strategy, the client wanted to know what their international business operations looked like. An OMC was created to depict these international business operations. It was an in-between project in the run-up to a bigger internationalisation project at the client.

Reason for using multimodality: The focus of the project was to merge earlier created OMC's into one international OMC. Those OMC's already had modalities, so they could be added here as well.

Insights provided by multimodality: The enterprise architects within the client organisation used the OMC for the architecture of the organisation. However, they also had landscape plates and models of their own. They used the OMC and modalities to a limited extent. Anderson MacGyver's advice would

have led to other decisions in their new IT landscape than eventually were made. The OMC and its modalities were also used in another follow-up project of Anderson MacGyver to create new business units. These units were predominantly distinct (purple) which indicated what the way of working should look like.

Current or future perspective: Future perspective

3.3.8 Conclusion of within-case analysis

We conclude from this section that multimodality is used for different reasons in projects:

1. **Organisational design**
   a. Multimodality supported clustering activity domains with the goal to formulate departments (CS1; CS2; CS3; CS7).
   b. Multimodality determined the way of working and way of management within departments (CS1; CS2; CS7).
   c. Multimodality influenced the formulation of teams (CS2).
2. **Technological design**
   a. Multimodality supported a selection of appropriate technological solutions (CS5; CS6).
   b. Multimodality indicated which technological solutions can be shared among business activities (CS5; CS6).
3. **Other**
   a. Multimodality created a common understanding of the focus of business activities among stakeholders (CS2; CS3; CS4; CS5).
   b. Multimodality allowed collaborative decision making on future strategic directions for each business activity (CS2).
   c. Multimodality supported the identification of outsourceable activities (CS3; CS4).
   d. Multimodality allowed the identification of differences and similarities between activities (CS3; CS5; CS6).

3.4 Cross-case analysis

3.4.1 Cross-case analysis of strategy, control and support activities

We performed a cross-case analysis to search for patterns in the classification of activities. We used overarching, generalisable domains to identify patterns in the classification. To perform a cross-case analysis, an excel document was created consisting of all the activities in all seven cases. In this excel, we added the rationales of the classification of each business activity. A sample of the excel sheet can be found in Appendix B1. The interchangeable use of current and future perspectives and the lack of generalisable domains only allowed for a cross-case analysis to a limited extent. Therefore, we only analysed business activities with generalisable domains and shared perspectives. The domains that could be generalised are: strategy, control and support. The cross-case analysis can be found in Appendix B2.

3.4.2 Conclusion of cross-case analysis

We concluded that activities that could be generalised across organisations, were often classified as a common business activity (77.2% of all cases). This means that the specificity of the activity is low and that the focus of the business activity is on cost-efficiency. In the following section, we highlight a number of business activities that stood out from the rest during the analysis of the project documentation.

3.5 Highlighted business activities

While analysing project documentation, we noticed salient classifications. We used the expert interviews to ask project consultants about the classification. The additional information provided by the consultants is presented in this section. In Table 4, the highlighted business activity of case 3 can

be found. Table 5 presents two business activities that were salient in case 4. The business activity that stood out in case 5 can be found in Table 6. Finally, Table 7 explains the activity we highlighted in case 6.

Case 3

Table 4: Highlighted business activity case 3

Activity name	"Product ontwerp" (translation: product development)
Classification	**Value-add**
Rationale for classification in documentation	Generic core activity, focuses on creating value and achieving excellence. Effectivity is key, so the performance of the activity is based on best practices
Explanation of the expert	Product development is in this case focused on the service offerings, providing external parties with the correct data. The organisation tries to keep their services modern, optimized and efficient. Therefore, they need to continuously adapt these services to the newest developments in the exchange of data. This activity is not focused at developing new products, but on the optimalization of existing services.

Case 4

Table 5: Highlighted business activities case 4

Activity name	- **Strategie Ontwikkelen** (translation: strategy development) - **Verbetermanagement** (translation: improvement management)
Classification	- **Strategie ontwikkelen: Value-add** - Verbetermanagement**: Value-add**
Rationale for classification in documentation	- Strategie ontwikkelen: The development of a strategy, in case of housing corporations often involve collaborations with municipalities and other housing corporations. - Verbetermanagement: improvements are focused on creating value for the customer.
Explanation of the expert	- Strategie ontwikkelen: This company focuses on optimizing the clients' situation, while defining a strategy. Later in the interview, we decide that this classification is incorrect because the strategy is value-adding for the customer in this case, not the activity in itself. This indicates a classification based on results instead of on the way the activity is performed. - Verbetermanagement: the improvements made are valuable for customers. Again, we decide that this activity is classified based on its results, the improvements, instead of the activity itself. We conclude that the activity "verbetermanagement" is not valuable in itself for customers.

Case 5

Table 6: Highlighted business activity case 5

Activity name	Technical proposal engineering
Classification	**Distinct**
Rationale for classification in documentation	Organisation E is really good at transforming client needs into specific vessels that cannot be bought off the shelf. This activity supports commerce if a client requests a new vessel or modification.

Explanation of the expert	One example of technical proposal engineering is the construction of a port. In such projects, organisation E is looking specifically at: what materials do we need? What staff do we need? What certification is required? Sometimes, an entire vessel is built for such projects, adapted to customer requirements. These are not standard services, these projects are complex. In these projects, organisation E is customizing the entire projects to the client's needs, that is where they add value.

Case 6

Table 7: Highlighted business activities case 6

Activity name	- **Enterprise Architecture** - **Predictive maintenance**
Classification	- Enterprise architecture: Special - Predictive maintenance: Distinct
Rationale for classification in documentation	- Enterprise architecture: by definition specific for each organisation. - Predictive maintenance: because of a high level of innovation and complexity of big data analysis.

Explanation of the expert	- Enterprise architecture: You can only perform enterprise architecture if you are familiar with the company. You need knowledge about the company and you need to know how decisions are made. You cannot hire an external resource to perform Enterprise Architecture, you need knowledge about the company. You have to deal with the maturity of a company, where they are headed. You have to take all these things into account while performing the activity.
	    - In case 5, the explanation for classifying enterprise architecture as "special" classification is as follows: "not a value add activity, but specifically tailored to the organisation."
	    - In case 3, enterprise architecture is classified as common (green) because: based on best practices.
	- Predictive maintenance: Predictive maintenance is in this industry often a value-add (blue) activity, because the client has a lot of influence in the activity, it is not common yet. What makes it distinct: Organisation F has a lot of experiments outstanding in terms of IoT and data. They are really piloting the predictions. They are using sensors that measure how the systems work. In other industries, that is already common / normal, but not in this industry. Organisation F really wants to innovate and distinguish itself from competitors there.

3.5.1 Conclusion of highlighted business activities

We conclude multiple things from the activities highlighted in this section:

1. Innovative, distinctive activities (such as product development) are often classified as distinct (purple).
   a. One exception on this finding is found in case 4, in which product development is value-add (blue). According to the project consultant, this product development activity is not focused on innovation, but on optimizing services according to market standard technologies to satisfy customer needs.
   b. In case 6, predictive maintenance is classified as valuable because of the customer influence in the business activity. It is classified specific because of the immaturity of the business activity in this industry, which makes the activity innovative and still distinctive in this industry.

c. In case 5, technical proposal engineering is distinct (purple) because of the combination between customer adaptation and the complexity of the activity.

2. From the highlighted activities in case 4, we conclude that activities are sometimes classified while assessing the result (output) of the activity. In this case, we saw that the strategy in "strategie ontwikkelen" and the improvements in "verbetermanagement" are classified as valuable.

3. From the special (orange) classification of enterprise architecture in case 6, together with the opposed common (green) classification of enterprise architecture in case 3, we conclude that it is not always clear when to classify activities as specific. Case 6 argues that Enterprise architecture is specific for each company. Opposed to case 3, which argues that enterprise architecture is based on best practices and not specific.

3.6 Other general findings

We identified two general conclusions we consider relevant to mention in the case study report:

1. **Less distinct and value-add activities in case 3:** In Case 3, we see fewer distinct (purple) and value-add (blue) activities than in other cases. Only 30.7% of the primary business activities are classified as value-add (blue) or distinct (purple). The expert in our case study interview explains that this is a governmental institution which is not focusing on profitability or competition. This context changes the interpretation of cost-efficiency and value (I3). In other cases, the number of value-add (blue) and distinct (purple) primary business activities is higher (Case 1: 63.0% and case 7: 60.6%).

2. **No distinct activities in case 4:** Case 4 does not contain any distinct (purple) activities. According to our expert, the client argued that they are not in competition with other housing corporations. This means that they do not want to differentiate from the rest of the market (I4).

From these findings, we conclude that organisations that operate in less profit-focused, competitive environments have fewer value-add (blue) and distinct (purple) activities. From case 4, we conclude that organisations that do not have the goal to differentiate, have fewer distinct (purple) activities.

In summary, we identified multiple situational factors from which we derived several conclusions. We found that innovative, distinctive activities are often classified as distinct (purple). However, we identified one exception to this statement. In case 4, product development is classified as value-add (blue), due to the lack of focus on innovation. The activity focuses on complying with market standard, not on developing new market standards. From this finding, we conclude that distinct (purple) activities are characterised by innovation. Second, in case 6, we found that the immaturity of a business activity in a particular industry influences the specificity of the business activity. If a particular business activity is not widely performed in an industry, it is often more specific due to its innovative and distinctive nature. Also, we saw less distinct (purple) and value-add (blue) activities in case 3, which indicates a less competitive market. Lastly, we concluded that there were no distinct (purple) activities in case 4. The project consultant explained that this organisation did not want to differentiate itself from other housing corporations. This leads to the conclusion that distinct activities are used to differentiate an organisation from the rest of the market.

We use this chapter as an answer to our first research question: *How are multimodality and the Business Activity Model currently used?* We provided a multiple-case study report to explain the concept of multimodality and the application of the Business Activity Model.

In the next chapter, we elaborate on the theoretical background of digital transformations, different perspectives on organisations and the theories behind the concepts in the Business Activity Model.

4. Literature analysis

4.1 Content of the literature analysis

This literature analysis elaborates on background information about the concepts considered relevant to this thesis. The aim of this literature analysis was to answer sub-question 2: *What is currently known in the literature about the concepts in the Business Activity Model?* We start by providing information about digital business transformations in section 4.2. We consider digital transformations as an application domain for multimodality and the Business Activity Model. We elaborate on bimodality, an existing approach used to support digital business transformations. The information about digital transformations and bimodality is used to answer sub-question 2a. In section 4.3, we present two different perspectives that can be used to analyse organisations: the activity-based view and the resource-based view. We first focus on the activity-based perspective, since multimodality takes an activity-based perspective. We also elaborate on the resource-based view as alternative perspective. We explain what an these perspectives entail and highlight the benefits and critiques we identified. Additionally, we add information about outsourcing. The concept of outsourcing is considered relevant because the development of the Business Activity Model was influenced by the increasing trend of sourcing of business activities (Tadelis, 2007). We used the information on different perspectives and their theories on sources of competitive advantages to answer sub-question 2b and 2c. Section 4.4 elaborates on the theoretical background of the horizontal axis of the Business Activity Model. It describes the theory behind the axis, focusing on value and cost. Moreover, we explain why value is a complex concept according to the literature. Sub-question 2d is answered by the literature on the strategic orientation of business activities. In section 4.5, we summarise the most important findings of the literature analysis.

4.2 Digital transformation

Digital transformation has emerged as an important topic in Information Systems research (Vial, 2019). Digital transformation emphasises the changes in society and industry through the use of technology. Bharadwaj et al. (2013) argue that it is time to rethink the role of IT in organisations. IT and business should not work alongside each other, they should be fused into each other. Their separate strategies, the IT and business strategies, should be integrated into one digital business strategy (Bharadwaj et al., 2013; Ismail et al., 2017; Vial, 2019). The digital business strategy should be considered as the future state of the company, while the transformation embodies the journey (Vial, 2019).

Ismail et al. (2017) argue that digital transformations are required because the world is developing into a global economy. This globalisation is characterised by dynamism, customization and intense competition. A digital transformation should involve the entire organisation, impacting three areas (Ismail et al., 2017):

1. Externally: It focuses on digitally enhancing the customer experience.
2. Internally: It impacts the operations of the organisation, decision-making and organisational structure.
3. Holistically: While all business segments and functions are impacted, it often leads to a completely new business model.

There exist multiple reasons for an organisation to digitally transform (Ismail et al., 2017). Internally, the focus of the business environment has been on cost savings, operational efficiency and making effective use of information. Through digital transformation, organisations are able to gain efficiency growth and productivity improvements. Externally, organisations should focus on offering new digital products. The external environment of organisations is characterised by fast-changing industries and market volatility. Client expectations, competitive rivalries and emerging technologies have to be taken into account in these dynamic environments. The speed of technological development demands organisations to quickly respond and assemble their digital resources. The digital world causes expectations of customers to change. Customers expect firms to react to their demands, and even

anticipate their future needs before identifying the needs themselves (Ismail et al., 2017). In this global economy, the customer is central and the organisation need to find ways to optimize customer experiences and satisfy customer needs. Enhanced customer experience and new digital offerings lead to greater customer satisfaction (Ross et al., 2019).

To digitally transform an organisation with success, it is important to establish a clear and common vision across the entire organisation. All stakeholders must be involved and informed about the future direction to ensure the transformation's success (Ismail et al., 2017).

Technological decisions have to be made. An organisation should decide what role particular technology should fulfil. Technology can provide an enabling role, creating new business opportunities, or a supportive role, fulfilling current business requirements. Closely related to this question is how the company approaches new technology and its exploitation. Firms often fall into one of two broad categories. The first category adopts widely used technology solutions from the market. The second category of organisations become market leaders by developing and introducing new technology solutions (Ismail et al., 2017).

4.2.1 Bimodality

To support digital transformations, the advisory firm Gartner introduced the concept of bimodality. Bimodality advises IT to operate at two different speeds (Horlach et al., 2016). The first IT mode focuses on traditional IT, working in long cycles at a lower speed with large core systems which are hardly ever changed or modified. The mode is focused on stability, safety and accuracy. Often, mode 1 is used to ensure operational excellence. Mode 2 acts as the fast IT mode and consists of a customer-facing and business-oriented IT organisation that reacts rapidly to customer needs. Mode 2 focuses on agility, exploration and speed. It acts like a start-up within the organisation to follow short term market trends, focusing on fast innovation and value creation. The two different modes of working require different governance, processes and organizational structures (Horlach et al., 2016). In another research, Horlach et al. (2017) explain that mode 1 involves mission-critical systems that are always running. On the other side, mode 2 uses new types of technology such as cloud-based environments and microservices. Mode 2 technology often consists of non-critical systems with low risk and low costs.

4.3 Different perspectives on organisations

4.3.1 An activity-based perspective

Bimodality has a strong focus on an IT perspective, while multimodality takes an activity-based perspective. An activity-based perspective looks at organisations as a collection of discrete, but interrelated activities (Ensign, 2001; Johnson et al., 2003). People that carry out the activities to deliver the product or service are actors. They are expected to have abilities in the form of knowledge, time and other resources to perform the activity (Axelsson & Wynstra, 2002). We adopt the definition of an activity used by Anderson MacGyver in their whitepaper about organizing data and technology (Sprokholt & Wijers, 2017): "A business activity is something an actor (human, system, machine) does by using resources (capacity, capital, expertise, data) in order to achieve a certain result (product, service, profit, information)". Porter also takes an activity-based perspective in his value chain (Ensign, 2001). Porter's value chain emphasises the importance of primary and supporting activities that together produce a product or service. The value chain is a conceptual framework that depicts all activities needed to produce a service or product. Taking an activity-based perspective towards an organisation helps in (Ensign, 2001):

1. Understanding which activities create competitive advantage.
2. Identifying the impact of each activity on the cost behaviour and differentiation of a company.
3. Formulating competitive strategies.
4. Identifying linkages and interrelationships between the activities..

Johnson and Melon (2003) also propose to use an activity-based perspective on strategy, focusing on day-to-day activities of a company. Their argument for using an activity-based perspective focuses on the growing hyper-competition in industries. This hyper-competition requires fast and innovative responses. An activity-based perspective empowers managers close to the activity to respond to the changing market (Johnson et al., 2003).

4.3.1.1 Outsourcing of business activities

Taking an activity-based perspective is beneficial in outsourcing strategies. It allows to determine which activities are core activities to an organisation and which activities share interdependencies with these core activities. It is a current trend that organisations increasingly collaborate, forming a value chain or ecosystem with other organisations (Tadelis, 2007). A value chain emphasises interrelationships between activities within a firm, but more increasingly, these interrelationships exist between firms. (Axelsson & Wynstra, 2002; Ensign, 2001).

One form of collaboration between organisations is the outsourcing of activities; the transfer of a business activity to an external contractor. Multiple reasons for outsourcing exist, but two primary reasons often mentioned are cost savings and the ability to focus on core activities. (Tadelis, 2007). Firms increasingly outsource activities, that were previously performed internally, due to specialisation (Axelsson & Wynstra, 2002). According to Axelsson and Wynstra (2002), a company should focus on the question: What are the specific skills, knowledge, abilities and processes we use to meet the needs of our customers to create competitive advantage? This is also in line with Juga (1999), who argues that due to the transparency of prices and growing emphasis on niche markets, organisations have to focus on specialisation of their business activities.

Due to close collaboration between firms, organisational boundaries become less clear and organisations become mutual dependent. The organisations 'grow into' each other through this close collaboration and resource dependency (Axelsson & Wynstra, 2002). Bharadwaj et al. (2013) also acknowledge these close collaborations and interdependencies by stating that firms increasingly operate in ecosystems that are intertwined. Organisations can no longer be seen independently of the ecosystem, alliances, partnerships and competitors.

