VALUE NETWORKS AND BUSINESS MODELS:

FORMULATING AND DEMONSTRATING A METHODOLOGY FOR THE DEVELOPMENT OF VALUE NETWORKS AND ALIGNMENT OF BUSINESS MODELS BASED ON DESIGN SCIENCE RESEARCH METHODOLOGY

M. Dara

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MANAGEMENT SUMMARY

In this study the Business Model Canvas and value networks are prominent subjects that are integrated to formulate a practice oriented methodology for the development of value networks and alignment of business models. Accordingly the main research question of this study is: How can the Business Model Canvas support a methodology for the development of value networks? This research question is answered by formulating the Value Network Development Approach which consists of five activities that guide practitioners in the development of value networks and the alignment of the business models of value network actors. Table 1 contains the five activities of the Value Network Development Approach and the application templates for each activity.

Table 1: The Value Network Development Approach

Activity	Description	Suggested application frameworks
Activity 1: Determine the network-mode for the value network	A network-mode that suits the purpose of the value network has to be determined. The network-mode clarifies the ways in which actors could participate in the value network. In addition the network-mode clarifies how the value network is governed. This activity also clarifies the purpose of the value network.	The collaboration framework
Activity 2: Identify value network actors and their roles	The purpose of activity two is to identify the participants of the value network and determine their roles. This activity is dependent on the previous activity. Specifically actor identification is based on the collaboration form that is selected in the first activity in the collaboration framework. Strategic and/or functional roles of value network actors should also be determined in order to produce a clear picture of the positions and importance of actors.	The actor selection and roles template
Activity 3: Clarify perceived advantages and disadvantages of value network actors	The purpose of this activity is to identify the perceived values that actors intend to capture from the value network. The Business Model Canvas is suggested as a basis from which actors will be able to identify relevant perceived advantages and disadvantages that they expect to retrieve from the value network.	The Business Model Canvas A template to summarize the perceived advantages and disadvantages of value network actors
Activity 4: Identify value exchanges between value network actors	In this activity the individual Business Model Canvases of value network actors are used to clarify the exchanges between actors and evaluate the economic potentials of the value network.	A translation from the Business Model Canvases of value network actors to value exchanges between actors
Activity 5: Align the business models of value network actors	The goal of this activity is to align the business models of value network actors with each other by identifying opportunities to gain, reconfigure, integrate, and/or dismiss resources amongst the business models of value network actors. The exchanges between value network actors that have been identified in activity 4 are used to perform this activity.	The GRID opportunities matrix

In addition to the main research question three sub-questions are answered in this study. The first sub-question – How are business models and value networks defined and related? – clarifies that the purpose of business models is considered to be capturing the business logic of organizations while value networks concentrate on a group of organizations who are related to one another and aim to achieve a common goal. Some business models mainly concentrate on the business logic of a single firm; other business models incorporate value network actors in the business logic of the firm. Yet other business models concentrate equally on all value network actors. Therefore business models clarify the business logic of organizations from different perspectives ranging from firm-centered to network-centered.

For the second sub-question – What methodologies exist for the development of value networks? – two methods – the Network Value Analysis of Peppard and Rylander (2006) and the Value Network Development model of Al-Debei et al. (2013) – are considered to be concrete business practice oriented methods for the development of value networks.

Finally, the third sub-question – How can representations of a value network and related business models be demonstrated and evaluated? – is answered by including application templates in each of the five activities of the Value Network Development Approach. Templates provide brief overviews of the results that are produced by the Value Network Development Approach.

Practitioners who are involved in the development of value networks need to understand the importance of each value network actor. It is a prerequisite for practitioners to acknowledge that the success of the value network depends on a coherent collaboration between value network actors. Value network actors need to clearly communicate their expectations from the value network. In order to highlight the potentials for the economic benefits for value network actors, practitioners need to evaluate scenarios that indicate benefits for all value network actors. Furthermore, value network actors need to establish and maintain a base (or current) business model in order to be able to adapt when circumstances change (for instance when change is required for the alignment of the actor's business model within a value network). Business models of value network actors need to be aligned in order to achieve coherency, complementarity and consistency for the successful performance of the entire value network.

ACKNOWLEDGEMENTS

In June 2012 I started my master thesis for Business Administration at BiZZdesign. While BiZZdesign was interested to conduct a research for the company's Business Model Management value proposition, as a graduate student, I was interested in a master thesis about the business model concept. During courses at the university I gained some interesting basic background knowledge about business models, therefore I was excited to investigate the subject in a practical setting during my master thesis. After several thorough discussions BiZZdesign, my internal supervisors at the university, and I agreed on this design oriented research.

During the thesis I stumbled across many challenges and difficulties. For example, formulating the Value Network Development Approach required lots of creativity and out of the box thinking. Another challenge was to understand and apply the case study; a large and complex research project in the field of crisis and disaster management. Eventually I experienced the master thesis as a tremendous professional and personal learning experience.

I would like to thank my university supervisors Björn Kijl and Kasia Zalewska-Kurek for their support, motivation and constructive feedback. Björn and Kasia, you always provided your timely and clarifying feedback and yet respected my choices and decisions. I also would like to thank my external supervisor Dick Quartel for his involvement and care. We had many useful discussions during the past couple of months. Dick, I appreciate your positive and understanding attitude. During the times that I was stuck in my progress you motivated me to keep on going. Your advice helped me well. Furthermore, I would like to thank Henry Franken for his support, feedback and confidence, Remco Blom for his contributions to my thesis, and all BiZZdesign staff who helped me to conduct my thesis. Also many thanks for my colleague students at BiZZdesign for their companionship, discussions and the fun we had at the office. Special thanks to all the respondents that participated in workshops and interviews and provided their useful insights for the case study. Finally, I would like to thank my girlfriend Suzan, for her unconditional support and care during my entire master study and especially during this thesis. Without you I would not have been able to achieve the things that I have.

I hope this report will inspire you for the business model concept, value networks, and design oriented research.

Maher Dara
March, 2013

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1 INTRODUCTION AND RESEARCH QUESTIONS

The goal of this study is to formulate a methodology for the development of value networks and the alignment of business models of value network actors. During the past decade business models have received increasing attention from researchers and practitioners. Several reasons have been mentioned which may have caused this increased attention such as among others the growing usage and development of the internet, growth in emerging markets and expanding industries and organizations (Zott et al., 2011). However, research about business models has progressed mainly in isolated silos resulting in different literature streams related to 1) e-business and information technology usage; (2) issues related to strategy, such as value creation and competitive advantage; and (3) innovation and technology management (Zott et al., 2011). Business model research incorporate findings from different theories such as strategic management, innovation management, network-analysis, and the Resources Base View (Al-Debei and Avison, 2010; Zott et al., 2011). As a result, different interpretations of business models exist and the business model concept is still fuzzy and vague (Al-Debei and Avison, 2010; Zott et al., 2011).