According to Tadelis (2007), the decision to outsource a particular business activity depends on the complexity of the function and the need to adapt the function over time. Characteristics of the activity and the interdependencies between activities should be taken into account while choosing activities to outsource. Each company has activities that are core to their operations. Those core activities should remain core and are not suitable candidates for outsourcing. Activities that are tightly linked to these core activities often share synergies and will also not be candidates for outsourcing. The loss of control over these activities makes outsourcing strategically dangerous (Tadelis, 2007).

4.3.2 A resource-based perspective on organisations

An alternative perspective on the activity-based perspective, is the resource-based view (RBV). According to Barney, the introducer of the RBV, the RBV should be used to explain a firm's sources of competitive advantage (Kraaijenbrink et al., 2010). The RBV emphasises the importance of internal resources of an organisation. Specifically, the RBV argues that valuable, rare, inimitable and non-substitutable (VRIN) resources are the source of a firms' competitive advantage. There is a lot of critique on the RBV. First, the RBV assumes a relatively fixed market. In unpredictable environments, in which new technologies or markets arise, the value of resources can change, requiring to go beyond the RBV to explain competitive advantage. Moreover, resources are often intangible (Kraaijenbrink et al., 2010), hard to measure (Kraaijenbrink et al., 2010), and they are not effective until they are deployed in activities (Kraaijenbrink et al., 2010; Sheehan & Foss, 2017).

4.3.3 Combining the activity-based and RBV

Multiple researchers combine the activity-based perspective and RBV. O'Regan and Ghobadian (2004) mention a capability-based view. They cite several researchers as they define capabilities as: "A firm's

capacity to deploy its assets, tangible or intangible, to perform a task of activity to improve performance" (O'Regan & Ghobadian, 2004, p. 294). O'Regan and Ghobadian (2004) state that competitive advantage only results from capabilities that are distinctive, costly and time-consuming to build and replicate. Moreover, they mention that resources alone are not a sustainable source of competitive advantage. Skills and resources and the way that they are exploited must constantly change, leading to a continuous but temporary competitive advantage. They highlight the importance of continuous innovation and the ability to meet the current, future and potential needs of customers.

Sheehan and Foss (2017) emphasise Porter's activity-based perspective by arguing that competitive advantage is created in the core activities of an organisation. They state that organisations can outperform competitors by:

1. Performing different activities than competitors (Porter, 1996; Sheehan & Foss, 2017).
2. Performing similar activities in different ways (Porter, 1996; Sheehan & Foss, 2017).
3. Using strong interdependency between activities that result in causal ambiguity. This interdependency between activities can be created within or across firms. These complex interdependencies between activities make it hard for competitors to imitate and can result in competitive advantages (Ensign, 2001; Sheehan & Foss, 2017).

They add the RBV by stating that resources are deployed in activities. However, they state that activities and resources are duals of each other. Moreover, resources do not always need to be VRIN to be combined into distinctive activities. Ordinary resources can be combined into differentiating activities as well. Also, VRIN resources are not effective unless they are effectively deployed in activities (Sheehan & Foss, 2017).

Sheehan and Foss (2017) use Porter's activity drivers to explain how an organisation can outperform competitors while performing similar activities. Activity drivers can be manipulated by an organisation to differentiate their activities. Activity drivers are choices that an organisation makes to impact the context of an activity. Porter's activity drivers and their explanation can be found in Table 8.

Table 8: Porter's activity drivers adopted from Sheehan and Foss (2017, p.45-46)

Activity driver	Definition
Scale of an activity	The size of an activity, relative to other activities within the firm, rival's activities and to the size of the market. Scale refers to the ability of the firm to perform an activity at lower unit costs at higher levels of volume (driver: cost).
Accumulated learning in an activity	Amount of times the firm performed the activity relative to competitors. As this number increases, a firm can become more efficient in completing the activity (driver: cost), it also improves process quality, which in turn allows more differentiation (driver: differentiation).
Pattern of capacity utilization for an activity	Activity's capacity relative to total capacity of the firm. If a firm's activity has a high ratio of fixed to variable costs, it is important to keep the activity usage at high-level to reduce the activity's unit cost (driver: cost).
Linkages between activities	The relationship between activities. One activity's costs may impact another activity. E.g. Poor quality input may lead to more defects in manufacturing and therefore increase costs (driver: cost)
Interrelationships between business units sharing activities	Coordination of activities between units may decrease costs. E.g. company-wide purchases may reduce input costs due to higher purchasing power (driver: cost).
Integration of activities across firms	Whether the activity is performed inside the firm or outsourced to third parties. Costs can be reduced by outsourcing non-core activities (driver: cost). On the other hand, integrating activities that are outsourced by rivals may increase uniqueness (driver: differentiation).
Timing of an activity's configuration	When activities/resources were initially bought and/or configured. Longer branding time for early entrants or lower purchase prices for early buyers (driver: cost).
Location of an activity	Physical location of the activity, relative to other firm activities, its competitor's activities and customer and supplier activities. E.g. manufacturing in areas with lower labor costs or close to customers (driver: cost). Key location of a retailer or restaurant may influence level of differentiation perceived by customer (driver: differentiation)
Institutional factors impacting an activity	Regulations can involve higher costs, whereas subsidies may decrease costs (driver: cost)
Policy choices independent of other factors	Strategic choices may increase cost or differentiation, e.g. different product features or level of R&D spending (driver: differentiation)

Gaya and Struwig (2016) also combine the two perspectives by proposing an activity-based resource view (ABRV). They take the concept of activity drivers and combine it with the RBV by arguing that

organisations require resources to generate value for customers through organisational activities. Aligned with Sheehan and Foss, they argue that the actual process of value creation involves activity drivers to create efficiency, quality and innovativeness and effectiveness of the response to customers.

4.4   Strategic orientation in business activities

The horizontal axis in the Business Activity Model distinguishes between the concepts cost and value. In the Business Activity Model, this is called: the strategic focus of the business activity. According to Anderson MacGyver's whitepaper (Sprokholt & Wijers, 2017), the horizontal axis is based on Porter's value chain, in which Porter uses his generic strategies. Porter (1997) looks at the strategic orientation of an organisation by introducing three strategies:

1. Cost leadership
2. Differentiation
3. Focus

Cost leadership uses efficient-scale facilities, cost reduction from experience, tight cost and overhead control to design activities cost-efficiently. This strategy can result in profitability due to large scales of production, despite small(er) margins. The second strategy, differentiation, focuses on differentiating the product or service that the firm offers from its competitors. Differentiation aims to create a product or service that is perceived as unique. According to Porter, customers are less sensitive to price if a product is differentiating, allowing for bigger margins. The third strategy proposed by Porter is the focus strategy. In this strategy, the organisation focuses on a particular buyer group or segment of a product line. The focus strategy aims to serve one particular target group effectively or efficiently (Porter, 1997).

Porter argues that to deploy these strategies, an organisation has two choices: cost leadership or differentiation (Ensign, 2001). This is in line with Anderson MacGyver's white paper, which argues that an organisation has two options: value creation through differentiation or cost optimization through standardization.

However, value is a multifaceted and complicated concept (Ravald & Grönroos, 1996). Value can be created in more than one way. Ravald and Grönroos (1996) emphasise that one of these ways is reducing the customer's perceived sacrifice. Perceived value is defined as the ratio between perceived sacrifice and perceived benefits for the customer. This implies that reducing cost can also be perceived as value-adding. Value is subjective and might vary among different customers. Ravald and Grönroos (1996) cite Wikström and by stating that value-creation occurs in two different dimensions: cost-efficiency and market-efficiency. Cost efficiency includes increasing the efficiency of the organisation by exploiting resources. Market efficiency, on the other hand, means developing offerings for customers that inject high value to customer's perception (Wikström & Normann, 1994). They also cite Morrow (1992), who also emphasises that attention to cost efficiency is just as important as trying to differentiate in the perception of the customer. Concluding, value creation can be found in differentiation, in creating offerings that customers value. However, it can also be found in cost-efficiency, in increasing the efficiency of the organisation to reduce perceived sacrifice.

4.5 Conclusion

In the preceding literature analysis, we learned that it is increasingly important for organisations to think about digital transformation to prepare for the digital era. A widely known approach to digital transformation is the concept of bimodality, introduced by advisory firm Gartner. Bimodality highlights that different modes of IT exist in terms of speed and agility. These different modes need to be governed differently. We use this information as answer to the first sub-question (2a): *What is currently known in the literature about digital transformations and approaches to guide this transformation?*

Also, we learned that different perspectives exist to look at an organisation. One of these perspectives is the activity-based perspective, which can be used to look at an organisation as a collection of activities. This activity-based perspective on organisations has several benefits:

1. It can help in understanding sources of competitive advantage.
2. It can identify the impact of each activity on cost behaviour and differentiation.
3. It can help in formulating competitive strategies.
4. It can identify linkages and relationships between activities.

Also, we stressed the increasing importance of specialisation, which means an organisation has to focus on its core activities. To be able to focus on its core activities , an organisation can decide to outsource non-core activities. An organisation needs to make decisions about what activities create their competitive advantage and which other non-core activities can be outsourced to suppliers. An activity-based view supports the identification of these core activities that should be kept in-house, and non-core activities that can be outsourced. As alternative to the activity-based view, we identified the RBV. The RBV argues that valuable, rare, inimitable and non-substitutable resources should be used to explain a firm's source of competitive advantage. Critics argue that the RBV only works in stable, fixed markets. Moreover, resources are often intangible, hard to measure and they are not considered valuable until they are deployed in activities. The information about the

Figure 8: Different sources of competitive advantage in the two different perspectives on organisations

activity-based view, outsourcing and the RBV, are used as answer to sub-question 2b and 2c: *What is currently known in the literature about different perspectives to look at organisations? & What is currently known in the literature about sources of a firms' competitive advantage?* We provided a short summary of the answer to these questions in Figure 8, which explains which two perspectives we identified and what their theories about sources of competitive advantage are. We answer sub-question 4d by exploring the theory behind the horizontal axis: *What is currently known in the literature about the strategic orientation of business activities?* We learned that Porter's strategies on cost leadership and differentiation are used on the horizontal axis. Specifically, value creation through differentiation and cost optimization through standardization (Sprokholt & Wijers, 2017). However, we saw that value can be created in both differentiation and cost-efficiency. Moreover, we learned that the concept of value is multifaceted and complex. Value is a subjective concept, which is perceived differently by each individual.
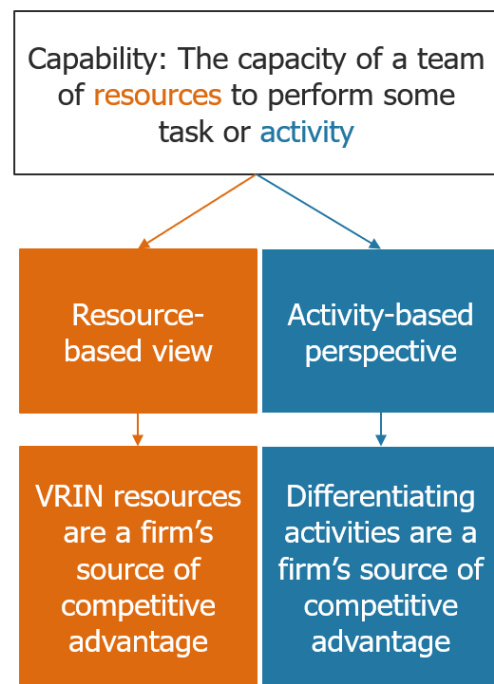
The next chapter presents the results of the expert interviews conducted in this research.

5. Results - Expert interviews

This chapter presents the results of our expert interviews. Throughout this chapter, we use codes for interview and case study results. These code look as follows: (CS..) for case studies and (I..) for interviews. Sources for these codes can be found in Appendix C1.

5.1 Expert interviews overview

We conducted two rounds of interviews. An overview of the participants and interview codes can be found in Appendix C1. More information about the different interviews and their objectives can be found in Appendix C2. The interview protocols can be found in Appendix C3 and C4.

The main goal of the interviews was to explore the concept of multimodality and create a more detailed view of the axes used in the Business Activity Model. First, we elaborate on the purpose of multimodality. We used the results of this section as input for our concept definition. Second, we present how the experts explain the intention of the vertical axis in section 5.3. Then, we elaborate on the intention of the horizontal axis in section 5.4. We used the results from sections 5.3 and 5.4 as input for the redesign of the Business Activity Model. Finally, we present the problems mentioned by the experts concerning the Business Activity Model.

5.2 Purpose of using multimodality and the Business Activity Model

From our interviews, we identified the two main purposes for using multimodality.

- **Multimodality as a conversational tool:** Our experts explained that multimodality is a good means to conversate about the strategic focus of a business activity (I8; I10; I12). It helps to identify what activities are differentiating the organisation (I8; I10), but also similarities between activities can be identified (I10). Multimodality is used to create a common understanding among stakeholders and a common starting point at the beginning of a project (I8; I10; I13).
- **Multimodality to support organisational and technological design:** Multimodality can be used for the design of organisational aspects. This includes the design of teams, domains, departments, business units, way of working (I8; I9; I10; I11; I12; I13). However, it can also be used to make decisions regarding technology and data in the design of technological support (I8; I9; I10; I11; I12; I13).

A full list of characteristics of multimodality that we used for our concept definition, can be found in Appendix G. We used these two main purposes, together with the full list of characteristics as input for the concept definition of multimodality.

5.3 Intention of the vertical axis of the Business Activity Model

We identified the intention of the vertical axis to use as input for our redesign. We asked all experts to explain what *specificity* entails. A summary of the intention of the vertical axis can be found in Figure 9. The text in the top of the model represents the intention of highly specific activities. The text in the bottom of the model represents the intention of low specific activities.

Figure 9: Intention of the vertical axis formulated from interviews

During our interviews, the experts gave multiple explanations for specificity. A full list of different explanations can be found in Appendix C5. The different explanations indicate that there is no clear definition of specificity. We identified one explanation that is mentioned by all experts: The activity is distinguishing the organisation from its competitors. The precise explanation given by each expert regarding this statement can be found in Table C 3, in Appendix C5. Therefore, we conclude that the most important intention of the vertical axis is that at the top of the model, the activity is differentiating the company from the rest of the industry. At the bottom of the model, activities that are performed similarly among organisations are classified.

5.4   Intention of the horizontal axis of the Business Activity Model

For the same reason as for the vertical axis, we identified the intention of the horizontal axis. We asked all experts what the intention of the horizontal axis is. A summary of their answers can be found in Figure 10. The text at the left side of the model represents business activities that are classified as cost-efficient. The rights side of the model represents the business activities that are classified as valuable. A more elaborate version of this table can be found in Figure C 1, in Appendix C6.

Figure 10: Intention of the horizontal axis formulated from interviews

We summarise the intention of the horizontal axis as follows:

The left side of the model contains internally focused, cost-efficient activities. These activities are mainly stable and predictable. The activities are performed in a more stable, less competitive environment. The right side of the model contains customer-focused, externally oriented activities. These activities are focused on value creation and require flexibility and speed to respond to environmental changes. The activities are performed in a dynamic environment.

5.5   Practical problems in the Business Activity Model

In this section, we present problems in the Business Activity Model, which are mentioned during the interviews. These problems were used as input for our problem identification for the redesign of the Business Activity Model.

5.5.1   Vertical axis

Definition specificity unclear

The unclarity in the definition of specificity was mentioned by multiple interviewees (I2; I3; I11). According to one of them (I3), there is often discussion in projects about when an activity is specific. This also becomes evident in the explanations the interviewees gave when they were asked what specificity is. The full list of different explanations used to explain specificity can be found in Appendix Table C 2, in Appendix C.

Scope of specificity unclear

It is unclear what the scope of the comparison is. In determining specificity, the business activities are compared against other organisations. But the scope of comparison is not determined. This causes confusion among consultants and their clients (I11; I13).

5.5.2   Horizontal axis

Value is a complex concept

The interpretation of value deviates among individuals, according to one of the participants (I2). Another interviewee stated that customer value is hard to define because in most cases, customer value also comes with a cost for the customer (I8). This was also acknowledged by other interviewees (I10; I13), who highlighted the fact that it is unclear what value is and to whom the activity should be valuable.

Activities can be both cost-efficient and valuable

Two interviewees explicitly mentioned that they consider all activities to be valuable (I6; I13). We paraphrase one of them: If your activity is not value-adding, you should not perform it. All activities are value-adding (I6). Another participant mentioned that organisations with a cost strategy are difficult to classify in the model (I10).

The concept of value contains judgement, which results in a tendency to classify activities as valuable

The horizontal axis in the model contains judgement (I8; I13). One of our interviewees stated that cost-efficiency is interpreted as: what I do is not valuable (I8). This results in a tendency, or preference, to colour activities as value-adding (blue) or distinct (purple). This reduces the objectivity in the classification of business activities.

Classification is sometimes done based on the results of the activity instead of the performance of the activity

As we already saw in case studies, sometimes the output of an activity is classified as valuable, while the activity itself is not directly adding value to the customer. An example of such a situation is the classification of strategy as valuable. When we discussed this with one of our interviewees (I4), he mentioned that developing strategy is not valuable for the customer. The strategy, as output of the

activity, can be considered valuable. Another interviewee also highlighted that this is a problem (I5), but that the activity and its output are sometimes hard to distinguish.

A modality represents the strategic focus of the activity, the horizontal axis is also called strategic focus
Multiple interviewees mentioned that each modality represents a strategic focus for the business activity (I8; I10; I11). The current title of the horizontal axis is: strategic focus. This causes confusion according to one of the participants (I13).