Despite the infancy of business model research in general, the usefulness of the business model concept is indicate as helping to design, innovate and manage businesses as conceptual models and tool (Fielt, 2011). Business models are necessary for all organizations because they provide a method to manage choices and enable, for instance, the design of information systems of an organization (Al-Debei and Avison, 2010). Furthermore, the business model defines the mechanisms behind revenues, costs and profits of the organization (Teece, 2010). Business models fulfill an important role by supporting businesses though different contributions such as providing input for decision making, designing the business, allowing businesses to innovate, explaining the interest of stakeholders, and defining the organization's logic for value creation, delivery and capture. The business model is defined as "a description of the way an organization or a network of organizations aims to make money and create customer value" (Kijl et al., 2010, 2005). Similarly, Al-Debei and Avison (2010) define the business model as "the ways in which an organization along with its stakeholders create value for each party involved" (p. 365).

The Business Model Canvas of Osterwalder and Pigneur (2010) is considered as a popular and well known representation of a business model (Andersson et al., 2006; Gordijn et al., 2005; Jiménez et al., 2005; Loss and Crave, 2011; Meertens et al., 2012). It is a holistic and easy applicable tool to develop, analyze and innovate business models of new and existing businesses. The Business Model Canvas is based on earlier work of Osterwalder (Osterwalder and Pigneur, 2003, 2002; Osterwalder, 2004; Osterwalder et al., 2005, 2004, 2002).

However, according to several papers the Business Model Canvas is mainly suitable to develop the business model of a single company rather than the development of the business models for a group of interdependent organizations in a value network, because it does not explicate the thorough analysis of value exchanges between different stakeholders within value networks (Gordijn et al., 2005). Value networks are interconnected networks of organization that form value creating systems, contrary to the traditional view of value chains in the manufacturing industries (Peppard and Rylander, 2006). The aim of the value network is to collectively create value for the customer and the involved stakeholders (Al-Debei et al., 2013). According to Loss and Crave (2011) The Business Model Canvas is static and unable to grasp the essence of value network analysis which is considered to be the collaborations, complementarities, and value exchanges between different value network stakehold-

ers. Loss and Crave (2011) argue that the Business Model Canvas is mainly applicable for single organizations and it assumes a linear value chain for the production, delivery and capture of value.

This research is sponsored by BiZZdesign BV which is founded in Enschede, the Netherlands in 2000. BiZZdesign is a consultancy, software and training company. Within a decade from the company's inception, revenue has grown to approximately €8 million, business activities have been extended into Canada, Mexico, Germany, Belgium, France and the UK, and the number of employees has grown to 85 in 2012. Today, the head quarter of BiZZdesign is still located in Enschede, The Netherlands. BiZZdesign is committed to the use of best practice methods and models to guarantee a thorough foundation for the offered services and to prevent vendor lock-inn from the perspective of customers. The company embraces open standard such as TOGAF1 and ArchiMate2 and participates in the development of such standards. BiZZdesign also values the importance of R&D which is represented through the company's R&D investment of approximately 40% of its yearly revenue. BiZZdesign furthermore collaborates extensively with other organizations such as universities, a variety of companies, and non-profit knowledge institutes.

BiZZdesign offers Enterprise Architecture, Business Process Management, and Business Model Management software tools, consultancy and trainings to medium and large size profit and non-profit organizations in the Netherlands and abroad. Most customers – such as financial service providers, insurance companies, and governmental tax authorities – rely heavily on extensive information management for their activities. The services of BiZZdesign enable organizations to clarify, analyze, and improve their business activities in order to anticipate organizational change and initiate performance improvements.

Business Model Management services of BiZZdesign consist of training courses, consultancy and software tools. These services are based on the Business Model Canvas of Osterwalder and Pigneur (2010). Training services consist of practical business courses of one till eight days in which practitioners are taught how to use the Business Model Canvas. Consultancy services are performed by helping clients to apply the Business Model Canvas for various purposes such as developing new business ideas and aligning existing products and services. Finally BiZZdesign supports the application of the Business Model Canvas through a software tool. It is important to use software tools for the design and visualization of business models because such models tend to become complex very rapidly (Gordijn et al., 2005). Therefore business models should be developed with the help of computer aided methods and tools.

1.1 RESEARCH OBJECTIVE AND QUESTIONS

The research objective is to support the business model management proposition of BiZZdesign (further referred to as the commissioning organization) such that value networks could be developed through a practice oriented approach based on well-established concepts and theories.

Central research question

1. How can the Business Model Canvas support a methodology for the development of value networks?

[1] The Open Group Architecture Framework (TOGAF®) is a global standard for Enterprise Architecture.
[2] ArchiMate®, an Open Group Standard, is an open and independent modeling language for enterprise architecture that is sup-ported by different tool vendors and consulting firms.

Sub-questions

1.1. How are business models and value networks defined and related?
1.2. What methodologies exist for the development of value networks?
1.3. How can representations of a value network and related business models be demonstrated and evaluated?

1.2 ACADEMIC AND PRACTICAL RELEVANCE OF THE STUDY

As indicated earlier different interpretations of the business model exist and the business model concept is still fuzzy and vague. This study is relevant because it contributes to the clarification of the business model concept. Although efforts have been made by scholars to conceptualize the business model concept, research contribution to the development of a rigorous conceptual model is still valued (Pateli and Giaglis, 2004). Defining the business model and its notation may clarify the business model's components and enhance the development of computer-based modeling tools for practical use. It is important to use software tools for the design and visualization of business models because such models tend to become complex very rapidly (Gordijn et al., 2005). The graphical representation of business models is valuable since it is suitable to communicate key information and acquire in-depth understandings (Pateli and Giaglis, 2004). Therefore business models should be developed with the help of computer aided methods and tools. Accordingly the results of this study are intended to be used by the commissioning organization for the development of supportive software tools. Since business models have been applied within different contexts for different purposes, the investigation of business models in an IT intensive business environment is valuable because not many similar research has been conducted yet (Al-Debei and Avison, 2010). Therefore the application of a single case study of an IT intensive research project contributes to the academic relevance of this study. This study is also relevant for the theoretical development of business models since it also aims at to integrate different business model concepts. Specifically the E3-value of Gordijn and Akkermans (2001) and the Business Model Ontology of Osterwalder et al. (2005) are proposed as suitable ontologies to be integrated due to their mutual complementarities (Gordijn et al., 2005).

Technology development forces companies to collaborate to produce a viable product or service, initiating the emergence of complex value networks (Palo and Tähtinen, 2011). Therefore the purpose of this study – to formulate a methodology for the development of value networks – is valuable because it describes the value creation method of a business network and exemplifies the role of involved actors within the network. Business models should be viable to all actors instead of one single firm (Palo and Tähtinen, 2011). Explicitly defining the business models of value network actors is necessary to allow value network actors to manage their organizations in line with the business model logic within the value network (Al-Debei and Avison, 2010). The methodology that is formulated in this study might assist single companies in mastering the collective competencies for the development of new technology-based value offerings within a business net (Palo and Tähtinen, 2011). Furthermore, the practical relevance of the research will be the development of methods, trainings, and computer-aided business modeling tools of commissioning organization based on the results of this study. Hence, the commissioning organization's Business Model Management proposition will be supplemented by the formulated methodology of this study.

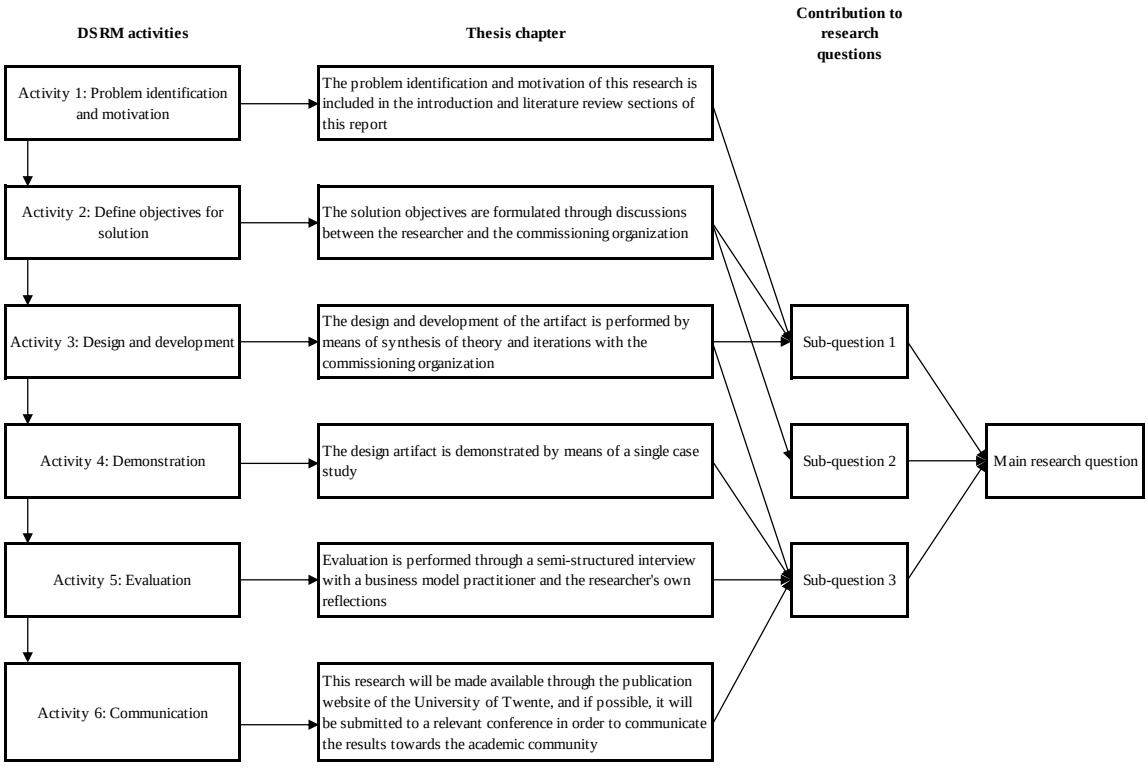
This report proceeds with describing the research approach of this study – the Design Science Research Method. The definition and examination of business models and value networks is discussed next in chapter 2. The key success factors for the development of value networks are discussed and relations with business models are explained. The theoretical examination of business models and

value networks form the basis for the proposed methodology for the development of value networks which is presented in chapter 3. The single case study research method is motivated in chapter 4. Subsequently, the Value Network Development approach is demonstrated through a single case study of a Dutch national research project in chapter 5. The validity of the Value Network Development Approach for the development of value networks is then evaluated in chapter 6. Finally, the report ends with a conclusion and discussion of the study in chapter 7.

1.3 RESEARCH APPROACH

Since the purpose of this study is to extend the business model management of the commissioning organization, the Design Science Research Methodology (DSRM) is used (Peffers et al., 2007). Peffers et al. (2007) developed the DSRM for information systems research. The authors argue that information systems research is an applied research discipline; most often theory from other disciplines is applied in order to solve problems in practical settings. However, traditional descriptive research methods are less suitable for information systems research. Traditional research in natural and social sciences aim at understanding reality, while design science research creates things for human purposes. Design sciences aims at realizing benefits from the practical application of research outcomes. Peffers et al. (2007) develop the DSRM as a structure to conduct design oriented research and as a template for researchers to evaluate design oriented studies. The DSRM consists of six activities: (1) problem identification and motivation; (2) defining the objectives of a solution; (3) designing and developing the solution artifact; (4) demonstration of the solution artifact; (5) evaluating the effectiveness of the solution; and (6) communicating the findings. The DSRM for this study is illustrated in Figure 1.

Figure 1: Application of the Design Science Research Methodology



The first activity of the DSRM is problem identification and motivation. The result of this activity is to define the research problem and rationalize the value of the solution. The problem definition will be used to develop an 'artifact' – which may be designs such as methods, models, and constructs (Peffers et al., 2007) – that provides a solution. Motivating the value of the solution encourages the researcher to achieve a solution and explains the reasoning of the researcher's perception of the problem. The problem identification and motivation of this study is included in the introduction and literature review chapters (chapters 1 and 2 respectively) of this report.

Second, solution objectives have to be formulated which need to be met by the design artifact. Solution objectives indicate the features of the design artifact. Objectives can be quantitative, such as measures of the better performance of the desired solution compared to current ones or qualitative such as the description of how the design artifact will support the solution of the addressed problem definition. The solution objectives of this study are presented in chapter 3.

The third activity is related to creating the artifact such as a model or method of which the research contribution is embedded in the design. The design and development of the artifact is performed by means of synthesis of theory and discussions with the commissioning organization. The results of activity three – the Value Network Development Approach – is presented in chapter 3.

Activity four refers to the demonstration of the methodology of this study for the development of value networks. Demonstrating the use of the methodology can be achieved through different methods such as experiments, case study, and workshops. In this study the design artifact (e.g. the Value Network Development Approach) will be demonstrated by means of a single case study that is motivated in chapter 4 and presented in chapter 5.

Evaluation (activity five) concerns observing how well the design artifact supports a solution for the problem. In order to do so the solution objectives from the second activity of the DSRM will be compared to the results of the demonstration. Evaluation can be performed by comparison of the design artifact's functionality with the objectives of the solution, satisfaction surveys, interviews, simulations and any other appropriate empirical prove. For this study evaluation is performed through a semi-structured interview with a business model practitioner and own reflections of the researcher in chapter 6.