5.6   General findings from interviews
We identified a few general findings that we consider relevant to mention:
1. Multiple interviewees (I1; I2; I11), mentioned that without a clear understanding of the business activity, the classification of the activity is not possible. One of our interviewees mentioned that the basis of the analysis lies in understanding the activity at focus. If you understand the activity, then the classification is not difficult (I1).
2. Two of our interviewees mentioned that organisations operating in niche markets, often perform more specific activities (I4; I11).
3. One of the interviewees stated that the classification should be based on a desired to-be situation. You can assess what the as-is situation is by looking at how technology and teams are currently organised. This can help you identify the gap between a current and desired situation. However, since the modality represents the strategic focus of the activity, the analysis should be focused on the preferred to-be situation (I13). The classification should be approached as a decision, not as an assessment (I2; I4; I6; I9; I13). Multiple interviewees emphasised that in the to-be classification, there are no rights or wrongs. It should be a collaborative decision between stakeholders. In practice, classifications deviate among stakeholders initially. The model helps to combine all these different perspectives, to determine one future perspective for the strategic focus (I1).
4. The Business Activity Model should be seen as a conversational tool to talk about strategy (I8; I10). It should be used to collaboratively determine the future strategic focus of each business activity. It structures the thought of the clients and it manages the discussion about strategy (I10). It brings together multiple perspectives, by involving multiple stakeholders to collaboratively determine a focus for the business activity (I10).
5. Multiple stakeholders are required to determine the strategic focus of the business activities (I9; I11). Using only one stakeholder's perspective, or one class of stakeholders, makes it hard(er) to classify the activity. When only one stakeholder or group of stakeholder is involved, you will get biased results (I9).

We use the results of this chapter as input to answer our third sub-question: *How can the Business Activity Model be redesigned?* We used the results for both the problem identification step and the design and development step of the design science cycle. Moreover, we used the results of this chapter to answer the sub-question 4a: *What are the characteristics of multimodality?* As explained above, a full list of identified characteristics as result of the interviews can be found in Appendix G.

In the next chapter, we propose a redesign for the Business Activity Model.

6. Results - Redesign of the Business Activity Model

This chapter presents our redesign of the Business Activity Model. It presents the results following the 5 steps in the design science cycle of Peffers et al. (2007), as proposed in Chapter 2. Throughout this chapter, we use codes for interview and case study results. These code look as follows: (CS..) for case studies and (I..) for interviews. Sources for these codes can be found in Appendix C1.

To redesign the Business Activity Model, we followed the method proposed by Peffers et al. (2007), consisting of 5 steps:
1. Problem identification
2. Objectives for a solution
3. Design and development
4. Demonstration and evaluation
5. Communication

6.1 Step 1: Problem identification

6.1.1 Practical problem identification

As presented in the previous section, we identified 2 practical problems during our interviews in the vertical axis of the Business Activity Model:
1. The definition of the concept of specificity is unclear. AMG uses many different forms of specificity. The current definition of specificity does not provide enough guidance on how to determine specificity in an organization (I2; I3; I11).
2. It is unclear to which other organizations specificity has to be compared with (I11; I13).

For the horizontal axis, we identified 5 practical problems:
1. Value is a complex concept that is hard to define and to explain to customers (I2; I8; I10; I13)
2. Activities can be both cost-efficient and valuable (I6; I10; I13).
3. The concept of value contains judgement which reduces objectivity in the classification (I8)(I13).
4. Classification of business activities is often done based on the result of the activity instead of on the way the activity is performed (I4; I5; CS2; CS4).
5. There is confusion about the title of the horizontal axis. A modality represents the strategic focus of an organization, while the horizontal axis is called strategic focus (I13).

6.1.2 Theoretical problem identification

We formulated the following problem to explain the theoretical issues in the vertical axis:
From our interviews and case study, we conclude that the RBV and the activity-based perspective are used interchangeably in projects. Both specificity in resources and specificity in activities are used as a unit of analysis during the multimodal analysis. Using resources as a unit of analysis results in several problems. As suggested by Kraaijenbrink (2010), valuable, rare, inimitable and non-substitutable resources are neither necessary nor sufficient for competitive advantage. Similarly, Sheehan and Foss (2017) argue that no resource is useful until they are effectively deployed in the context of an activity. Moreover, resources are often intangible and hard to measure (Kraaijenbrink et al., 2010).

Also, we found theoretical issues for the concepts on the horizontal axis: The theory on the horizontal axis is built upon Porter's generic strategies. "*Porter based his Value Chain Model on business domains and activities. From a strategic perspective, an organisation has two basic options: value creation through differentiation or cost optimization through standardization.*" (Sprokholt & Wijers, 2017, p. 6). As we concluded in our interviews in the previous section, the intention of the vertical axis is to identify what activities differentiate an organisation from its competitors. From these findings, we conclude that both axes are partially based on Porter's generic strategies. Therefore, we conclude that the

theories behind the axes are overlapping. This can also be seen in Appendix D1, where we present documentation in which the metrics for the axes are overlapping.

6.2 Step 2: Objectives for a solution

For our redesign, we aimed to define concepts for both axes that take into account the practical and theoretical problems identified. An important objective we added for the design is that we do not want to change the intention of the model. Therefore, we formulated the following objectives for a solution:

- The concepts should meet the intention of the axis.
- The concepts should contain a clear definition of the concept.
- The axis should be based on theoretical concepts.
- The concepts should take into account practical and theoretical problems identified in the problem identification.

6.3 Step 3: Design for a solution

6.3.1 Vertical axis

We start by defining the vertical axis. After we proposed a solution for the vertical axis, we continue with the horizontal axis. We used three sources of input to design our solution: the expert interviews, the case study, and the literature analysis.

Input from expert interviews

As we presented in the results of the interviews, we found one explanation of specificity that is given by all experts: The activity is differentiating the organisation from its competitors.

Input from case study

From our case study report, we recall that case 4 did not contain any purple (distinct) activities. According to our expert (I4), the organisation did not want to differentiate itself from the rest of the market. We also recall that product development and other innovative activities are often distinct (purple). In our case study report, we concluded that distinct activities often have a complex, innovative and distinctive character. Also, from our cross-case analysis, we noticed that activities that are performed by all organisations (strategy, control and supporting activities) are often generic in nature. Generic business activities are performed similarly across organisations. One example of such generic activity is administration. These generic activities do not dinstinguish an organisation from the rest of the industry. In other words, these activities do not create a competitive advantage for the organisation.

Input from literature analysis

In the literature analysis in Chapter 4, we identified two different perspectives that explain a firms' sources of competitive advantage. First, we identified the activity-based view, introduced by Porter (Ensign, 2001; Porter, 1996; Sheehan & Foss, 2017). Porter argues that differentiating activities are the source of competitive advantage in organisations. He emphasises that to achieve competitive advantage, an organisation must perform different activities than rivals, or an organisation must perform comparable activities in different ways (Porter, 1996). Ensign (2001) and Sheehan & Foss (2017) add to this that an organisation can also differentiate by creating a strong interdependency between activities, resulting in causal ambiguity. This causal ambiguity makes it hard for competitors to imitate activities, creating a differentiating chain of activities within or across organisations. On the other hand, we learned about the RBV. The RBV focuses on identifying internal resources to achieve competitive advantage. However, VRIN resources are not necessary nor sufficient for competitive advantage (Kraaijenbrink et al., 2010; Sheehan & Foss, 2017). Sheehan and Foss (2017) argue that no resource is useful until they are effectively deployed in distinct activities. Moreover, resources are often intangible and hard to measure (Kraaijenbrink et al., 2010). Sheehan and Foss (2017)

acknowledge that both resources and activities are used to create competitive advantage, but they adopt activities as units of analysis to explain how firms can outperform competitors.

From the insights presented above, we conclude that the top side of the model represents the activities that differentiate an organisation from its competitors. In these activities, systems are customised to support the activities as defined by the company. On the other hand, the bottom of the model is used to classify activities that are performed similarly across an industry. This means that the activities performed at the bottom will not distinct an organisation from its peers. In these standard business activities, an organisation is willing to adopt the processes defined as market standard. Based on this conclusion, we propose to use the following concept on the vertical axis: differentiation. In the remaining of this section, we present our definition of differentiation. Also, we provide a scope of comparison, two different reasons for differentiation, and sources of specificity that should be taken into account while designing business activities.

Definition of differentiation
We define a business activity as differentiating when:
- An organisation performs different activities as competitors (Porter, 1996; Sheehan & Foss, 2017).
- An organisation performs similar activities in different ways (Porter, 1996; Sheehan & Foss, 2017).
- An organisation performs an interdependent chain of activities, within or across firms. This results in a differentiating chain of activities (Ensign, 2001; Sheehan & Foss, 2017). This interdependent chain causes causal ambiguity that makes it difficult to imitate the chain.

We adopted this definition of differentiation because we agree with Sheehan and Foss (2017) that activities and resources are duals from each other. We emphasise that resources are required to perform activities, but decided not to adopt resources as a unit of analysis because:
- Multimodality is used to classify activities, taking activities as unit of analysis.
- Resources are often intangible and hard to measure (Kraaijenbrink et al., 2010; Sheehan & Foss, 2017).
- Resources are not effective until they are deployed in activities (Sheehan & Foss, 2017).

This definition of differentiation was also used by our experts in the interviews. They stated that an organisation can differentiate by performing different activities than competitors (I1; I3), performing activities in different ways than competitors (I2; I5; I6; I8; I13) and differentiation can also be a result from co-production and co-development with other activities or organisations (I3).

Scope of comparison for differentiating activities
To solve the practical problem mentioned in the expert interviews: It is unclear to which other organizations specificity has to be compared with (I11; I13), we defined a scope of comparison. We formulated this scope based on our expert interviews. The defined scope of comparison can be found in Figure 11. We defined this scope of comparison to clarify to whom an organisation should compare its activities, to determine if activities are differentiating. Currently, there exist no guidelines for this comparison. Users of the model do not know the scope of comparison when determining if an activity is differentiating. By applying this scope of comparison, an organisation can determine to whom they should be compared.

> **Industry scope**
> Differentiating business activities are assessed by comparing the activities with the rest of the industry, within the scope in which the organization operates. (I1, I2, I3, I4, I5, I6, I8, I13)
>
> **Size scope**
> Differentiating business activities are assessed by comparing the activities with activities of organizations of comparable size (I13)
>
> **Geographical scope**
> An organization operating in one country, should be analyzed by comparing their activities with organizations operating in the same country. When an international organization is analyzed, the competitors who also operate internationally should be taken into account (I13)

Figure 11: Scope of comparison

For technical design solutions, we advise looking beyond the borders of the industry, as suggested by Ismail et al. (2017). They suggest to examine solutions from other industries to potentially share the benefits of new technologies. This is also mentioned by a participant of our interviews, who stated that a company should look beyond the borders of their own industry to find technological solutions for their activities (I6).

Reasons for differentiation

From our case study and interviews, we identified two different motivations for an organisation to differentiate:

- **Choice:** In competitive markets, organisations try to find ways to differentiate from competitors. This form of differentiation is often not sustainable (Kraaijenbrink et al., 2010) and will (if proved successful) be copied by others. To differentiate by choice, we see that organisations are constantly searching for ways to differentiate and innovate their activities to sustain their competitive advantage. After a while, these activities are copied by others and they will become market standard. Therefore, purple activities often have an innovative character, because they should keep innovating to stay differentiating.
- **Necessity:** On the other hand, we identified differentiation out of necessity. We identified that this form of differentiation is often found in niche markets. One example is case 3 in our case study report. The governmental institution in case 3 operates in a less competitive market compared to our other cases. In case 3, we see that they perform more differentiating business activities because no one else performs these activities. This is also supported by the expert who elaborated on this high percentage of specific activities: "The organisation is appointed by the government to perform these tasks. They are the only ones who perform these activities. They are forced to customise technology to support these activities". Because of their special position, on behalf of the government, the organisation in case 3 is the only one operating in this market. The organisation in case 3 performs these activities in a differentiating way not because they want to, but because they have to. We call this differentiation by necessity. These organisations are often monopolists or operate in niche markets, which makes their differentiation more stable. A potential downside to this monopoly position or niche market is that there are no market standards defined for the activities they perform. Subsequently, there is no market for standard technological solutions. This results in a higher amount of specificity in business activities and a higher amount of customised technological support (I3). This finding is also supported by case 4. This organisation argued that they do not want to differentiate from its peers. However, they do have specific activities classified as special. This indicates that although they do not want to differentiate, some activities are differentiating by necessity (CS4).

The main difference between these two reasons for differentiation is that differentiation by choice is often stimulated by the organisation. While in differentiation by necessity, the organisation wants to reduce the specificity in the activity. This is also mentioned by our interviewees who stated that in some cases an organisation wants to increase the differentiation. While, in other cases, specificity has emerged over time, and a company tries to find ways to reduce this specificity (I1).

We identified and explained these reasons because they require a different design approach. Differentiation by necessity is often undesired. Organisations want to reduce the differentiation in these activities. On the other hand, differentiation by choice is often motivated by stakeholders in the organisation, because it creates competitive advantage.

Sources of specificity in differentiating activities
Differentiating activities often require sources of specificity to enable an organisation to differentiate. Porter calls this activity drivers, factors in an activity that can be manipulated to create differentiation (Sheehan & Foss, 2017). We call these factors: sources of specificity. In differentiation by choice, these sources are important to increase differentiation. For example, you might need firm-specific knowledge to perform a differentiating activity. In differentiation by necessity, these sources are relevant to be able to reduce the specificity. By identifying the source of the specificity, it is easier to determine why the specificity is there and how it should be taken into account while designing organisational or technological solutions.

In our literature analysis, we cited Sprokholt & Wijers (2017) by defining a business activity as: "A business activity is something an actor (human, system, machine) does by using resources (capacity, capital, expertise, data) in order to achieve a certain result (product, service, profit, information)".

We agree with Sheehan and Foss (2017) that an organisation requires resources to perform differentiating activities. As they propose, we also add Porter's activity drivers, to explain other possible sources of specificity. Sheehan and Foss (2017) explain that an organisation can manipulate these drivers to differentiate their activities. This indicates that Porter's activity drivers are possible sources of specificity, which may result in differentiation when they are manipulated. We propose to take into account the following sources of specificity:
1. Tangible resources
2. Intangible resources
3. Laws and regulations
4. Location of the activity
5. Timing of the activity
6. Political factors

Explanation and examples of the sources of specificity can be found in Appendix D2. We included the sources of specificity as proposed by Sheehan and Foss (2017), but only if they are supported by experts in our interviews or if they are found in one of the cases in our case study. We emphasise that this is not a complete, exhaustive list of sources of specificity. To create a full list of sources of specificity, more in-depth research will be needed. We considered a full, exhaustive list of sources of specificity outside the scope of this research. As mentioned by one of the interviewees (I3), a list such as Porter's activity drivers can be used as support to detect where specificity comes from.

By presenting this list of sources of specificity, we conclude our design for the vertical axis. We continue by defining the horizontal axis.

6.3.2   Horizontal axis
We used three sources of input to design our solution: expert interviews, case study, and literature.

Input from expert interviews
As presented in the interview results, we concluded that the left side of the model comprises of: internally-focused, cost-efficient activities. The activities performed are mainly stable and predictable.

The activities are performed in a more stable, less competitive environment. On the other hand, the right side of the model contains customer-focused, externally oriented activities. These activities are focused on value creation and require flexibility and speed to respond to environmental changes and demands.

Input from case study
The most notable insight we used from our case study report to support this intention is the general finding from case 3. The governmental institution in case 3, operates in a less competitive and more stable environment. They classified only 30% of the activities as value-add (blue) or distinct (purple). From this finding, together with the intention as formulated in Figure 10, we conclude that organisations in a less competitive, more stable environment have less value-adding or distinct primary activities.

Input from literature analysis
From our literature analysis in Chapter 4, we recall that digital transformations require strategic responses from an organisation (Bharadwaj et al., 2013). Internally, the focus has been on operational efficiency, cost savings and making effective use of information. Externally, an organisation should focus on offering digital products and meeting customer demands. This external orientation is characterised by an agile response to fast-changing industries and market volatility. Client expectations and competitive rivalries have to be taken into account in these dynamic environments (Ismail et al., 2017). More over, we recall that the horizontal axis is currently build upon Porter's generic strategies. This overlaps with the theory used for the vertical axis, while both axis use the differentiation of business activities in their concepts. The vertical axis focuses on differentiating business activities that distinguish an organisation from its competitors, while the horizontal axis focuses on value creation through differentiation. More over, we conclude that the concept of value is subjective, multifaceted and complicated (Ravald & Grönroos, 1996).

We conclude that value, speed, competition, flexibility, dynamism and uncertainty are important concepts on the right side of the model. On the other hand, stability, predictability and efficiency are important concepts on the left side of the model. We conducted an extra literature review on these concepts, which can be found in Appendix E1. Based on the findings in this extended literature review and the intention formulated for the horizontal axis, we propose the following concept for the horizontal axis: Dynamism of the business activity.

Definition of dynamism
Dynamic markets or business environments are characterised by a high level of uncertainty (Cingöz & Akdoğan, 2013). Cingöz & Akdoğan (2013) define environmental dynamism as: *"the rate and the unpredictability of changes in a firm's external environment"*(Cingöz & Akdoğan, 2013). Firms must create flexibility to create sustainable competitive advantage (Cingöz & Akdoğan, 2013). Organisations should find ways to optimize customer needs and experiences by constantly enhancing their value propositions (Ross et al., 2019; Warner & Wäger, 2019). Teece et al. (2016), call this constant optimization a part of a firm's dynamic capabilities. These dynamic capabilities enable the firm to build and reconfigure activities to address environmental dynamism. On the other hand, these dynamic capabilities are costly and involve sacrificing efficiency. In stable markets, it might be more profitable to optimize efficiency at the expense of flexibility (D. Teece et al., 2016).

This leads us to conclude that an organisation can choose to be able to respond to environmental dynamism by allowing flexibility into a business activity. If an activity does not have a highly dynamic environment, it allows an organisation to organise the activity more stable. By proposing the concept of dynamism on the horizontal axis, we emphasise this trade-off between stability and flexibility in business activities (D. Teece et al., 2016). Teece et al. (2016), use the term dynamic capabilities to explain these activities. According to them, highly dynamic capabilities: *"define the firm's capacity to*

innovate, adapt to change and create change that is favorable to customers and unfavorable to competitors" (D. Teece et al., 2016, p. 18).

Business activities that are classified at the left side of the model are less dynamic. These activities allow stable processes that are used to perform business activities efficiently and effectively. The future of the activity is predictable and controllable by the organisation. The response to the environment of the activity is limited. This theory was also substantiated by our expert interviews. For example, one participant mentioned that (I13) activities at the left side of the model are more stable, an organisation can autonomously design their activities here. Business activities at the right side of the model are highly dynamic. They are characterised by environmental dynamism, which in turn, requires flexibility in the activity. This allows the organisation to adapt to changes in the environment. The uncertainty of the environment makes the future of the activity unpredictable. By designing these activity in such way that they are flexible, allows the organisation to change the activity more frequently in response to their dynamic, uncertain environment. This was also acknowledged by the participants in our expert interviews. For example, one expert (I3) mentioned that as the environment becomes more dynamic, an organisation should be able to rapidly configure their offerings to customer demands. Another participant (I6) stated that in these activities, an organisation requires flexibility because customer demands are changing constantly. The activities at the right side of the model are less predictable (I10).

Labels in the Business Activity Model
We propose to remove the labels of the Business Activity Model, to further reduce judgement. We noticed that consultants never mention these labels because they contain judgement (I8)(I13). Moreover, consultants mentioned that talking about colours makes people more comfortable (I10). One of our experts even mentioned that one of the main benefits of using colours is that it seems to simplify the discussion (I8). Therefore, we propose to change the labels into the colour of the modality.

6.3.3   Conclusion design for a solution

Based on literature, interviews and our case studies, we conclude that the current axes used in the Business Activity Model result in multiple practical and theoretical problems. We defined the intention of the model and proposed the following concepts to use on the axes of the Business Activity Model:
- **Vertical axis:** Differentiation
- **Horizontal axis:** Dynamism

Vertical axis
At the top of the model, differentiating activities are classified. These activities can be differentiated in three ways: (1) different activities, (2) similar activities performed differently, (3) part of a differentiating chain of activities. These activities are compared to other organisations in industry, size and geographical scope. An organisation can differentiate because they (1) choose to differentiate, or because (2) they have to (necessity). Identifying the source of

Figure 12: Redesign of the Business Activity Model

specificity can be helpful in the design of the business activity. At the bottom of the model, non-differentiating activities are classified. These activities do not distinguish an organisation from the rest of their industry and are performed similarly among organisations.
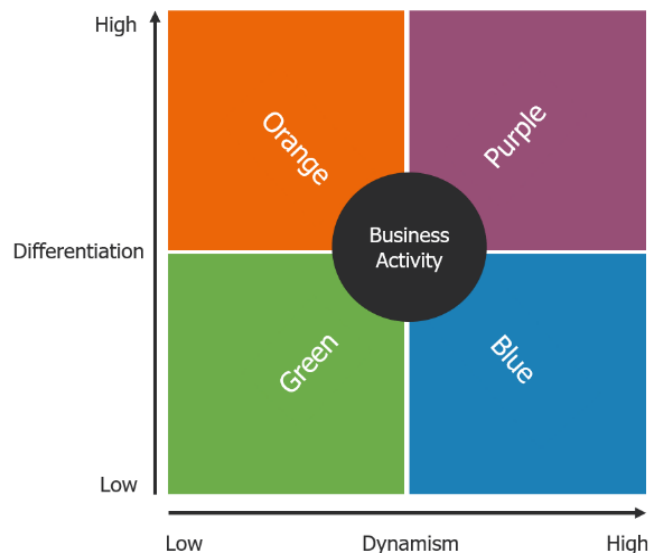
Horizontal axis

At the left side of the model, stable and predictable activities are classified. These activities are less dynamic and do not require frequent changes in response to the environmental dynamism. At the right side of the model, flexible and unpredictable activities are classified. These activities are dynamic and are designed flexible allowing for adaptation in response to changes in the environment.

The redesign of the Business Activity Model can be seen in Figure 12. This section and the subsequent redesign, is used to answer the third sub-question: *How can the Business Activity Model be redesigned?* In the rest of this thesis, we refer to the redesign as BAM 2.0.

In the next section, we discuss the demonstration and evaluation of BAM 2.0.

6.4   Step 4: Demonstration and evaluation

Step 4 of the design science cycle entails the demonstration and evaluation of our redesign. In this section, we present the results from this demonstration and evaluation by presenting our validation results. To assess the redesign, we created two different workshops with two target groups:
- Anderson MacGyver consultants (daily users of the Business Activity Model)
- Practitioners in the field of Digital Transformations and Enterprise Architecture

6.4.1   Workshop 1: Results of validation questionnaire

Demonstration and evaluation with Anderson MacGyver consultants

We conducted a demonstration and evaluation workshop with experts from Anderson MacGyver, who are daily users of the model. In the workshop, we presented the problems identified during this research and our proposal for a redesign. Five artificial business activities were formulated to demonstrate the use of the model. With the help of a questionnaire, we measured the operationality, ease of use, effectiveness and fidelity with real-world phenomenon of the model.

Results of the classification of the business activities in the workshop

During our workshop, the consultants were asked to classify the artificial business activities. The business activities that were formulated for the demonstration and the results of the classification can be found in Appendix F1.

Questionnaire results

The questionnaire was answered by 24 participants. We inverted the scores of the negative formulated statements. The results of the questionnaire statements can be found in Figure 13. An average was calculated to get an indication of the overall scores. A 5-point Likert scale was used in the questionnaire. The scores from 1 to 5 have the following meaning:

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree
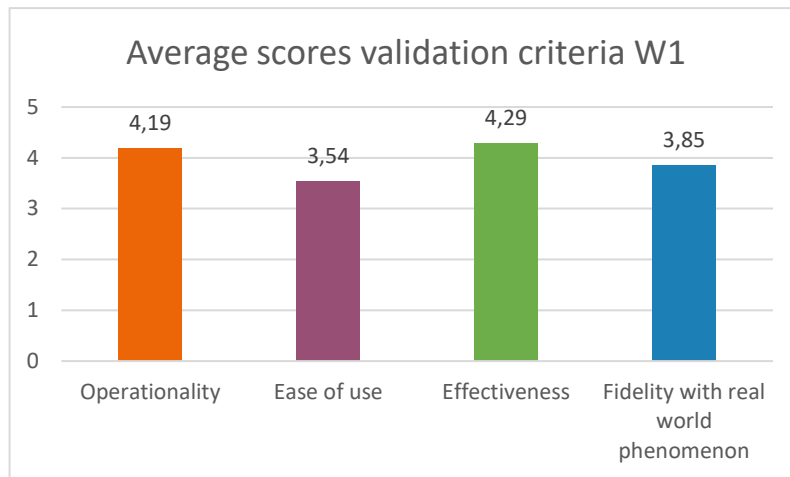
Figure 13: Questionnaire results for each validation criteria workshop 1

Operationality

An average score of 4,19 was given by the 24 participants of the survey on operationality. Overall, the participants think that the BAM 2.0 can be used in practice. Multiple participants state that before it can be applied in practice, they need more elaboration and training on the concepts. One of the participants states: "I will need training and more elaboration on the specifics of the axis, especially truly understanding and being able to use the questions related to the axes". Another participant elaborates on the subjectivity: "It feels much more value free."

Ease of use

The ease of use of the BAM 2.0 has been scored with a 3,54 by the participants. A few participants state that the model seems easy to use, but the actual application is difficult. One of the participants elaborates more on this topic: "The model itself is very easy to use. Actually applying the model as an instrument to achieve awareness, unified view, compelling story for change, starting point for technology & data organisation design etc is the expertise of the AMG advisor, which is not always easy". Another participant highlights that the conversation around the classification is most important. Some participants were less positive about the ease of use. One of the participants stated that the model is not too complex to use in practice, but the concepts are too ambiguous for now and need more elaboration.

Effectiveness

The average score on effectiveness is 4,29. Participants are overall positive about the support the model provides to guide the organisational and technological design of the organisation. One of the participants states: "The horizontal axis really helps in defining the way of working (project vs. agile)".

Fidelity with real-world phenomenon

We asked the participants to score fidelity with real-world phenomenon. The statements were focusing on the question if all business activities can be classified into the BAM 2.0. The participants score this criterion with a 3,85 on the 5-point Likert scale. Many participants emphasised that they have to test this statement before being able to answer it. One of the participants stated: "We have to test this one, but the foundation didn't change in my opinion. We can change wordings to get a better understanding and always explain the rationale behind the modality of an activity."

Demonstration and evaluation with practitioners in the field of Digital Transformation and Enterprise Architecture

We conducted four workshops with practitioners working in the domain of digital transformations and enterprise architecture. In these workshops, we explained how the Business Activity Model is currently used in practice. Then, we presented our problem identification and the redesign of the Business Activity Model. With the help of a questionnaire, we measured the effectiveness, ease of use, usefulness and understandability of the redesign.

Questionnaire results

All items of the questionnaire were answered by all four participants. We inverted the scores of the negative formulated statements. We present the results of the questionnaire in Figure 14. Because the scores were deviating among the four participants, we decided to present their scores separately.
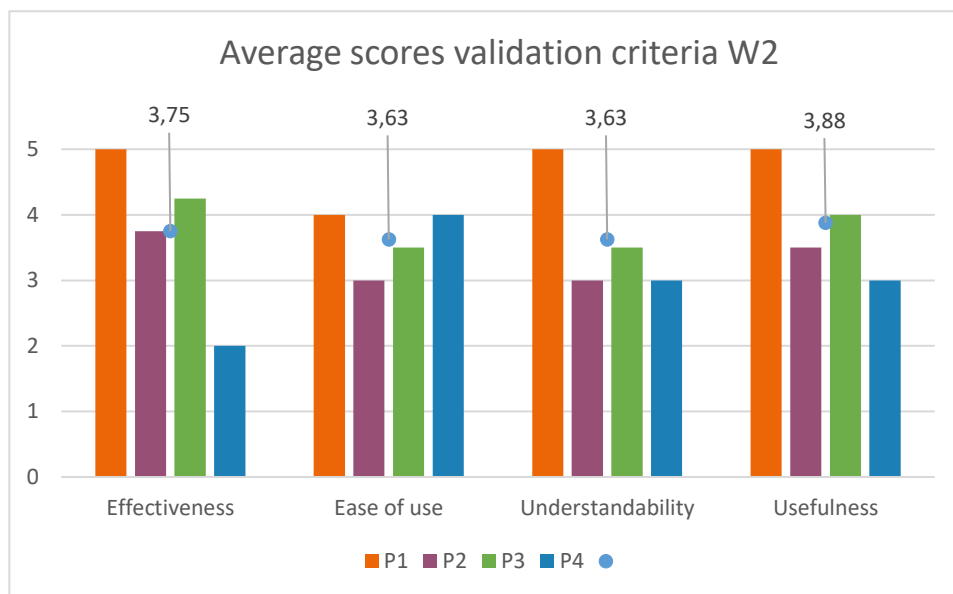
Figure 14: Questionnaire results for each validation criteria workshop 2

Effectiveness

An average score of 3,75 was given on the effectiveness of the BAM 2.0. One of the participants mentions that the model is a good tool to conversate with organisations to support them in decision making. Participant 4 mentions that the model is not yet ready to effectively support the conversation between stakeholders. It needs more detailed instruction on how the model can be used to facilitate decision making.

Ease of use

The ease of use of the model is scored with an average of 3,63. According to one of the participants, you have to know how to handle the BAM 2.0, in order to successfully use it. The participant discourages using the BAM 2.0 without knowing the background and nuances. Moreover, one of the participants states that the redesign is not too complex, but that it is recommended to first classify the business activities along the two axes, before plotting them into one of the quadrants.

Understandability

The participants state that they understand why the BAM 2.0 is used and why these concepts are used on the axis. One of them mentions that the axes are better defined in the redesign. Participant 4 is

more critical about the understandability. The participant mentions that he is not sure that the input cases are completely validated. The overall understandability received an average score of 3,63.

Usefulness
Overall, the experts are convinced that the BAM 2.0 is useful, they grade usefulness with an average score of: 3,88. Two of the participants emphasise that the model is useful being a conversational tool between stakeholders to allow collaborative decision making.

Conclusion of demonstration and validation workshops
Based on the first workshop, we conclude that the concepts need more clarification before the redesign can be used in practice. For the BAM 2.0 to be easily applied, the consultants need some more background and metrics, but the redesign speaks to them.
Based on the second workshop, we conclude that experts that are not familiar with the model, react mainly positive on the BAM 2.0. They understand the concepts that are used in the model and they think it is useful to support decision making in the organisation. One of the participants (P4) is not sure of the functioning of the model.

6.5   Step 5: Communication
As explained in chapter 2, we use this thesis as means of communication to complete the final step of the design science cycle.

We continue with presenting our concept definition for multimodality in the next chapter.

7. Results – Definition of the concept multimodality

This chapter presents the definition of the concept of multimodality, which we formulated by following the method of Podsakoff et al. (2016). We created a full list of characteristics, organised by themes. Together with experts, we determined which characteristics were necessary for the long and short definition. The short definition we formulated can be seen in Figure 15. Additionally, due to the immature nature of the concept, we formulated a long definition, which is found in Figure 16.

We present a full list of characteristics and the selection of which characteristics were necessary to define the concept in Appendix G1. This list provides an answer to the sub-questions 4a and 4b: '*What are the characteristics of multimodality?*' and '*What identified characteristics of multimodality are necessary to define the concept?*'

The first part of the short definition of multimodality answers sub-question 4c: *How can the intention of the concept be defined?* We defined the intention as follows: "*Business activities can be classified according to two dimensions (differentiation and dynamism) which result in a business activity type, a modality.*"

We answer sub-question 4d by describing the two main purposes of multimodality: "*These modalities allow stakeholders in the organisation to collaboratively determine the strategic focus of a business activity. The characteristics of the modality can be used to guide the organisational and technological design of the business activity.*"

The definition as presented in Figure 15 and Figure 16 answers sub-question 4: *How can multimodality be defined?*

Short definition

> **Multimodality:** *Business activities can be classified according to two dimensions (differentiation and dynamism) which result in a business activity type, a modality. These modalities allow stakeholders in the organisation to collaboratively determine the strategic focus of a business activity. The characteristics of the modality can be used to guide the organisational and technological design of the business activity.*

Figure 15: Short definition of multimodality

Long definition

Multimodality emphasises that different business activities require different organisational and technological design solutions, which should be taken into account when organising business activities. Multimodality uses two dimensions (differentiation and dynamism) to classify business activities, which result in one of four business activity types, modalities. Each modality has different characteristics and different requirements to support the business activities. The modality guides the design of organisational and technological aspects such as defining business units, ways of working, teams, and technological solutions.

Multimodality is used as a conversational tool to manage the discussion between stakeholders in an organisation. It allows stakeholders from different domains to collaboratively determine the strategic focus of each business activity. This focus determines how business activities are best organised to support the business strategy. Multimodality simplifies the discussion by using colours for the modalities.
Multimodality helps organisations identify what activities distinguishes them from other organisations.

Multimodality is used in the context of transformations. Transformations require a change of the business activities within the organisation. Multimodality is used in the design phase of projects, to identify the gap between current and desired states of activities, with focus on the design of technology and data.

Figure 16: Long definition of multimodality

8. Discussion

8.1 Reflection on the results of the research

8.1.1 Reflection on the redesign of the Business Activity Model

During the demonstration and evaluation of the BAM 2.0, we noticed that the classification of the business activities strongly deviates between participants. The classification of business activities is dependent on how the modeller perceives the activity and how the modeller believes it should be approached. Although the redesigned axes are mutually exclusive and contain no judgement, the differences in perception and knowledge of the modeller results in that cannot be reproduced. This is in line with the results from our interviews. In our interviews, multiple participants state that the Business Activity Model should be used to align these different perspectives among stakeholders into one future perspective. Therefore, we believe that the goal of the model should be to guide the discussion to align these different perspectives. Stakeholders in the organisation should use the model to collaboratively make decisions about the strategic focus of the business activity. For successful use of the model, we believe that it is crucial to involve different stakeholders of the organisation and have a clear understanding of the business activities in focus. The BAM 2.0 can be used to create one unified perspective for a future direction of the business activity. Only when the stakeholders agree on the future focus, the modality can be used to guide the design of organisational and technological aspects. We noticed that in some projects, consultants classify the business activities, after which they are validated by the client. We would advise to classify the activities together with stakeholders, while the purpose of the model is to align their perspectives.

Presently, current and future perspectives are used interchangeably and unconsciously. We advise Anderson MacGyver to use the model to determine a future strategic focus. We identified opportunities on how to use the model to assess the current perspective, which we present in the future work section below.

From our validation, we learned that some consultants struggle with the new concepts in the BAM 2.0. They stated that they need more explanation and training to be able to apply the redesign in practice. The redesign ensures that the model has defined concepts with a solid theoretical foundation. To be able to apply it in practice, we acknowledge that the concepts need to be operationalised to further extent.

8.1.2 Reflection on the concept definition of multimodality

The definition we created on the concept of multimodality explains the most important characteristics of the concept. We created the concept before we redesigned the Business Activity Model, which means that the concept had to be adapted to the redesign. This adaptation is not iteratively reflected upon by experts. We believe that this has no severe implications for the definition since we made sure that the intention of the model stayed the same. We formulated the definitions in such way, that they can be generalised across organisations and domains. Therefore, we mentioned stakeholders in general as possible users of the model. We emphasise that within the scope of digital transformations, these stakeholders often operate in business and technology domains. In this scope, alignment is often required between stakeholders from business- and technology-domains. However, we acknowledge that the model should be used to align perspectives of all stakeholders, not limited to business and IT. Also, we defined that multimodality is used in the context of transformations. Multimodality is currently used in the context of digital transformations. However, in our definition, we emphasised that it can be used for transformations in general.

8.2 Implications

8.2.1 Practical implications

Organisations are in need of frameworks to support their digital transformation. These organisations can use multimodality and the BAM 2.0 as support for their (digital) transformation. It can help them understand business activities can have different characteristics, even within one organisation. These different characteristics require different approaches in terms of organisational and technological aspects. We call this a multimodal perspective.