Preferably the research is communicated to researchers and practitioners upon completion in activity six. Therefore, this study will be made available through the publication website of the University of Twente, and if possible it will be submitted to a relevant conference in order to communicate the results towards the academic community.

2 LITERATURE REVIEW

The literature review is conducted in order to formulate the objectives for a solution as part of the Design Science Research Methodology and gain relevant knowledge regarding the business model concept and value network. The literature review is conducted as following. First, thirty four business model papers have been examined in order to classify firm-centered and network-centered perspectives of business models. Second, two business modeling methods are discussed. Finally, two Value Network Development methodologies are discussed.

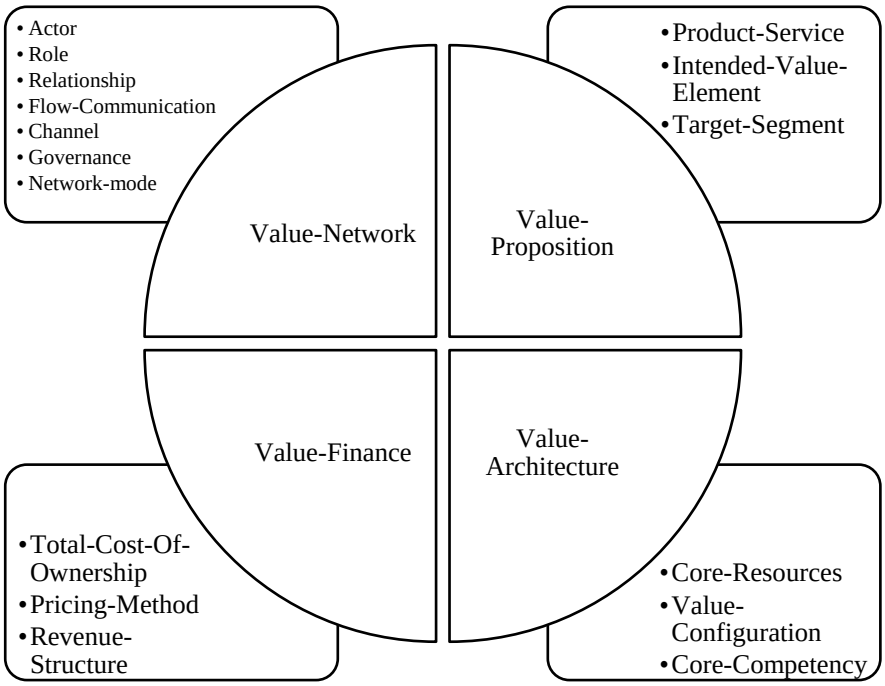
Papers for the literature review are identified through a structured search method. First, four electronic data bases have been selected (Google Scholar, EBSCO Information Services, SCOPUS, and Web of Knowledge). These particular databases have been selected due to their extensive coverage of business literature, as indicated by the library services of the University of Twente. Second, an initial set of papers was found through searching by key words and variations of key words such as business models, business logic, value network development, and value chains. Hereafter, each paper is studied and forth and back references are examined. To prevent the exclusion of key paper, forth and back reference is also considered for business models review papers of the following authors Alberts (2011); Al-Debei and Avison (2010); Burkhart et al. (2011); Pateli and Giaglis (2004); Vermolen (2010); and Zott et al. (2011). To retain a deeper understanding of value networks relevant theory is included in the literature review. According to Zott et al. (2011) the examination of indirectly related subjects to business models provides a solid basis for the business model concept. For the selection of papers a sampling process is iterated (Light et al., 1984) until no new relevant papers were found.

2.1 BUSINESS MODELS

Business model papers have been examined by studying their definitions and concepts of business models in order to answer the first research question; How are business models and value networks defined and related? In order to examine the relation between business models and value networks business models descriptions and definitions of each paper are examined to determine whether the respective business model is mainly suitable for an application to the single firm, value networks, or a single firm within a value network.

In this study the V4 Business Model Ontological Structure (further referred to as the V4) of Al-Debei and Avison (2010) is considered to be an extensive business model representation due to its thorough theoretical grounding. V4 is developed through a bottom up approach by examining key academic papers on business models published during 1998 – 2008. Al-Debei and Avison (2010) adapt a bottom up approach to develop their framework by categorizing thematic indicators from the selected paper. The authors conceptualize their findings as V4. For each business model paper the components of business models are classified according to V4. The ‘V4’ stands for the four overarching dimensions of business models which are: Value-proposition, Value-network, Value-architecture, and Value-finance. Each dimension consists of three to seven concepts which complement one another. For a detailed description of V4 see Al-Debei and Avison (2010). Figure 2 illustrates V4 including its four value dimensions in the middle circle and the sub-dimensions of each value dimension in the outer boxes.

Figure 2: V4 Business Model Structure



The validity of V4 is indicated through the coverage of its dimensions by other business model papers (Table 2) and its empirical demonstration by Al-Debei et al. (2010); Joha and Janssen (2012); Panagiotopoulos et al. (2012); and Serrano et al. (2010).

Table 2: Coverage of V4 dimensions by other papers

	V4 business model framework dimensions				**Authors**
	Value-proposition	**Value-network**	**Value-architecture**	**Value-finance**	(Al-Debei and Avison, 2010)
Corresponding dimensions of other business model conceptualizations	Strategic choices	Value network	Create value	Capture value	(Shafer et al., 2005)
	Product pillar	Customer interface pillar	Infrastructure management pillar	Financial aspects pillar	(Osterwalder et al., 2005)
	Service domain	Organization domain	Technology domain	Finance domain	(Bouwman et al., 2008)

In this study the V4 Business Model Structure is considered to be an extensive and up-to date business model representation due to its grounding in business models research and empirical demonstrations so far. Therefore it is used to structure and analyze the literature on business models. Table 3 contains the examined business model papers.