The BAM 2.0 is a tool to support communication about the focus of business activities. This helps them to collaboratively determine what the strategic focus of the activity should be. The BAM 2.0 can be used to structure the conversation between different stakeholders to make more collaborative decisions about the focus of the activity and subsequent design of the business activity. For the consultants of AMG, the redesigned Business Activity Model contains theoretical concepts that are defined in more detail. The subjectivity in the model is reduced by replacing subjective concepts with more measurable, objective concepts. The judgement in the model is reduced and replaced with concepts which are more substantiated in theory. The BAM 2.0 is more aligned with the topic of digital transformation, in which agility and flexibility are important topics.

8.2.2 Scientific implications

The concept of digital transformation is extensively described in literature. In this research, we used multiple of their insights and combine them into a practical model to support the digital transformation of organisations. As mentioned by Ismail et al. (2017), organisations need practical frameworks to support the transformation.

By proposing *differentiation* as a concept for the vertical axis, we aligned the model with traditional literature about strategy (Ensign, 2001; Porter, 1996, 1997; Sheehan & Foss, 2017). The BAM 2.0 uses an activity-based view as introduced by Porter. Using activities as a unit of analysis is considered more useful than resources, as proposed in the RBV. Resources are often intangible and hard to measure and they only become valuable when successfully deployed in activities (Sheehan & Foss, 2017).

By proposing *dynamism* as a concept for the horizontal axis, we align the BAM 2.0 with contemporary literature about digital transformation (Bharadwaj et al., 2013; Ismail et al., 2017; Ross et al., 2019; D. J. Teece, 2020; Warner & Wäger, 2019). Dynamism is mentioned in the majority of papers about digital business strategies and digital transformations. Ismail et al. (2017) write about the new global economy as it is characterised by dynamism and competition. Warner & Wäger (2019) stress that we are now in a situation where customers constantly change and that these changes are totally unpredictable. Teece (2016) emphasises that firms should constantly scan the environment for unexpected trends that disrupt the company. However, he also mentions that these transformations come at a cost and he emphasises that change is not always necessary. A firm should consider this as a trade-off between flexibility and stability. We use the concept of dynamism to introduce this trade-off in the redesign of the Business Activity Model.

The two concepts in the BAM 2.0 combine traditional theories on strategy, i.e. the activity-based view and differentiation of business activities, with more current and emerging topics in digital transformation, dynamism, uncertainty and the trade-off between stability and flexibility.

8.3 Limitations

8.3.1 Construct validity

Construct validity assesses if the instrument measures what is intended to be measured. One of the threats to construct validity can be found in the expert interviews. We noticed that interviewees had opposing opinions about the concepts and that the concepts were explained differently. This made it

hard to determine what should be measured by the model. We minimized this threat by defining the intention of the Business Activity Model over the course of 13 interviews. When definitions or explanations were only given by one interviewee, we did not consider them as important as intentions that were mentioned by multiple experts. To mitigate this threat further, we used multiple sources, i.e. case studies and literature to substantiate the intention of the model.

8.3.2 Internal validity

Internal validity refers to the causal relationship on which conclusions are based, whereby certain conditions are believed to lead to other conditions. The threat to internal validity we could not mitigate applies to expert interviews. Some sources of specificity were only mentioned in expert interviews, not identified in our case study. The experts emphasised that these sources were important in designing the organisations. Therefore, we decided to include these sources. However, the lack of multiple input sources can be considered a threat. We did not see these sources of specificity (location and timing) in our case study, but our experts clearly stated that these sources are relevant. Sheehan and Foss (2017) also mention that these factors can be manipulated to differentiate business activities. Since we aimed to create an indicative list of sources of specificity, we decided to add them. We consider this list as non-exhaustive and more in-depth research should be conducted to identify and create an exhaustive list on ways to differentiate activities.

8.3.3 External validity

We consider the threat to external validity of our case studies successfully mitigated by using organisations from six different industries. Our case studies showed that that the model can be used across industries. The external validity in the interviews could not be fully mitigated because all of our expert interviews were conducted with experts within one organisation. Because multimodality is developed within this organisation, the only knowledge about the concepts is built within the organisation. Therefore, we could not mitigate this threat by using experts from other disciplines or organisations. We did partially mitigate it by validating the model with experts outside of Anderson MacGyver.

8.3.4 Reliability

Reliability refers to the repeatability of the research, explaining the extent to which the research is dependent on the researcher. We aimed to mitigate this threat by using established methods and protocols and discuss in detail what was done to get to these results. We carefully documented the phases of the research to increase repeatability.

One threat that remained with regard to reliability can be found in the interviews. The interviews were conducted in Dutch and the researcher transcribed them in Dutch, after which the interviews were translated to English. This was done carefully, but there is a risk that answers are slightly altered because of translation mistakes. We do not believe that this has impacted the results of this research, but it is considered a reliability risk.

To reduce researcher bias, we used multiple sources of input in each phase of the project. We asked several experts in both design phases to give feedback to improve the input and reliability. Reducing researcher bias was difficult because the daily supervisors in this project were the developers of the initial model. They had strong opinions about multimodality and the Business Activity Model. At times, it was hard to stay objective as a researcher, but we consider the reliability as sufficient because we always used multiple sources to substantiate statements.

We demonstrated the model to experts to increase demonstration reliability. However, the first focus group, consisting of AMG consultants are considered biased because they work with the model on a

daily basis. We could therefore not fully trust their validation and evaluation. To mitigate this threat, experts outside of Anderson MacGyver evaluated the BAM 2.0 as well.

8.4   Future research
We identified several new opportunities for future work during this research.

Comparison between practical frameworks that support digital transformations
It would be relevant to compare existing frameworks that have the goal to support digital transformations. The frameworks might benefit from each other's insights or supplement each other. For example, compare multimodality against bimodality and see what strengths and weaknesses of both frameworks are.

New frameworks
With this research, we introduced a practical support tool for digital transformations. However, the Business Activity Model only covers a small part of the digital transformation of companies. New frameworks that guide following steps of the digital transformation can be helpful to understand the phases of a digital transformation, for both science and practice.

How other frameworks relate to the Business Activity Model
Anderson MacGyver uses the Cameron and Quinn competing values culture framework in practice to design organisational aspects of a company. They aligned the Business Activity Model with the model of Cameron and Quinn. In this research, we proposed to change the axes of the current Business Activity Model. This means that the relation between the Business Activity Model for multimodality and the Cameron and Quinn model should be re-assessed.

A complete list of sources of specificity
We identified a list of sources of specificity from our case studies, literature and interviews. However, we believe that this list is indicative, not exhaustive. It would be relevant to create an exhaustive list of sources of specificity. This list would contain all factors that a company can use to differentiate their business activities from competitors. Differentiating these factors might influence the design of a business activity. It would be relevant to create an exhaustive list of these factors.

A method for determining the axes
In practice, we saw that users of the model use different methods to classify the activities. For example, some of them first ask to classify all purple (distinct) activities, while others start with all green (common) activities. It would be relevant to develop a structured method to classify the business activities into the Business Activity Model.

Operationalising and validating the model in practice
Further research into the application of the model should be conducted to validate the use of the BAM 2.0 in practice. We proposed new axes for the Business Activity Model, but the operationalisation of the concepts could be researched in more depth. In our demonstration and evaluation, we noticed that consultants were struggling with measuring the concept of dynamism. We proposed some concepts to operationalise the concept of dynamism, but more in-depth research into the measures is crucial to increase the applicability of the model.

Current perspective in the Business Activity Model
As mentioned above, the BAM 2.0 should be used to determine a future perspective of a business activity. One of the experts in our expert interviews mentioned that a gap between current and future perspectives can be determined by analysing the underlying working methods (organisational aspects) and technology (technological aspects) that are currently used in a business activity. This way, the

modality of the business activity can be used to indicate the desired future focus, and the current analysis can determine the current design. The gap between these perspectives represents the transformation that is desired. We would advise more in-depth research into the organisational and technological aspects that matches the quadrants in the Business Activity Model, to make this analysis more reliable.

In the next chapter, we present the conclusion of this research.

9. Conclusion

The importance of digital transformations as a topic for organisations nowadays has been extensively described in theory (Bharadwaj et al., 2013; Ismail et al., 2017). But there is a lack of practical frameworks that support strategic decisions regarding this digital transformation (Ismail et al., 2017). Anderson MacGyver developed a model, the Business Activity Model intending to support this digital transformation of organisations. They used this model in practice for several years now, with success. They use this model to take a multimodal perspective at organisations. This implies that four different types of business activities exist, that have different characteristics. These different characteristics have different requirements in their organisational and technological design. However, there were some practical problems in using the model. Therefore, the aim of this study was to redesign the Business Activity Model and define multimodality as a concept. To reach these two objectives, we formulated four sub-questions which we answer below.

S-Q 1.   How are multimodality and the Business Activity Model currently used?

We presented a multiple-case study report (Chapter 3) to explain how multimodality supports digital transformations. We explained what possible insights are that multimodality gives during projects and why multimodality was used. We identified multiple reasons why multimodality was used in the case study projects. In conclusion, multimodality is used to (1) align perspectives among stakeholders with regard to the strategic focus of the business activity. When this perspective is aligned, the modality can be used to (2) design organisational and (3) technological aspects of the business activity. We used two rounds of expert interviews to gather knowledge about multimodality and the Business Activity Model, to create an extensive overview of how multimodality and the Business Activity Model are currently used.

S-Q 2.   What is currently known in literature about the concepts in the Business Activity Model?

Our literature analysis (Chapter 4) showed that digital transformation is an important topic nowadays. It focuses on digital changes in society through the use of technology. We identified that it can impact organisations internally by allowing an organisation to gain efficiency and productivity. Externally, it allows an organisation to offer new IT/IS-based products. This external environment is characterised by fast-changing industries and market volatility. We also learned why organisations should take an activity-based perspective on organisations. An activity-based perspective allows an organisation to understand their sources of competitive advantage. Also, an activity-based perspective allows organisations to respond faster to their environment, which can be crucial in a hyper-competitive market. We saw that there are different theories about a firm's sources of competitive advantage. Lastly, we learned about Porter's generic strategies and that the concept value is considered complicated, multifaceted and that it is perceived differently by each individual.

S-Q 3.   How can the Business Activity Model be redesigned?

We formulated the intention of both axes of the Business Activity Model to identify what concepts should be considered in the redesign. For the vertical axis, the intention focused on activities that differentiate an organisation from other organisations in the industry. Therefore, we proposed to change the axis to differentiation. We described in what ways an organisation can differentiate itself from competitors. We acknowledged that there are different motivations to differentiate, by choice or by necessity. Also, we defined a scope for comparison. Finally, we used the sources of specificity that we identified in our multiple-case study, interviews and literature to explain that differentiation

can result in specificity of these sources. For the horizontal axis, we also formulated the intention to identify possible concepts that could be used on the axis. For the horizontal axis, the intention focuses on the trade-off between stable, predictable activities and flexible, unpredictable activities. Therefore, we proposed to use the concept of dynamism. This allows organisations to balance the trade-off between stability and flexibility. An organisation should decide to what extent the activity should be flexible and dynamic, in response to environmental dynamism. On the other hand, activities that deal with more stable environments can be organised more stable and predictable.

S-Q 4.   How can multimodality be defined?

To define multimodality as a concept, we used the input from our expert interviews and the findings from our case study report. We identified a list of characteristics and together with experts, we determined which characteristics were important to use in the definition. Because of the immature nature of the concept in this domain, we decided to add a long definition next to the short definition.

Main objectives
We combined the insights of the sub-questions to achieve our two main objectives:
1. Redesign the Business Activity Model
2. Define multimodality as a concept

Redesign the Business Activity Model
We redesigned the Business Activity Model by using two concepts that matched the intention of the model, while solving the practical and theoretical problems we identified. We used concepts that are extensively discussed in theory. Therefore, we proposed to use the following concepts in the model: Differentiation and dynamism. The BAM 2.0 can be found in Figure 17.
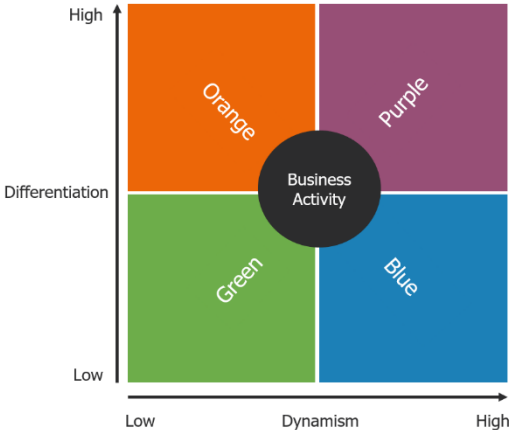
Figure 17: The redesigned Business Activity Model

Define multimodality as a concept
The concept definition of multimodality we formulated can be found in Figure 18.

> **Multimodality:** *Business activities can be classified according to two dimensions (differentiation and dynamism) which result in a business activity type, a modality. These modalities allow stakeholders in the organisation to collaboratively determine the strategic focus of a business activity. The characteristics of the modality can be used to guide the organisational and technological design of the business activity.*

Figure 18: Short definition of multimodality

This definition includes the intention of multimodality: classifying business activities according to two dimensions. Also, it explains the most important purposes of multimodality, namely (1) allowing business and IT to determine the strategic focus of business activities together and (2), supporting the organisational and technological design of business activities. For a more extensive definition of multimodality, we refer to our long definition in Chapter 7.

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Appendices

A. Research methods extended

1. Sample of systematic literature review approach

This appendix presents a sample of the excel sheet we used to structure our SLR. For each paper we identified, we gathered the following information:

- Title
- Author(s)
- A summary of the abstract
- Source where the paper was identified
- Keywords used to identify the paper or backward/forward snowballing method
- Theme of the paper

A preview of the excel sheet can be found in Figure A 1.

		Title	Author	Year	Summary of abstract	Source	Keywords used	Snowballing/search engine	Theme	Multimod
2	1	Bimodal IT: Busines	Bettina H	2016	Today, companies face	Google scholar	Bimodal digital G	Search engine	Bimodality	Value
3	2	Strategic alignment	J.C. hende	1993	It has evolved in the la	Google scholar		Backward snowballing from 1	Strategic alignment of b	Digital tra
4	3	Assessing business-	Jerry Lufti	2000	Strategic alignment fo	Google scholar		Backward snowballing from 1	Strategic alignment of b	Strategy
5	4	The transformative	Ingmar Ha	2017	Digital transformation	Google scholar	Bimodal digital G	Search engine	Bimodality	Activities
6	5	Digital business stra	Anandhi E	2013	We argue that the rim	Google scholar		Backward snowballing from 4	Digital transformation strategies	
7	6	Digital transformati	Christian	2015	The exploration of nev	Google scholar		Forward snowballing from 5	Digital transformation strategies	
8	7	Digital innovation s	Daniel Ny	2015	Recent research has ill	Google scholar		Forward snowballing from 5	Digital transformation strategies	
9	8	Understanding digit	Gregory V	2019	282 works are reviewe	Google scholar		Forward snowballing from 5	Digital transformation strategies	
10	9	Aligning with new d	Adrian Ye	2018	This paper conduct lon	Google scholar		Forward snowballing from 5	Aligning of digital strategies	
11	10	The role of the CIO	Ingmar Ha	2016	The CIO role often em	Google scholar		Forward snowballing from 6	the role of a CDO	
12	11	Stages in digital bus	Sabine Be	2016	Nine dimensions of th	Google scholar		Forward snowballing from 6	Maturity stages in digital transform	
13	12	Digital business tran	Mariam H	2017	Recent studies of succ	Google scholar		Forward snowballing from 6	Digital transformation strategies	
14	13	Building dynamic ca	Karl S.R. V	2019	We explore how incun	Google scholar		Forward snowballing from 6	build dynamic capabilities to trans	
15	14	Increasing the agilit	Bettina H	2017	In the age of digital bu	Google scholar		Forward snowballing from 6	Different types of bimodal IT	
16	15	Disentangling the fu	Sabine Be	2017	This paper identifies tl	Google scholar		Forward snowballing from 6	Activities in initial phase digital tra	
17	16	Transform to succee	Sarah E. S	2016	We examined what di	Google scholar		Forward snowballing from 7	Enhancing business activities throu	
18	17	The innovative orga	Steven Ta	2007	This paper explains wl	Google scholar	function of busin	Search engine	Outsourcing, why and how	
19	18	Technological innov	David J. T	2010	Dynamic capabilities a	Google scholar		Forward snowballing from 17	Value creation vs value capturing	
20	19	Deliver on the prom	Simon Mi	2016		Google scholar		Bimodality Gartner	Bimodality	
21	20	Business model des	Christoph	2010	We conceptualize a fir	Google scholar	specific versus ge	Search engine	Business activities perspective	
22	21	Using Porterian acti	Norman T	2017	This article argues that	Google scholar		Forward snowballing from 20	Porterian activity analysis	
23	22	Contextuality withir	Michael P	2008	This paper researches	Google scholar		Forward snowballing from 21	Alternative phrasing generic/speci	
24	23	Towards a dynamic	Michael E	1991	This is one of the fund	Google scholar		Forward snowballing from 21	cost efficient versus value creating	
25	24	Micro strategy and s	Gerry Joh	2003	While the field of strat	Google scholar	Activity based vie	Search engine	Activity based view to strategy	
26	25	Exploring corporate	Gerry Joh	2008	This is a book about co	Google scholar		Forward snowballing from 24	Different perspectives on organiza	
27	26	Is the resource-base	Jay B. Bari	2001	This paper argues that	Google scholar		Forward snowballing from 24	Questioning the word value	
28	27	Knowledge and valu	Bente R. L	2001	This paper distinguish	Google scholar		Forward snowballing from 26	Value creation for client vs value c	
29	28	Review: Informatio	Nigel Mel	2004	This paper distinguish	Google scholar		Forward snowballing from 26		
30	29	The resource-based	Jeroen Kr	2010	This paper is emphasiz	Google scholar		Forward snowballing from 26	Questioning the word value	
31	30	Customer Value cre	J. Brock Sr	2007	This paper explains wl	Google scholar		Forward snowballed from: Mea	Value creation for customer	
32	31	Examining the Firm'	Aron O'Ca	2011	This paper tosses the t	Google scholar		Forward snowballed from 30	Value creation for customer	
33	32	The value concept a	Annika Ra	1996	This paper emphasizes	Google scholar	cost efficient foc	Search engine	Cost efficiency is value for the cus	
34	33	Multimodality: a gu	Jeff Bezer	2018	This paper defines mu	Google scholar	multi modality de	Search engine	Multimodality term definition	
35	34	Challenges in desig	Kay O'hall	2010	This paper takes multi	Google scholar	multi modality de	Search engine	Multimodality term definition usir	
36	35	Transport through r	Manolis T	2019	I added this paper to e	Google scholar	Bimodal versus n	search engine	Multimodality vs bimodality in dif	
37	36	Strategic marketing	Gerald E.	1995	This paper suggests th	Google scholar	differentiators in	search engine	different differentiators	
38	37	Are you sure you ha	Donald C.	2005	This paper talks about	different differentiators that can be used in a strategy, both cost efficient ones and differentiating or				

Figure A 1: Sample of the SLR excel sheet

B. Results from multiple-case study extended

1. Example of excel sheet used for cross-case analysis in case study report

In Figure B 1, a sample of the excel sheet used for our cross-case analysis can be found. We used it to identify patterns in the project documentation. This turned out to be difficult because the majority of domains cannot be compared. Therefore, we used it to analyse overarching domains (strategy, control and support). Moreover, we used it to gather and structure all arguments used to classify business activities.

Activity	Rationale(s) for vertical axis		Rationale for horizontal axis			Modality	
Strategizing	Specific knowledge required		Internally focused	Aim for maximizing business value		Special	Strategy
Forecasting	Specific knowledge required		Internally focused	Aim for maximizing business value		Special	Strategy
Brand portfolio management	Specific skills required	Specific knowledge required	Internally focused	Aim for maximizing business value		Special	Strategy
Product/service portfolio management	Specific knowledge required		Internally focused	Aim for increasing profit	Aim for increasing market size	Special	Strategy
Program portfolio management	Commonly generic		Internally focused	Aim to maximize performance		Common	Strategy
Financial control	Commonly generic		Cost-focused	Making use of standards and procedures		Common	Control
Reporting	Generic	Non-distinctive	Cost-focused	Making use of standards and procedures		Common	Control
Auditing	Generic	Non-distinctive	Internally focused	Making use of standards and procedures		Common	Control
Compliance	Non-specific		Internally focused	Does not directly add value for customer		Common	Control
Legal	Dealing with specific copyrights and logos		Internally focused	Focus on cost optimization		Special	Control
Data, privacy and security	Specific expertise required		Internally focused	Does not directly add value for customer		Special	Control
Marketing B2C	Non-specific		Value-adding promise for customer	Result-oriented		Value-add	
Prospecting B2C	Non-distinctive	Best practice execution	Externally focused			Value-add	
Customer data management	Generic		Internally focused	Cost-focused		Common	
Campaign management B2C	Generic		Directly adds value for customer			Value-add	
Pricing B2C	Generic	Done by other companies as well	Directly adds value for customer			Value-add	
Sales B2C	Non-specific		Externally focused	Helping customer		Value-add	
Subscription management	Specific knowledge required		Internally focused	Focus on efficiency		Special	
Customer information	Non-specific		Directly adds value for customer			Value-add	
Customer services	Generic	Non-discriminant	Directly adds value for customer	Point of contact		Value-add	
Channel management	Generic	Done by other companies as well	Externally focused	Directly adds value for customer		Value-add	
Customer journey management	Specific customer knowledge required		Focus on value creation for customer			Distinct	
Community building and moderating	Non-specific		Directly adds value for customer			Value-add	
Organizing events	Generic		Cost-focused			Common	
Marketing B2B	Non-specific		Value-adding promise for customer	Result-oriented		Value-add	
Prospecting B2B	Non-distinctive	Best practice execution	Externally focused			Value-add	
Campaign management B2B	Generic	Done by other companies as well	Directly adds value for customer			Value-add	
Pricing B2B	Specific activity	Distinguishes from other companies	Directly adds value for customer			Distinct	
Quoting advertising	Specific activity	Distinguishes from other companies	Directly adds value for customer			Distinct	
Advertisement sales	Non-specific		Externally focused	Helping customer		Value-add	
Relationship management	Non-specific		Directly adds value for customer	Maintain customer relation		Value-add	
Contract management	Generic	Done by other companies as well	Internally focused	Cost-focused	Focus on efficiency	Common	
Contract management	Generic	Done by other companies as well	Internally focused	Cost-focused	Focus on efficiency	Common	
Relationship management	Non-specific		Directly adds value for customer			Value-add	
Formula management media	Specific activity	Distinguishes from other companies	Directly adds value for customer			Distinct	
Market research	Generic		Internally focused	Aim for maximizing business value		Common	

Figure B 1: Sample of excel sheet cross-case analysis

2. Results from the cross case analysis - extended

We concluded that current perspectives (as-is) and future perspectives (to-be) are used interchangeably in projects. This interchangeable use of perspectives did not a allow reliable analysis of patterns in the classification. Also, business activities within a project are difficult to compare because the overarching domains are not easily generalized. For the cross-case analysis, we only used the domains that were present in all cases which are:

- Strategy
- Control
- Support

For these domains, we distinguished the current and future perspectives and analysed activities in the Strategy, Control and Supporting domain to find patterns in the classification.

Future perspective cases

The modalities of strategy, control and supporting activities in future perspective cases (CS1; CS2; CS5; CS6; CS7) can be found in Table B 1.

Table B 1: Modalities of strategy, control and supporting activities in future perspective cases

	Strategy	**Control**	**Support**
Total number of activities	22	36	95
Common activities	8 (36.4%)	30 (83.3%)	81 (85.3%)
Special activities	9 (40.1%)	6 (16.7%)	11 (11.6%)
Distinct activities	4 (18.2%)	0 (0%)	2 (2.1%)
Value-add	1 (5.5%)	0 (0%)	1 (1.1%)

Current perspective cases

The modalities of strategy, control and supporting activities in current perspective cases (CS3; CS4) can be found in Table B 2.

Table B 2: Modalities of strategy, control and supporting activities in current perspective cases

	Strategy	**Control**	**Support**
Total number of activities	11	6	19
Common activities	7 (63.6%)	6 (100%)	14 (73.7%)
Special activities	1 (9.1%)	0 (0%)	4 (21.1%)
Distinct activities	0 (0%)	0 (0%)	1 (5.3%)
Value-add	3 (27.3%)	0 (0%)	0 (0%)

For the conclusions on this analysis, we refer to the results in the case study report in section 3.4.2.

C. Results from interviews extended

1. Overview of interview scope and interview participants

Scope

We conducted two rounds of interviews. The first round focused on the case studies. In these rounds, we extracted knowledge about project cases that could not be found in the project documentation. The information provided about the purpose of using multimodality in the projects and the insights it gave the consultants can be found in our case study report in Chapter 3. We also used the interviews to extract knowledge about the Business Activity Model. Therefore, we summarise focus of the case study interviews as follows:

- General project information
- Purpose of using multimodality in projects
- Difficulties in the application of the concept multimodality and the Business Activity Model
- Explanation and interpretation of the axes in the Business Activity Model

Next to this round of interviews, we conducted a second round of interviews to gather information about the characteristics of multimodality. The experts that were not interviewed in the first round, were also asked about difficulties in the application and the concepts on the axes of the Business Activity Model. Therefore, we summarise the focus of the interviews as:

- Characteristics of multimodality
- Difficulties in the application of the concept multimodality and the Business Activity Model
- Explanation and interpretation of the axes in the Business Activity Model

Interview participants

We conducted 7 interviews in the first round, and 6 interviews in the second round. An overview of the participants, interview types and the role of the interviewee within Anderson MacGyver can be found in Table C 1.

Table C 1: Interview participants overview

Source code	Source type	Interviewee role	Date of input	Interview type	Case study code
I1	Interview	Senior consultant	4-3-2021	Case study interview	CS1
I2	Interview	Medior consultant	5-3-2021	Case study interview	CS2
I3	Interview	Senior consultant	8-3-2021	Case study interview	CS3
I4	Interview	Senior consultant	8-3-2021	Case study interview	CS4
I5	Interview	Senior consultant	10-3-2021	Case study interview	CS5
I6	Interview	Senior consultant	10-3-2021	Case study interview	CS6
I7	Interview	Medior consultant	10-3-2021	Case study interview	CS7
I8	Interview	Medior consultant	21-3-2021	Defining multimodality	
I9	Interview	Senior consultant	22-3-2021	Defining multimodality	

I10	Interview	Senior consultant	22-3-2021	Defining multimodality	
I11	Interview	Medior consultant	22-3-2021	Defining multimodality	
I12	Interview	Senior consultant	23-3-2021	Defining multimodality	
I13	Interview	Medior consultant	24-3-2021	Defining multimodality	

2. Interview guide

We conducted two rounds of interviews.

1. Case study interviews: In these interviews, we talked about the case study projects and how the use of a multimodal perspective and the Business Activity Model influenced the project results. We also used this interview to ask the experts some questions about problems in the use of the Business Activity Model and the definitions they use for both axes. The interviews were semi-structured, so before the start of the interview, we prepared a guide with questions. We prepared these questions together with our supervisor within AMG. The complete list of interview questions for these interviews can be found in Appendix C3.

2. Defining multimodality: In these interviews, we asked the experts multiple questions about the characteristics of multimodality. We also used this interview to ask the experts about problems in the use of the Business Activity Model and their definition of both the axes. These interviews were semi-structured, so we prepared a guide with questions upfront. We prepared these questions together with our supervisor within AMG. The complete list with questions can be found in Appendix C4.

3. Interview protocol – case study

Introductie (5 minuten)
- Opname goedkeuring
- Introductie onderzoek, doelen van het interview, voorbereiding van het interview

Consultant vragen (5 minuten)
1. Kun je in een paar zinnen uitleggen wat je ervaring als consultant is binnen AMG en daarvoor (indien van toepassing)wat?
2. Wat was jouw rol in dit project?
3. Wie was de lead-consultant in het project?
4. Wie was verantwoordelijk voor het activity modelling in het project? (het maken van het OMC + modaliteiten)
5. Hoeveel projecten heb je gedaan waarin je een OMC hebt gemaakt?

Bedrijfscontext
- *Bedrijfsomschrijving + context vanuit Lotte*
1. Klopt deze informatie?
2. Heb je hier nog iets aan toe te voegen?

Project questions (5 minuten)
1. Is het project afgesloten of is het nog in uitvoering?
2. Wat was jullie opdracht waarmee jullie op dag 1 binnen liepen, geformuleerd door de klant?

OMC and multimodality questions (15 minuten)
1. Waarom hebben jullie ervoor gekomen om modaliteiten toe te voegen aan het OMC?
2. Welke inzichten hebben de modaliteiten opgeleverd voor de klant of voor jou als consultant?
   - Bijv: markt-oplossing technologie voor common activiteiten
   - Downsizing van FTE voor common activiteiten
   - Outsourcen van generieke activiteiten
3. Hebben jullie een huidig of toekomstig perspectief gebruikt in het OMC? Waarom?
4. Hoe hebben jullie het indelen van de activiteiten aangepakt? Kun je dit proces beschrijven?
   - Bijv: alles in samenwerking met de klant d.m.v. workshops
   - Bijv: Eerst alle activiteiten groen gemaakt en toen aangepast
5. Waarom hebben jullie voor deze aanpak gekozen?
6. Kies je bij andere projecten wel eens voor een andere aanpak? Zo ja, welke en waarom?

BAM (20 minuten)
1. Waar loop je als consultants tegenaan tijdens het classificeren van de activiteiten?
2. Waren er ook moeilijkheden vanuit de klant? Zo ja, wat voor moeilijkheden?
3. Hoe zijn jullie met die moeilijkheden vanuit de klant omgegaan?
4. Wat doen jullie wanneer je geen consensus kunt bereiken over de classificatie van een activiteit?

Verticale as (project onafhankelijk)
1. Wanneer is iets volgens jou specifiek?
2. Wanneer is iets volgens jou generiek?
3. Ervaar je wel eens onduidelijkheden onder consultants over wat generiek is en over wat specifiek is?
4. Ervaar je wel eens onduidelijkheden onder klanten over wat generiek is en over wat specifiek is?

5. Komen afwijkende interpretaties wel eens voor volgens jou? Dat in het ene project specifieke activiteiten anders worden beoordeeld / ingedeeld dan in andere projecten?
    o Bijv: Door veranderende context / industrieën
    o Bijv: Klant wil het anders interpreteren

Horizontale as (project onafhankelijk)
1. Wanneer is iets volgens jou valuable?
2. Wanneer is iets volgens jou cost-efficient?
3. Ervaar je wel eens onduidelijkheden onder consultants wanneer iets value-adding is en wanneer is cost-efficient is?
4. Ervaar je wel eens onduidelijkheden bij klanten wanneer iets value-adding is en wanneer is cost-efficient is?
5. Komen afwijkende interpretaties wel eens voor volgens jou? Dat in het ene project waardevolle activiteiten anders worden beoordeeld dan in andere?
    o Bijv: Door veranderende context / industrieën
    o Bijv: Klant wil het anders interpreteren

Activiteiten bespreken (10 minuten)
Ik kom er bij een paar activiteiten niet uit wat de activiteit precies inhoudt, of ik snap niet goed waarom hij daar is ingedeeld. Verschilt per project. Activiteiten waarvan classificatie niet duidelijk is bespreken.

Als tijd over
1. Wat zijn volgens jou de grootste voordelen van het multimodaal denken? Waarom is deze denkwijze zo waardevol in jouw ogen?
2. Wat was jullie advies aan het eind van het project (bij voltooid project)?
3. Wat gaan jullie het bedrijf adviseren (bij project in uitvoering)?

Conclusie
- Is er iets wat je nog wilt toevoegen, wat we niet besproken hebben?
- Heb je vragen met betrekking tot mijn onderzoek?
- Is er nog documentatie van dit project waarvan je denkt dat het relevant kan zijn voor mijn onderzoek?

Feedback

4. Interview protocol – defining multimodality

Introductie (5 minuten)
- Opname goedkeuring
- Introductie onderzoek, doelen van het interview, voorbereiding van het interview

Het doel van dit interview is om zoveel mogelijk kenmerkende informatie over multimodaliteit naar boven te halen. Wat het precies inhoudt, in welke context en situaties het wordt gebruikt, etc. Het interview bestaat daarom uit veel verschillende maar op elkaar lijkende vragen om zoveel mogelijk kenmerken over multimodaliteit naar boven te halen. Deze kenmerken verzamel ik en gebruik ik om een eenduidige definitie van multimodaliteit te formuleren. Ik wil je daarom ook graag vragen om alles te zeggen wat in je opkomt, ik ga later de antwoorden filteren en kijken welke kenmerken relevant zijn.

Intention
1. Hoe leg jij multimodaliteit tijdens projecten bij klanten uit?
   a. Doe je dat altijd op dezelfde manier?
   b. Gebruik je hierbij documentatie, zo ja welke?
   c. Wat voor vragen krijg je als je het uitlegt? Zijn er vragen vanuit de klant die telkens terugkomen?

2. Waarvoor gebruik je multimodaliteit?
   a. Kun je hier voorbeelden van geven?

3. Kun je me uitleggen waar de naam multimodaliteit vandaan komt?
   a. Multi?
   b. Modaliteit?

4. Met welk doel gebruik je multimodaliteit?

5. Kun je aangeven wat voor inzichten multimodaliteit je geeft bij projecten, die je niet had gehad zonder de kleuring van activiteiten?

6. Hoe reageren klanten op multimodaliteit?
   a. Begrijpen ze het, zijn ze enthousiast, kritisch? Waarom?
   b. Verandert deze reactie vaak nadat het is toegepast?

7. In hoeverre beïnvloedt multimodaliteit het resultaat bij de klant?

8. Zou je het gebruik van multimodaliteit aanraden? Waarom?

Extension
9. Wat heb je nodig om multimodaliteit toe te passen?

10. Hoeveel inspanning kost het je om de analyse van multimodaliteit uit te voeren?
    a. Is er tijd genoeg? Te weinig? Wat is hier de oorzaak van?

11. Zijn er dingen die je lastig vindt bij de analyse van multimodaliteit?

12. Heb je suggesties over dingen die je zou willen veranderen rondom multimodaliteit?

    a. Waarom?
    b. Wat voor verbetering zou dit geven?

13. In welke situaties gebruik je multimodaliteit?

14. Zijn er ook situaties waarin je het gebruik zou afraden?

15. Zijn er situaties geweest waarin multimodaliteit je niet geholpen heeft?

16. Nu je deze situaties hebt geschetst, hoe zou je dan de context beschrijven waarin multimodaliteit nuttig is?

17. Zou multimodaliteit buiten deze context ook nuttig zijn?

18. Gebruik je multimodaliteit wel eens voor andere entiteiten dan activiteiten?
    a. Kun je hier voorbeelden van geven?
    b. Werkt dat in zo'n geval goed? Op dezelfde manier?
    c. Geeft het je andere inzichten?

19. Waarin verschilt volgens jou multimodaliteit van bimodaliteit van Gartner?

Bimodaliteit: Bimodaliteit stelt bedrijven in staat om IT in twee verschillende snelheden in te richten. De eerste IT modus bestaat uit de traditionele IT van het bedrijf. Deze werkt in lange cycli, in een langzaam tempo met grote core systemen, die nooit veranderen. Deze modus is gefocust op stabiliteit, veiligheid en nauwkeurigheid. Deze modus wordt vaak gebruik om operational excellence te garanderen. De tweede modus is een snelle IT mode. Deze modus is gefocust op het snel reageren op klantbehoeften. Het maakt vaak gebruik van een agile werkomgeving en is heel snel en verkennend. Het volgt markttrends en houdt zich bezig met snelle innovatie en waarde creatie.