Table 3: Classification of business model papers according V4

Authors	BM description	V4 Business Model Ontological Structure (Al-Debei and Avison, 2010)																	Application of Business Model*	Additional concepts**
		Vale-propo-sition			Value-network							Value-archi-tecture			Value-fi-nance					
		Product-service	Intended-value-element	Target-segment	Actor	Role	Relationship	Flow-communication	Channel	Governance	Network-mode	Core-resources	Value-configuration	Core-competency	Total Costs of Ownership	Pricing-method	Revenue-structure			
(Sinfield at al., 2012)	At a conceptual level, a business model includes all aspects of a company's approach to developing a profitable offering and delivering it to its target customers	✓	✓	✓		✓			✓								✓	N	
(Tsvetkova and Gustafsson, 2012)	Helps to analyze how value is created	✓		✓								✓					✓	C	
(Palo and Tähtinen, 2011)	The way a strategic business net creates value	✓		✓	✓			✓										C	
(Zott et al., 2011)	How firms do business and how value is created and captured	✓	✓					✓					✓		✓		✓	C	
(Mason and Spring, 2011)	An objective representation of the reality of the firm and its markets	✓	✓				✓	✓				✓	✓	✓				N	
(Kijl and Nieuwenhuis, 2011)	The way an organization or a network of organizations aim to make money and create customer value	✓			✓	✓						✓			✓		✓	C	
(Casadesus-Masanell and Ricart, 2010)	A firms realized strategy									✓	✓	✓						S	
(Kijl and Nieuwenhuis, 2011)	The way an organization operates to ensure its sustainability (Demil and Lecocq, 2010)(Demil & Lecocq, 2010)	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	N	
(McGrath, 2010)	No explicit definition	✓											✓					S	
(Yunus et al., 2010)	No explicit definition	✓		✓	✓								✓				✓	N	✓
(Chesbro	No explicit definition	✓		✓	✓								✓		✓		✓	N	✓

ugh, 2010)																			
(Itami and Nishino, 2010)	The business model consists of business system a profit model which is					✓					✓	✓	✓					N	
(Arana and Castellano, 2010)	A simplified representation of a company's business logic	✓		✓	✓		✓		✓			✓	✓		✓		✓	N	
(Chen et al., 2010)	Series of planned activities, or business processes, with a focus on market profitability	✓				✓							✓			✓	✓	C	
(Nenonen and Storbacka, 2010)	Depicts the managerial opportunities for a focal firm to influence value co-creation	✓		✓					✓			✓	✓	✓				C	✓
(Björkdahl, 2009)	The logic and the activities that create and appropriate economic value, and the link between them	✓	✓	✓					✓			✓					✓	S	
(Kamoun, 2008)	The blueprint of the way a business creates and captures value from new services, products, or innovations and interact with providers, customers, and partners		✓	✓					✓			✓	✓		✓		✓	C	
(Johnson et al., 2008)	Explains how to create and deliver value	✓	✓	✓			✓	✓	✓			✓	✓		✓	✓	✓	S	
(Bouwman et al., 2008)	A blueprint for a service to be delivered, describing the service definition and the intended value for the target group, the sources of revenue, and providing an architecture for the service delivery, including a description of the resources required, and the organizational and financial arrangements between the involved business actors, including a description of their roles and the division of costs and revenues over the business actors	✓	✓	✓			✓		✓	✓		✓	✓	✓	✓	✓	✓	C	
(Rajala and Westerlund, 2007)	Ways of creating value for customers and to show how a business turns market opportunities into profit through the agency of sets of actors, activities and collaboration	✓	✓				✓					✓					✓	N	
(Chesbrough, 2007)	Defines a series of activities, from procuring raw materials to satisfying the final consumer, which will yield a new product or service in such a way that there is net value created throughout the various activities, and captures value from a portion of those activities for the firm developing and operating it		✓	✓							✓		✓		✓	✓	✓	N	✓
(Morris et al., 2005)	A concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics	✓	✓	✓										✓	✓	✓	✓	S	✓

	are addressed to create sustainable competitive advantage in defined markets																		
(Tikkanen et al., 2005)	The sum of material, objectively existing structures and processes as well as intangible, cognitive meaning structures at the level of a business organization				✓						✓	✓	✓	✓			N	✓
(Voelpel et al., 2005)	The particular business concept (or way of doing business) as reflected by the business's core value proposition(s) for customers; its configured value network to provide that value, consisting of own strategic capabilities as well as other (e.g. outsourced/allianced) value networks; and its continued sustainability to reinvent itself and satisfy the multiple objectives of its various stakeholders		✓						✓							✓	N	
(Shafer et al., 2005)	A representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network		✓	✓			✓	✓			✓	✓	✓	✓		✓	N	✓
(Helander and Rissanen, 2005)	Describes the operating model of the organization											✓	✓			✓	S	✓
(Osterwalder et al., 2005)	A conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. A description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams	✓		✓	✓		✓		✓		✓	✓		✓		✓	N	
(Komulainen et al., 2004)	No explicit definition	✓			✓	✓		✓									C	
(Pateli and Giaglis, 2004)	The logic of doing business of a firm and the linkages and configurations of a broad spectrum of organizational activities			✓			✓				✓	✓		✓	✓	✓	N	✓
(Hedman and Kalling, 2003)	Integrates firm-internal aspects that transform factors to resources, through activities, in a structure, to products and offerings, to market		✓	✓	✓		✓				✓	✓					S	✓
(Chesbrough and Rosenbloom, 2002)	How a firm makes money		✓	✓	✓							✓		✓		✓	N	✓
(Gordijn and Akkermans, 2001)	Highlights a network of actors and how they create or consume objects of value	✓	✓	✓	✓	✓		✓	✓								C	✓

(Alt and Zimmer-mer-mann, 2001)	Allows focusing and measuring Information Systems activities and results					✓				✓		✓	✓					✓	N	✓
(Ma-hadevan, 2000)	A business model is a unique blend of three streams - the value stream for the business partners and the buyers, the revenue stream, and the logistical stream - that are critical to the business				✓			✓										✓	N	

*The business model is indicated to be suitable for: a single firm (S); collaborating organizations, multiple firms or a value networks (C); or a single firm within a value network (N). **Business model components which did not fit within the V4 Business Model structure.

Based on the analysis of business model papers, the distinction is made between firm-centered and network-centered business models. The difference between the two perspectives is that the former refers to the application of business models to a single firm, while the latter perspective approaches the business model of a network of firms.

All papers are classified to different extents within V4 (Figure 3). Although it was possible to classify all business model papers according V4, 39% of the papers included also business model components which could not be categorized according to V4 (final column in Table 3). These papers included in the business models concept components mainly related to strategy such as competitive strategy, strategic scope, scope of management, and strategic objectives (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010, 2007; Hedman and Kalling, 2003; Shafer et al., 2005; Tikkanen et al., 2005). Other papers explicitly mentioned mission and visions statements as business model components (Alt and Zimmermann, 2001; Pateli and Giaglis, 2004). Furthermore, the sub-dimensions of V4 are well represented by other business model papers as indicated in Figure 4.

Figure 3: Classification of business model papers according V4

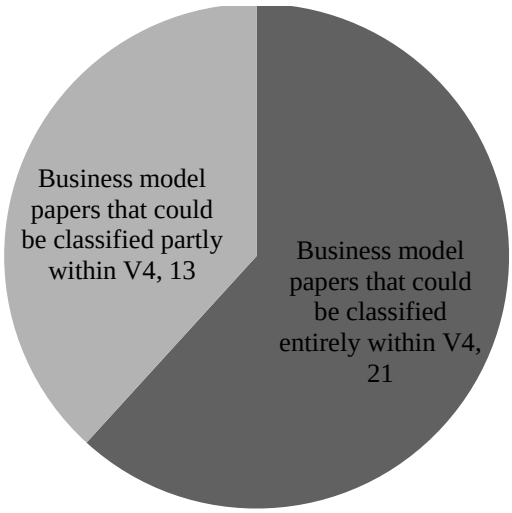
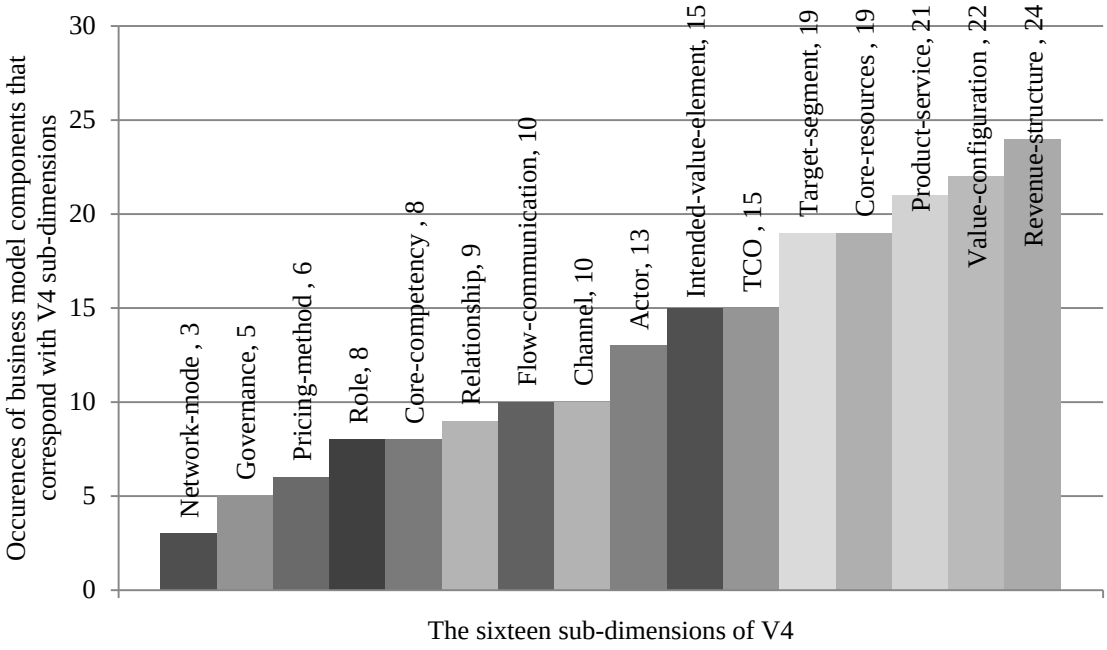
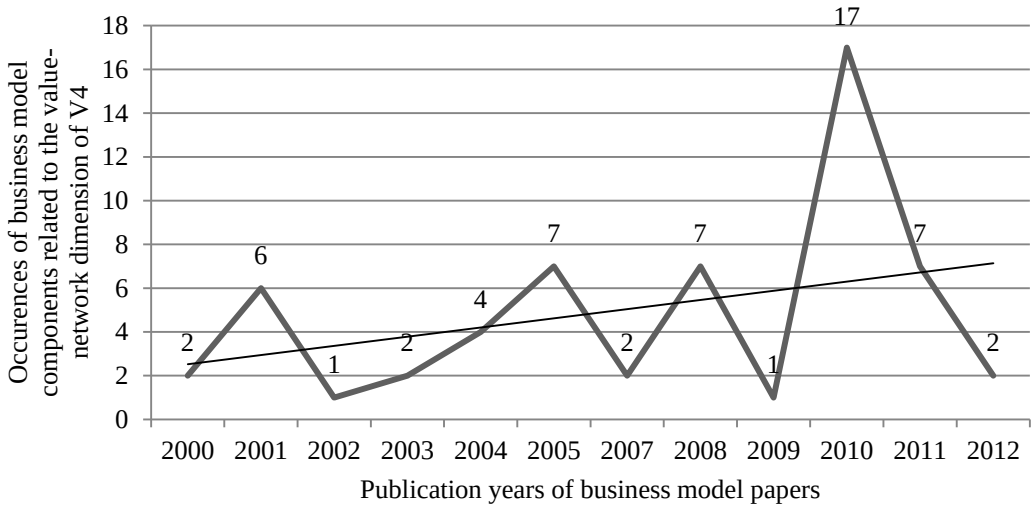


Figure 4: Occurrences of business model components that correspond with V4 sub-dimensions



Through the analysis of the papers it is apparent that business models increasingly consider components related to value networks (Figure 5). Thus, a conclusion is that papers have increasingly considered the value network as part of the business model during the past decade. An explanation may be indeed the increased interconnectedness of organizations to co-produce value through the development, usages and availability of information and communication technology and the internet (Al-Debei and Fitzgerald, 2010a; Fielt, 2011; Jiménez et al., 2005; Loss and Crave, 2011; McGrath, 2010; Peppard and Rylander, 2006; Zott et al., 2011).

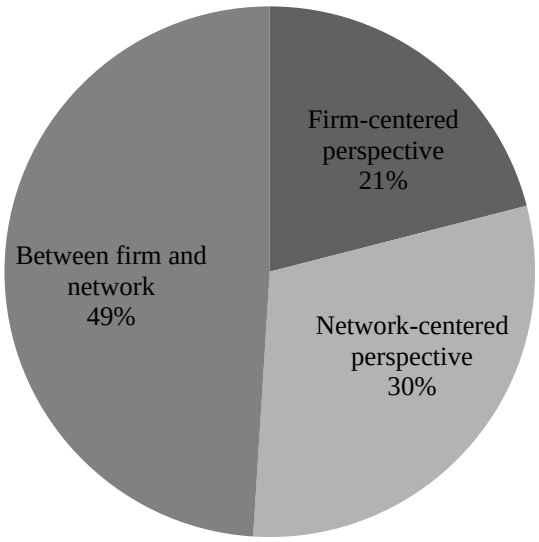
Figure 5: Increasing consideration of the value-network dimension



Moreover as indicated by several authors, business models are applied in different contexts (Al-Debei and Avison, 2010; Burkhart et al., 2011; Fielt, 2011; Gordijn et al., 2005; Pateli and Giaglis, 2004). They are used to understand businesses at different levels such as individual organizations, organizational parts, and business networks. Even at the individual level business models are applied to reinvent ones abilities, and career (Clark et al., 2012), and to investigate "the set of activities, organizing, and strategic resources individuals employ to create and capture value while pursuing their interests and motivations" (Svejenova et al., 2010, p. 408).