Aan de interviewees die ik nog niet gesproken heb tijdens case study interviews
20. Wanneer is iets volgens jou specifiek?
21. Ervaar je wel eens onduidelijkheden onder collega's of klanten over wat generiek is en over wat specifiek is?
22. Wanneer is iets volgens jou valuable?
23. Ervaar je wel eens onduidelijkheden onder collega's of klanten wanneer iets value-adding is en wanneer is cost-efficient is?
24. Waar loop je als consultants tegenaan tijdens het classificeren van de activiteiten?

Conclusie
- Is er iets wat je nog wilt toevoegen, wat we niet besproken hebben?
- Heb je vragen met betrekking tot mijn onderzoek?
- Is er nog documentatie van dit project waarvan je denkt dat het relevant kan zijn voor mijn onderzoek?

Feedback

5. List of explanations for specificity from interviews

This appendix presents the different explanations given by the interviewees on the definition of specificity, which is the concept used on the vertical axis of the business activity model. The list of different explanations can be found in Table C 2.

Table C 2: Different explanations given for specificity

	Source interview	Definition
1	(I1)(I3)(I5)(I6)	Specificity means that the activity is specific worldwide.
2	(I1)(I2)(I3)(I4)(I5)(I6)(I8)(I13)	Specificity arises when you perform activities differently than competitors. Being unique.
3	(I1)(I2)(I3)	If you need specific expertise and knowledge to perform the activity.
5	(I2)	This can be specific expertise about your technology landscape.
6	(I2)	Specificity can arise when you need specific knowledge about your clients or market. This specific knowledge is required to offer appropriate products to your client. To do so, you have to know your customer.
7	(I2)(I6)(I10)	Specificity can depend on location.
8	(I2)(I3)(I6)(I9)	Specificity can arise when the activity is bounded by laws & regulations.
7	(I2)	Specificity also arises when you need specific knowledge of your products. You need specific knowledge about your product / service combination. This is specific knowledge that you competitor does not have and can be very specific for your company
8	(I2)	Specific knowledge of markets. You have to know your specific market to perform activities in a certain way. Example: pricing products → you have to know your market to properly and correctly price your products.
9	(I2)	The activity is less specific when your competitors perform the activity as well. When the knowledge and expertise in performing the activity can be found outside the firm and can therefore be outsourced.
10	(I2)	The combination of a generic activity (e.g. data analysis), combined with specific knowledge you need from the market, knowledge about your products which your organisation offers in a specific way, makes the activity specific.
11	(I3)	Specificity is often determined by context.
12	(I3)	Specificity is focused on the way of performing the activity. When you need specific expertise to perform it, specific know-how on specific data, to be able to perform the activity.
13	(I3)	In companies that are focusing on custom-made products, specificity can be in product development.
14	(I3)	If the way of performing the activity is different than how your competitors do it. If needing specific customer knowledge results in performing the activity differently, then it is specific.
15	(I5)	Specificity can often be found in places where the company earns money. They do something unique there.
16	(I6)	Specificity has to be researched in different layers. Sometimes an activity is specific in an industry, but less specific in general. All layers have to be considered.
17	(I6)	Specificity in technological solutions may be required due to in-house procedures.
18	(I6)	Specificity in technological solutions may be required due to strong political views..
19	(I6)	Specificity in technological solutions may be required due to how processes are organised.
20	(I4)(I6)	Sometimes, the complexity of the activity can cause the activity to be specific.
21	(I3)(I9)	Specificity can be found in product development when they collaborate with third parties. This coproduction and co-development is specific.
22	(I13)	Scope is important to take into account while identifying specificity. I compare against competitors in the industry, within the scope you operate. If you operate in the Netherlands, then you compare against Dutch competitors. If you operate international, then you compare against international peers. The geographical scope is often specified in the assignment.
23	(I3)	The activities in which a company tries to be unique, often have a specific character.
24	(I3)	Customized solutions do not have to mean that an activities is specific. It is often historically determined.
25	(I6)	You can only perform enterprise architecture if you know how a company operates. You need company knowledge, the way you make decisions, how you organise things etc. That is so specific, you need specific knowledge to properly perform this activity. You can not just hire someone to do this. I think it is the same with strategy , you need to know what the culture within your organisation is, how decisions are made, history etc.

| 26 | (I9) | For example, it can be critical for your operations to keep certain activities available 24/7, it can also be the case that those activities create strategic value. You will organise those activities differently than generic activities. |
| 27 | (I1)(I9)(I12)(I13) | Orange activities often need extra attention. These are activities that are really specific for a company but often do not get much attention, because they are performed internally. These often involve integrations between activities. |

As can be concluded from the list above, the experts used many different definitions for the concept of specificity. We did identify one overarching explanation, which was used by all of our experts. They all mentioned that the activity should distinguish the organisation from its competitors. In the table below, the detailed answer of each of the participants is given. Experts that were interviewed more than one time (in both rounds) are only once cited in Table C 3. This means that each statement was given by different experts. We translated and paraphrased the statements from the experts from Dutch to English to increase readability. The Dutch explanation given by the expert can be found between the brackets.

Table C 3: Differentiation as definition of specificity

Interview	Explanation of specificity
(I1)	The most important is that the organisation is unique worldwide. But I also consider something to be unique if they really want to be different than competitors. In the end, that is the most important factor. *("Denk ik het meest belangrijke dat ze, of het is wereldwijd uniek, maar ik vind het ook wel unieke als ze daar echt anders willen zijn dan hun concurrenten. Dat is denk ik uiteindelijk het meest belangrijke. De keuze ligt altijd bij de klant, dus als de klant zegt Ja, ik wil dit gewoon, iets unieks specifieks maken.")*
(I2)	De criteria I have is: if it is something specific your company does, that your competitors do not do in the same way. *("Uhm, de definitie of tenminste het criterium wat ik vaak meegeef is: als het iets is wat heel specifiek is voor jouw bedrijf, dat andere, dat jouw concurrenten dat bijvoorbeeld niet op zo'n manier doen dat je er bijvoorbeeld hele specifieke expertise en kennis voor nodig hebt die andere bedrijven zogenaamd niet hebben.")*
(I3)	If an organisation does not have competitors, the activities are often specific. There is no market and based on the activities they perform, the company is specific. We consider something specific if the organisation is the only one that performs the activity. This means that they will be forced to customise their technology to support the activity *("Dan is het heel snel specifiek, klopt. Er is geen markt en het is dus op basis van de kernactiviteiten die ze doen. Is dit bedrijf eigenlijk al specifiek. … Er is niet een andere, er is er maar één van die dat doet. Dus dat betekent dat zij ten allen tijde gedwongen zullen zijn om systemen te maken en administraties te maken die een specifiek karakter hebben. Hetzelfde geldt voor organisatie binnen de Rijksoverheid, zoals de Belastingdienst.")*
(I5)	An activity is specific, if the way you perform it is different from other companies. *("Als De manier waarop je bepaalde dingen doet. De manier waarop je handelt, bijvoorbeeld in energie handelt. Of de manier waarop bijvoorbeeld bij … dat je echt iets doet wat niemand anders in Nederland doet.")*
(I6)	In specificity, you really want to consciously differentiate from others. You have to, or want to, perform activities differently than others, competitors, the industry or worldwide. *("Wat ik heel belangrijk vind bij specifiekheid is dat je dus echt bewust dingen anders doet, dat je dingen anders moet doen of wil doen ten opzichte van je concurrenten en de industrie of in z'n algemeenheid")*
(I8)	Activities are specific if, one way or another, you differentiate your activity from competitors. If you do it one way, and the rest of the market does not, that makes it specific *("En ik vind het specifiek als. Ik ga even vanuit actviteiten denken. Als er op een of andere manier verschil is tussen hoe jij, tussen wat jij wilt doen en wat jouw competitors doen.")*
(I13)	If the company wants to perform the activity distinctive compared to the rest of the market. If they really want to make the difference there, compared to market standard *("Als het bedrijf het in hun specifieke markt onderscheidend wil organiseren. Dus als ze daar echt verschil willen maken ten opzichte van de markt standaard.")*

6. Detailed description of the intention of the horizontal axis

This section presents an elaborate version of the intention of the horizontal axis. The full intention can be found in Figure C 1. The intention is a summary from the explanations about the axis given during the expert interviews.

- Internal orientation (I1)(I2)(I9)(I11)(I12)(I13) - Stable activities (I2)(I11)(I12) - Standard procedures (I2) - Improving business value (I2) - Efficient (I2)(I13) - Standardisation (I9)(I11)(I13) - Operational excellence (I8)(I12) - Predictable (I10)(I11)(I13) - Long term planning (I11) - Cost savings (I11)(I12)(I13) - Optimizing business processes (I12) - Autonomous design of activities (I13)	- Doing the right things, so you can impact the market (I1)(I12) - Competition is important (I1) - These activities are visible for customers (I1)(I12) - Activities that enhance the digital experience of customers (I1) - These activities are linked to the value proposition (I1)(I5)(I12) - These activities target the customer's experience with your organisation. (I1)(I2)(I5)(I9)(I10)(I11)(I13) - These activities are all about delivering value to your customer (I2)(I8) - In these activities, you target a particular customer segments (I2) - Here, you tailor activities to your customers (I2) - You are willing to invest in these activities (I2) - These activities are performed to unburden the customer (I3)(I9) - As supplier, you are thinking about how to solve your customer's problems (I3) - These activities are performed in a dynamic environment, you have to adapt your activities to customer's demands (I3)(I6)(I9)(I10)(I11)(I12)(I13) - Your external orientation has to be in place (I3)(I6)(I12)(I13) - You need to constantly be aware of what your customer's needs are (I3) - These activities have to deal with uncertainty, they are not predictable (I5)(I10)(I11)(I13) - Your client has influence on these activities (I6) - These activities have to be configurable (I6)(I8)(I11)(I13) - These activities need to be flexible (I6) - These activities are externally oriented (I8) - Speed is important(I2)(I8)(I9)(I12)(I13) - Primary activities (I12)

Figure C 1: Intention of the horizontal axis identified in interviews

D. Results of the redesign phase extended – vertical axis

1. AMG documentation about specificity

Table D 1 provides an overview of the AMG documentation about specificity. It shows that different explanations of specificity are used in different AMG documentation.

Table D 1: Sources of specificity identified in documentation

White paper	Projects – practice	Question pro survey	Other AMG documentation
Customer specifications			Solutions tailored to (specific) customer needs (client workshop)
Specific way of working			
Specific technology		Uses developed digitalized technology (Question Pro)	
Strong integration between activities	Connection of activities	Depending / integrated with other activities (Question Pro)	
Location bound			Location bound (client workshop)
Time-critical dependency			Highly time critical (client workshop)
Frequency of changes in activity			Highly dynamic (client workshop)
Specific legislation and guidelines	Specific legislation and guidelines		Specific legislation and guidelines (client workshop)
Uniqueness of activity: one of a kind	Unique activity		
	Specific knowledge, skills, expertise, experience	Specific knowledge, expertise, experience (question pro)	
	Specific activity		
	Distinctive activity		
	Specific topics		
	Distinguishes from other companies (but not unique)		
	Specific customer knowledge required		
	Complexity of activity		
	Specific contractual agreements		
	Implementation is specific		
	Specific for each organisation	Requires organization specific knowledge (question Pro)	
	Coordination with other parties		
	Specific assets	Uses specific developed resources and technology (Question Pro)	
		Activity is improved and innovated by company itself (question pro)	

Figure D 1 is added to this Appendix to show that AMG mixes up the axes in some of the documentation. On the left side, statements about stability and client requirements are used to determine the horizontal axis. On the right side, these same statements are used to determine the vertical axis.

Figure D 1: Similar metrics used for different axis

2. Sources of specificity included in the redesign

We combined literature about the RBV (Kraaijenbrink et al., 2010) and Porter's activity drivers (Sheehan & Foss, 2017) to create a list of sources of specificity. The included sources of specificity and their explanation can be found in Table D 2. We only included the source of specificity if we identified at least two sources of input.

Table D 2: Sources of specificity included in redesign

Activity driver	Explanation	Substantiation found in
Tangible assets	Some activities require specific assets to be able to perform the activity. Assets that are firm specific and not owned or easily bought by competitors. These resources often involve technology. Examples of tangible assets are: machines and actors	- Interviews: (I3) - Case study: (CS5) - Literature: (Kraaijenbrink et al., 2010; O'Regan & Ghobadian, 2004)
Intangible assets	The IP, knowledge, skills, expertise or data used in this activity is considered to be specific and of core value for the company. The activities that are performed with this knowledge are mission-critical for the organisation. The intangible assets here are not easily tradeable and are built over time. Examples of intangible assets are: knowledge, IP, expertise and data	- Interviews (I1)(I2)(I3)(I6) - case studies (CS1)(CS2)(CS3)(CS4)(CS5)(CS6) - Literature: (Axelsson & Wynstra, 2002; Ensign, 2001; Kraaijenbrink et al., 2010; O'Regan & Ghobadian, 2004; Tadelis, 2007)
Location of an activity	The location where an activity is performed might impact the design of the activity. For example: a restaurant that is located at the hotspot in a town might attract more customers than other restaurants in less attractive places.	- Interviews: (I2)(I6)(I10) - Literature: (Sheehan & Foss, 2017) - Case studies: -
Timing of an activity	When organisations have to deal with seasonality in activities. The design of the activity has to take this aspect into account	- Expert opinion after interview (I10) - Literature: (Sheehan & Foss, 2017) - Case studies: -
Institutional factors impacting an activity; laws and regulations	Laws and regulations that an organisations has to comply with can involve higher costs. Moreover, they can be an important system requirements when customising technological support for a business activity.	- Interviews: (I2)(I3)(I6)(I9) - Case studies: (CS1, CS3, CS4, CS6) - Literature: (Hung & Low, 2008; Sheehan & Foss, 2017)
Policy choices independent of other factors	Strategic choices of upper management in an organisation might influence the business activity. One example is that a CxO wants to use software he has been using for years, although this might not be the cheapest or most suitable option.	- Interviews: (I6) - Literature: (Hung & Low, 2008; Sheehan & Foss, 2017) - Case studies: -

E. Results of the redesign phase extended - horizontal axis

1. Additional literature review on the concept of dynamism and uncertainty

Dynamism: "Environmental dynamism describes the rate and the unpredictability of changes in a firm's external environment."(Cingöz & Akdoğan, 2013)

Markets or business environments are characterised by a high level dynamism and uncertainty. Firms that operate in dynamic business environments must create strategic flexibility to respond to this uncertainty. This strategic flexibility can be used to obtain sustainable competitive advantage (Cingöz & Akdoğan, 2013). Another recommendation for firms operating in dynamic environments is to create flat, decentralised horizontal organisational structures to allow fast decision making. (Bharadwaj et al., 2013; Cingöz & Akdoğan, 2013; D. Teece et al., 2016). Slowness in response could results in customers dissatisfaction, which motivates customers to move away from your company.

Digital transformation in dynamic environments
Currently, our world economy is more and more characterised by dynamism and intense competition (Ismail et al., 2017). Digital transformation helps organisations to cope with this dynamism and competition by supporting firms in fast and flexible decision making in a dynamic, uncertain environment. Digital transformation emphasises that these decisions need to be fast, customer-centric and agile (Warner & Wäger, 2019).

Digital transformation is not just about technology, but mainly about strategy (Bharadwaj et al., 2013; Ismail et al., 2017; Warner & Wäger, 2019). Digital business strategies enable organisations to incorporate opportunities of the digital economy by leveraging digital resources to design customer-focused business models. (Ismail et al., 2017). In this global economy, customers are central and organisations must find ways to optimize customer needs and experiences (Ross et al., 2019; Warner & Wäger, 2019). They must constantly try to enhance their value propositions. Enhanced customer experience and new digital offerings, lead to greater customer satisfaction (Ross et al., 2019).

The digital era changed strategy (Warner & Wäger, 2019):
- New functionalities can be added to products after they have been released into the market
- Firms join or build digital platforms to communicate directly with customers
- Digital infrastructures provide new tools for scaling and globalisation

Digital technologies have accelerated the speed of change in markets, resulting in more environmental volatility, complexity and uncertainty. Digitalization has empowered customers with more choice. This results in higher expectations and demands. Firms must react to these emerging demands by re-evaluating their traditional value propositions (Ismail et al., 2017). Warner & Wäger (2019) emphasise that we are in a situation where customers constantly change, it is totally unpredictable what is going to happen, and going to be demanded tomorrow. To compete in dynamic environments, an organisations must rapidly respond to new customer-centric trends (Warner & Wäger, 2019). Firms need to scan the environment for unexpected trends that disrupt the organisation. External triggers that require such responses are (Warner & Wäger, 2019):
- Disruptive digital competitors
- Changing customer behaviour
- Disruptive digital technologies

Cooperation among firms
New technologies have accentuated changing network dynamics. This results in digitally engaged customer. Customers and communities can co-create value in a digital ecosystem (Ismail et al., 2017).

Currently, we are shifting to a service-oriented model. Traditional firms join or build digital ecosystems to work with new partners (Warner & Wäger, 2019). In digital transformation, open innovation and co-creation is key to success (Matarazzo et al., 2021; Nambisan et al., 2019; D. J. Teece, 2020). Digital platforms allow this co-creation by allowing different entities to collaboratively build on the platform, or complement one another's contributions. Open innovation becomes more attractive because of the speed of technological change and the emerging global competition (D. J. Teece, 2020). Collaborative innovation can be seen as a complement to, but in some situations substitute for, in-house R&D activities. New open models and more traditional closed models should operate side by side in the future.