Based on the definitions and applications (suggestions) of the studied papers business models are classified in Table 3 (second column from right) to be suitable for: a single firm (S); collaborating organizations, multiple firms or value networks (C); or a single firm within a value network (N). Accordingly 21% of the analyzed papers approach the business model concept from the firm-centered perspective while 30% of the papers elaborate the business model from a network-centered perspective. The majority (49%) of the examined papers classify the business model concept in between firm-centered and network centered perspectives (Figure 6). This suggests that business models are indeed considered from the perspective of a single firm as well as the perspective of a network of firms or value network (Al-Debei and Avison, 2010; Zott et al., 2011).

Figure 6: Business Model perspectives



2.1.1 FIRM CENTERED BUSINESS MODELS

An example of a firm-centered business model is indicated through the following business model definition: "A business model describes the rationale of how [an organization] creates, delivers, and captures value" (Osterwalder and Pigneur, 2010, p. 14). In other words, the business model reasons from the perspective of a single firm, even though it might (and often does) consider inter-firm relations and the importance of partnerships and suppliers. Nonetheless, essentially the business model elaborates the core logic of doing business for a specific company (Pateli and Giaglis, 2004; Shafer et al., 2005). Other examples of firm centered business model definitions are "how [a company] makes money" (Chesbrough and Rosenbloom, 2002, p. 533) and "a simplified representation of [a companies] business logic" (Arana and Castellano, 2010, p. 105).

At the core of firm-centered business models lies the individual firm and its products or services. The business model then describes the core logic for the firm to create, deliver and capture value. Therefore firm-centered business models approach the value proposition as "the ways in which an organization along with its providers and partners (business actors) create value for its customers" (Al-Debei and Avison, 2010, p. 365).

2.1.2 THE BUSINESS MODEL CANVAS

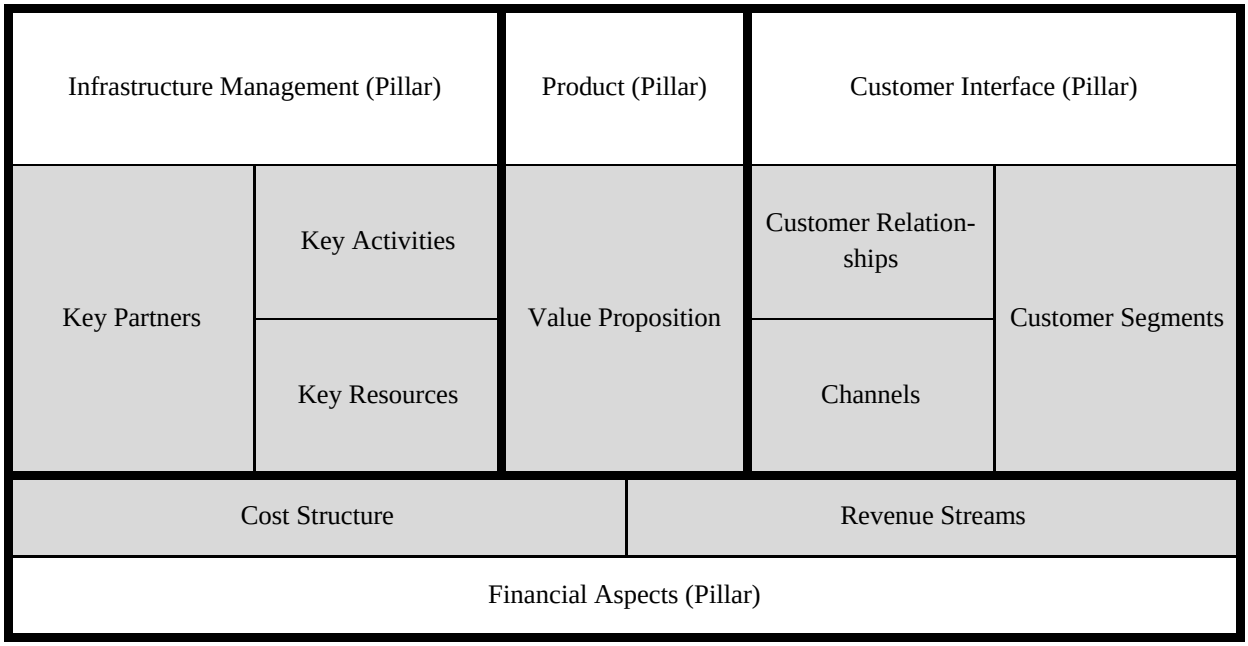
As explained earlier in section 1 the Business Model Canvas is used by the commissioning organization for the Business Model Management value proposition because the Business Model Canvas is well known and popular among practitioners. As a result the Business Model Canvas is prominent for the purpose of this study. The Business Model Canvas is based on the business model ontology which is developed by Osterwalder (2004) during his PhD research and has become the most known representation of a business model (Andersson et al., 2006; Gordijn et al., 2005; Jiménez et al., 2005; Loss and Crave, 2011; Meertens et al., 2012). It is a holistic and easy applicable tool to develop, analyze and innovate business models of new and existing businesses. The Business Model Canvas is based on earlier works of Osterwalder (Osterwalder and Pigneur, 2003, 2002; Osterwalder, 2004; Osterwalder et al., 2005, 2004, 2002).

The Business Model Canvas consists of four pillars; Customer Interface; Product Innovation; Financial Aspects; and Infrastructure Management. Each pillar contains a set of building blocks. All four pillars combined contain nine building blocks which together form the Business Model Canvas. The Business Model Canvas allows entrepreneurs, managers and consultants to capture, visualize, understand, and communicate ideas on a single sheet of paper. It enables analysis through measurement of relevant key indicators derived from business model components. In addition, the Business Model Canvas allows tracking and observing key components over time. The comparison of a company's Business Model Canvas to other canvases from different industries is fruitful and stimulates business model innovation (Sinfield et al., 2012). Table 4 contains the pillars, building blocks and their brief descriptions and Figure 7 illustrates the Business Model Canvas.

Table 4: The pillars, building blocks and key questions of the Business Model Canvas

Pillar	Building block	Key questions
Product (What business the company is in, the products and the value propositions offered to the market)	Value Propositions	What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? Which customer needs are we satisfying? What bundles of products and services are we offering to each Customer Segment?
Customer Interface (Who the company's target customers are, how it delivers them products and services, and how it builds a strong relationships with them)	Customer Segments	For whom are we creating value? Who are our most important customers?
	Channels	Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?
	Customer Relationships	What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How costly are they? How are they integrated with the rest of our business model?
Infrastructure Management (How the company efficiently performs infrastructural or logistical issues, with whom, and as what kind of network enterprise)	Key Resources	What Key Resources do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams?
	Key Activities	What Key Activities do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue streams?
	Key Partnerships	Who are our Key Partners? Who are our key providers? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform?
Financial Aspects (What is the revenue model, the cost structure and the business model's sustainability)	Revenue Streams	For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?
	Cost Structure	What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive?