Balancing agility and stability in dynamic, uncertain environments

This new openness and tension between new and traditional ways of working forces firms to balance flexibility and stability. The art of digital business design is distinguishing what can be considered relatively stable from those elements that change constantly (Ross et al., 2019; Warner & Wäger, 2019). Firms require dynamic capabilities to balance this trade-off. Operational capabilities are required to support a firm in their daily practices. On the other hand, dynamic capabilities are required to alter a firms current business model and match it with customer demands. Warner & Wäger (2019) emphasise that structure and regulatory are required, while being faster and more technology focused.

It is often ignored that digital transformation and changes come at a cost (D. Teece et al., 2016). (Digital) transformations are not always necessary. According the Teece (2016), most research literature suggests that firms should become agile and stay in constant state of radical transformation. However, he emphasises that change is costly and flexibility often involves sacrificing efficiency. Knowing when and how much flexibility is required to remain competitive is crucial. This comprises a trade-off between efficiency and flexibility that will never be eliminated.

Dynamic environments have to deal with uncertainty, which implies presence of unknown unknowns. On the other hand, we have risk. Risk can be calculated and predicted using tools, uncertainty cannot. This makes risk more manageable than uncertainty (D. Teece et al., 2016). In case of uncertainty, it is crucial to do the right things, than doing things right (operational efficiency). Uncertainty has always been present in business environments, but it has increased since the global economy has become more digitally advanced. Flexibility is defined as a firm's ability to manage uncertainty in demands. Strategic flexibility is the ability to strategically respond to this uncertainty and redirect strategy.

However, the world also knows more stable markets. In these markets, it may be more profitable to optimize operational efficiency at the expense of flexibility. Disruptions are less common in these markets and in such case, weaponing against disruption is too costly to sacrifice efficiency and profits. The absence of disruptions often allows organisations to optimize and automate processes.

However, in more uncertain markets, agility is a valuable organisational attribute. Competitive business environments often require frequent changes. In these circumstances, firms needs flexibility in their structure to modify their business rapidly.

In dynamic environments, quickly launching MVPs, cooperation with customers and receiving customer feedback is an often used method to reduce time to market (Matarazzo et al., 2021; D. Teece et al., 2016; D. J. Teece, 2020). This method is most suitable for software development, but less appropriate for domains such as aircraft or automobile. In this agillity, stability trade-off, context matters. Key lessons introduced by Teece (2016):
- Not all business environments face strong dynamic competition. The organisation should be assessed on this uncertainty and dynamism.

- Relative calm environments allow for forms of "business as usual". Change is costly, it may not be profitable to design for flexibility.
- The benefits of flexibility increase with the degree of uncertainty in the organisation's competitive environment. If the environment is relatively stable, with little to no dynamism, benefits of being stable outweigh costs of maintaining flexible.

The greater the uncertainty and dynamism in the business environment, the greater the need for agility and flexibility. More flexibility and agility is not always better, they are costly. Agility is usually unnecessary in business environments exposed to only risk, but it is crucial in uncertain, dynamic environments (D. Teece et al., 2016).

Measurement of dynamism

We propose to adopt the measurements of environmental dynamics from literature:
- Competitors in the market (Harrington, 2001)
- Frequency of change (Begun & Kaissi, 2004; Newkirk & Lederer, 2006)
- Unpredictability of change (Begun & Kaissi, 2004; Newkirk & Lederer, 2006)

F. Results of expert demonstration and evaluation extended

1. Demonstration and evaluation workshop 1

The activities we formulated as part of our simulation can be found Figure F 1. We asked the participants in the workshop to classify the activities according to our redesign. The results of the classification can be found in Figure F 2.

Activities used in the simulation

Figure F 1: Activities used as artificial data in workshop 1
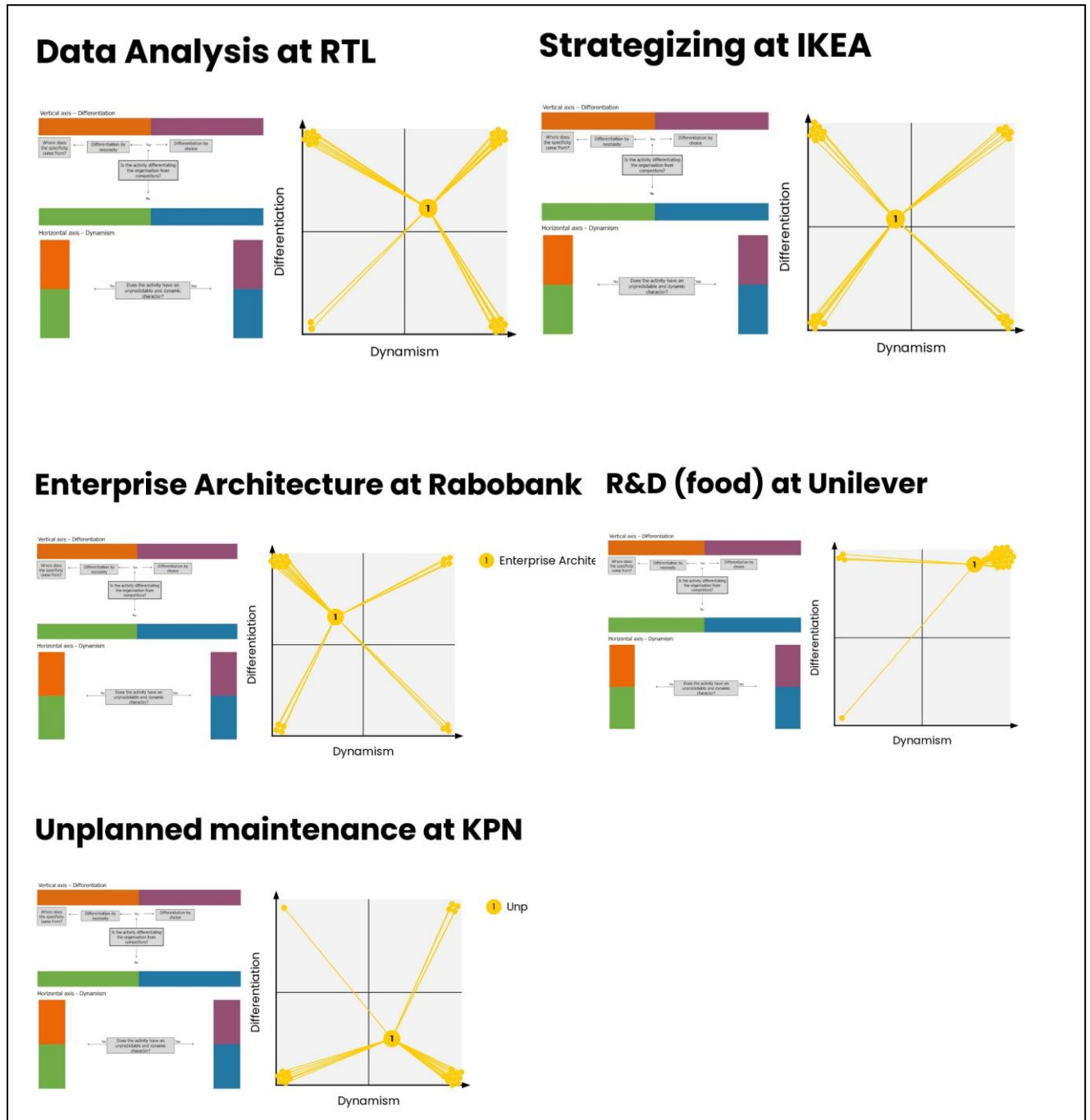
Results of the classification

Figure F 2: Results of simulation workshop 1

Criteria validation workshop 1

We asked the experts to evaluate our redesign based on four evaluation criteria. Below, the rationale for the criteria and the questionnaire statements are presented.

Criteria rationale

We picked four evaluation criteria as proposed by Sonnenberg and Vom Brocke (2012). They state that the reason for choosing validation criteria is dependent on the type of object to be evaluated and the point in time that the evaluation is conducted. We approached our redesign validation as a prototype, which they explain to be an validated artifact instance in an artificial setting, as proof of applicability. They propose eight criteria, of which we chose four.

Workshop 1 targeted the daily users of the model. Therefore, we focused on criteria that validate the applicability of the model in practice. We chose criteria that test the practical functioning of the model instead of more theoretical criteria, because the experts of this workshop should be able to apply the model in practice.

Expert opinion questionnaire

1. I would be able to successfully use this model in future projects (Operationality)
2. This model will FAIL its purpose when used in future projects (Operationality)
3. The model is too complex to use (Ease of use)
4. This model is easy to use (Ease of use)
5. This model can successfully support the technological design of organisations (e.g. IT landscapes) (Effectiveness)
6. This model can successfully support the organisational design of organisations (e.g. departments and teams) (Effectiveness)
7. The dimensions in the model can classify all business activities relevant in practice (Fidelity with real world phenomenon)
8. I can think of some business activities from practice that can NOT be classified using this model (Fidelity with real world phenomenon)

2. Demonstration and evaluation workshop 2

In Table F 1, an overview of the workshop participants can be found. The experts all have multiple years of experience in the domain of Digital Transformation and/or Enterprise Architecture.

Overview of workshop participants

#	Experience in Digital transformation / Enterprise Architecture
1	7 years practical experience + 20+ years academic experience in DT /EA
2	24 years
3	25 years
4	16 years

Table F 1: Overview of participants demonstration and evaluation workshop 2

Criteria validation workshop 2

For the interviews with the experts, we also picked four evaluation criteria as proposed by Sonnenberg and Vom Brocke (2012). We also approached these expert interviews as a prototype validation. They propose eight criteria, of which we chose four.

Workshop 2 targeted experts in the domain of Digital transformation and Enterprise Architecture. However, these experts had never seen the Business Activity Model before. Also, they were not familiar with the concept of multimodality. Therefore, we focused on criteria that validate the understandability and the perceived usefulness of the model. We considered these criteria more useful for this target group, because of unfamiliarity with the concepts and lack of knowledge about the application of the model.

Expert opinion questionnaire
1. The model can support decisions about the technological design of organisations (e.g. IT landscapes) (Effectiveness)
2. The model can support decisions about the organisational design of organisations (e.g. departments and teams) (Effectiveness)
3. The model supports collaborative decision making between business and IT (Effectiveness)
4. The model helps to structure the conversation between business and IT about the focus of business activities (Effectiveness)
5. The model is too complex to use (Ease of use)
6. The model is easy to use (Ease of use)
7. I can imagine that the model is useful in digital transformation projects (Usefulness)
8. The model is NOT useful to support digital transformations (Usefulness)
9. It is clear to me why these concepts are used in the model (Understandability)
10. The model and its use are easy to understand (Understandability)

G. Results of defining multimodality extended

1. Complete list of identified characteristics of multimodality

This appendix presents the complete list of identified characteristics which were used as input for our concept definition.

Long list of characteristics

1 = Required in short definition
2 = Required in long definition
Extension = Multimodality is applied to / for
Intension = Multimodality is

Benefits

Source	Characteristics	1	2	Theme ; part of definition
(I8) (I10) (I13) (CS2)	Multimodality makes your organisation more efficient / Multimodality helps to make decisions easier / Multimodality helps to determine a direction / Multimodality helps to structure the discussion about business activities and their strategy / Multimodality helps to make the discussion about business activities and their strategy manageable / Multimodality allows you to utilize your IT budget and investments optimally			Benefits; extension
(I8)(I10)(I12) (CS2)(CS3) (CS4)(CS5) (CS6)	Multimodality is a good means to conversate about the strategy of business activities, technological design, organisational design or data design. It especially allows business managers to join the conversation / Multimodality allows people to connect IT to business / Multimodality is used to create a common understanding and common starting point **/ Multimodality allows groups of people from different domains, business and IT, to collaborate and jointly determine a future direction** / Multimodality makes the discussion about IT comfortable for business managers /	X	X	Benefits; extension
(I8)	Multimodality is a nuanced concept compared to bimodality			Benefits ; intention

Added in short definition:

- *These modalities allow business and IT to collaboratively…*

Added in long definition:

- *Multimodality is used as a tool to manage the discussion between business and IT. It allows business and IT to collaboratively determine the strategic focus of each business activity.*

Application

Source	Characteristics	1	2	Theme ; part of definition
(I8)(I9)(I10) (I11)(I12)(I13)	**Multimodality is used to adjust the organisational and technological design of business activities to the**	X	X	Application; extension

Source	Characteristics	1	2	Theme ; part of definition
(CS1)(CS2)(CS3)(CS5)(CS6)(CS7)	**modality of the business activity** / Multimodality is used for organisational design. This includes **teams, domains, departments, business units, way of working** etc / Multimodality is used to make technological / IT decisions, in technological design			
(I9)(I10)(I13)(CS3)	Multimodality is used in sourcing decisions			Application; extension
(I9)(I12)	Multimodality can be used to classify data and design ways to use data			Application; extension
(I13)	Multimodality allows you to translate the business strategy into the design of technology and data			Application; extension
(I8)	Multimodality is a business activity analysis			Application ; intention

Added in short definition:

- *The characteristics of the modality can be used to guide the organisational and technological design of the business activity.*

Added in long definition:

- *The modality guides the design of organisational and technological aspects such as defining business units, ways of working, teams and technological solutions.*

Context

Source	Characteristics	1	2	Theme ; part of definition
(I8)(I9)	Multimodality is used in the **context of (digital) transformation** / Multimodality is used in organisational context		X	Context; extension
(I8)(I9)(I12)	Multimodality is used in the **context of change** / Multimodality can be used when change within an organisation is required due to problems in the organisation / Multimodality can be used when change within an organisation is desired due to strategic decisions / Multimodality can be used when external, environmental influences require a change within an organisation. Examples of these external, environmental influences are IT developments, changes in laws and regulations		X	Context; extension
(I13)	Multimodality is always used in the **design phase** of projects, it works through in the execution phase		X	Context; extension

Added in long definition:

- *Multimodality is used in the context of (digital) transformations.*
- *Transformations require or desire a change of the business activities within the organisation.*
- *Multimodality is used in the design phase of projects…*

Multimodality uses

Source	Characteristics	1	2	Theme ; part of definition
Literature (I8)(I9) (I10)(I11) (I12)	Multimodality uses the characteristics of business activities to determine information and technology needs / **Multimodality uses the specificity and strategic focus of business activities to determine the type of business activity** / Multimodality takes into account the specificity of business activities and IT. / Multimodality reasons about business activities in terms of strategic focus and specificity of the business activity / Multimodality uses 2 axis / **Multimodality uses two dimensions to classify business activities** / Modalities represent whether the business activity is generic or specific / Modalities represent whether the business activity is focused internally or externally / Modalities represent whether the focus of a business activity is on cost-efficiency or on creating value	X	X	MM uses; intention
(I8)(I10)(I11)	Multimodality uses a model to classify business activities into different modalities.			MM uses; intention
(I8)(I10)	Multimodality uses **colours** for the modalities to make it **easy to talk** about. / Multimodality simplifies concepts		X	MM uses; intention
(I8)(I9)(I10) (I11)(I12)	**In multimodality, the business activities and their modalities are guiding the design of all aspects** / Multimodality starts from a business perspective / Business activities are guiding for the classification of modalities / The focus of multimodality is on business / Multimodality reasons from business perspective		X	MM uses; intention
(I8)	Multimodality reasons that more than two kinds of IT are possible to support business activities			MM uses; intention
(I9)(I11)	Multimodality **uses 4 modalities** / Multimodality uses multiple working methods regarding IT projects / Multimodality has 4 modalities to classify business activities / Multimodality has more than two modalities /		X	MM uses; intention
(I9)	Multimodality implies that the business and IT are together responsible for IT / Multimodality implies that the business owns its own technology, IT department facilitates and supports this technology. / Multimodality implies that business domains are responsible for their own data.			MM uses; intention
(I11)	Multimodality takes into account the integration between different IT systems			MM uses; intention

Added in short definition:
- *… can be classified according to two dimensions (differentiation and dynamism) which result in a business activity type, a modality.*

Added in long definition:

- *Multimodality uses two dimensions (differentiation and dynamism) to classify business activities*
- *Multimodality simplifies the discussion by using colours for the modalities.*

- *The modality guides the design of organisational and technological aspects…*
- *which result in one of four business activity types, modalities.*

Insights

Source	Characteristics	1	2	Theme ; part of definition
(I8)(CS2)	**Modalities represent the strategy of your business activity** / The company has a strategy that translates into the business activities		X	Insights; intention
(I8)(I9)(I10) (CS5)(CS6)	Multimodality helps to identify in what **business activities an organisation is unique,** what distinguishes them in the market / Multimodality helps to identify in what business activities an organisation is not unique. This allows them to be more efficient, better and faster in those standard activities		X	Insights; extension
(I9)(I12)(CS2) (CS3)(CS4) (CS5)	**Multimodality provides insights into the characteristics of business activities**			Insights; extension
Literature, (I12) (I9) (I12)	Multimodality helps you understand that there is **not just one mode** in an organisation. In terms of culture, way of working, way of management etc / Multimodality uses different modes for a purpose, whether it is used to make meaning, create medical images, or transportation / Multimodality is used to explain that cultural differences exist within organisations / Multimodality helps you see the difference between business activities / Multimodality uses a granular approach to the organisation		X	Insights; extension
(I10)	**Multimodality helps you identify the gap between current state and desired state**		X	Insights; extension

Added in long definition:

- *…determine the strategic focus of each business activity*
- *This helps organisations identify what activities distinguishes them from other organisations.*
- *Each modality has different characteristics and different requirements to support the business activities.*
- *… to identify the gap between current and desired states of activities, with focus on the design of technology and data. Identification of this gap can guide the (digital) transformation.*

Requirements

Source	Characteristics	1	2	Theme ; part of definition
(I8)(I9)(I10) (I12)(I13)	Multimodality requires business activities to perform the analysis			Requirements; intention
(I8)(I9)(I12)	Multimodality requires input from a variety of stakeholders of the organisation of focus.			Requirements; intention
(I8)(I9)(I10) (I12)(I13)	Visualising business activities aids multimodality, so that business activities can be classified into modalities.			Requirements; intention