Figure 7: The Business Model Canvas (Osterwalder and Pigneur, 2010)



2.1.3 NETWORK CENTERED BUSINESS MODELS

In contrast to the firm-centered Business Model Canvas, other business model definitions adapt a network-centered perspective by reasoning that a group of businesses and their value capturing and exchanging activities combined form the business model instead of a single firm. An example of a network-centered business model definition is found in the E3-value business model ontology (further referred to as E3-value) of which the purpose is "to help define how economic value is created and exchanged within a [network of actors]" (Gordijn and Akkermans, 2001, p. 11). In contrast to the Business Model Canvas E3-value emphasizes the interactions between businesses, instead of focusing on a single enterprise (Gordijn et al., 2005). Network-centered business models acknowledge that companies do not operate on their own; however they have many relations with other businesses (Komulainen et al., 2004) and therefore require "a higher involvement by other stakeholders, i.e. customers, providers, partners, in a company's business model and deeper consideration of their business processes and benefits" (Tsvetkova and Gustafsson, 2012, p. 247).

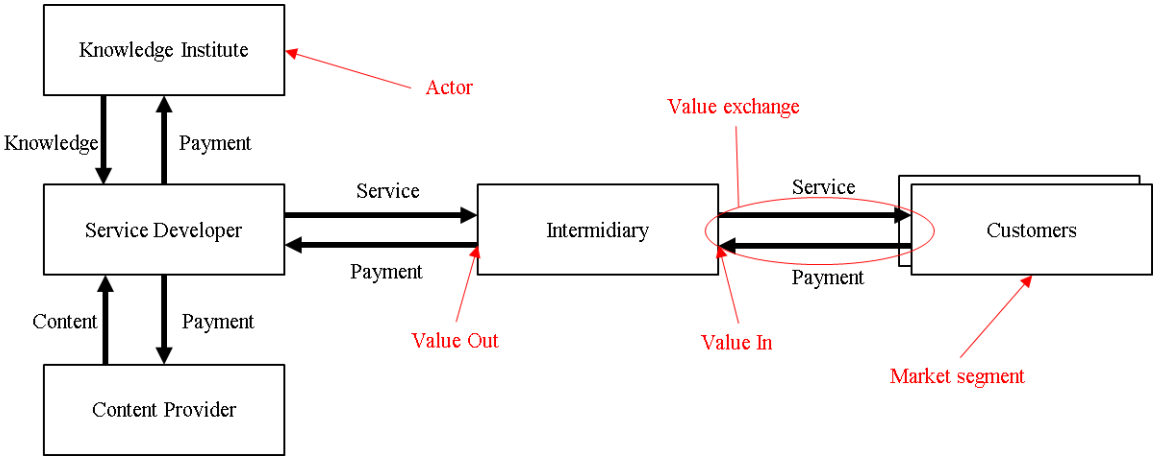
The focus of network-centered business models is not only the individual firm. Instead, network-centered business models clarify the value exchanges between a group of collaborating organizations and key activities performed by organizations to create, deliver and capture value for an end customer. Therefore, network-centered business models refer to "the ways in which an organization along with its stakeholders create value for each party involved" (Al-Debei and Avison, 2010, p. 365).

2.1.4 THE E3-VALUE BUSINESS MODEL ONTOLOGY

While the Business Model Canvas clarifies the core business activities of an organization to create, deliver and capture value E3-value described the value exchanges among actors of a value network (Gordijn and Akkermans, 2001; Gordijn et al., 2000). E3-value represents the business logic view of a value network and "entails defining, deriving, and analyzing multi-enterprise relationships, e-business scenarios, and operations requirements in both qualitative and quantitative ways" (Gordijn and Akkermans, 2001, p. 11). It enables the visual representation of value exchanges between value network actors by modeling their interactions. Subsequently E3-value enables the analysis of monetary values

between actors. E3-value is suitable to model and evaluate the economic viability of a business model, through an assessment of incoming and outgoing values of involved actor. In addition, the evaluation of different scenarios through profit sheets clarifies how all actors could gain from the value network. Although Pateli and Giaglis (2004) indicate that the difficulty of expressing value flows in monetary terms is a major shortfall of E3-value, Gordijn and Akkermans (2001) argue that the articulation of the economic potential of a business model is required by business analysts and that the "industry lacks effective techniques to express and analyze the value viewpoint" (p. 11). In this study the economic analysis techniques based on the principle of value exchanges is appreciated because it is considered to be viable for the clarification of the economic potential of a value network. A simplified representation of E3-value is illustrated in Figure 8 in which profits for the each actor could be calculated by subtracting the totals of value out from the totals of value in of the respective actor.

Figure 8: Simplified illustration of an E3-value business model

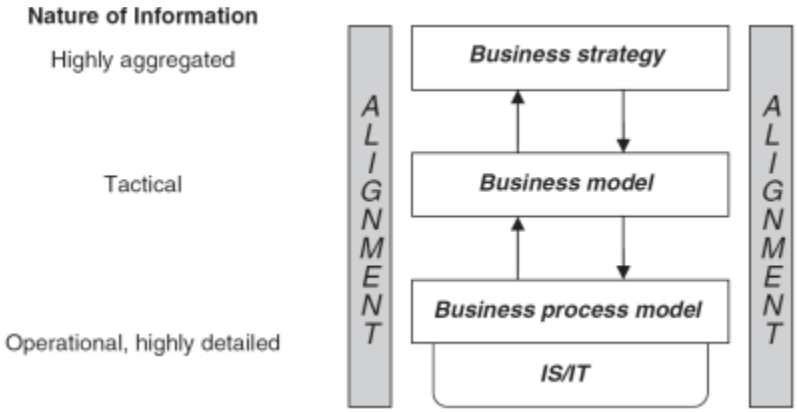


2.1.5 BUSINESS MODEL ALIGNMENT

Recently, in the Journal of Long Range Planning a special issue on business models was published (Long Range Planning, Volume 43, Issues 2–3, Pages 143-462, April–June 2010) which contains nineteen papers that examine business models from an academic point of view, highlighting the theoretical and conceptual foundations and empirical applications of the concept. A brief review of these papers reveals that business model alignment is considered in different perspectives.

One perspective concerns the internal alignment of business models. According to Sosna et al. (2010) newly developed business models require organizational alignment as managers need to mobilize resources and develop competencies to implement the business model. Similarly McGrath (2010) argues that firms need to align their business logic according to newly developed business models. Indeed, according to Al-Debei and Avison (2010) the business model functions as an alignment instrument that improves "harmonization and consistency among strategy and business process" (p. 366). As illustrated in Figure 9 strategy, business models, business processes, and information systems/technology need to be treated as a harmonized package (Al-Debei and Avison, 2010).

Figure 9: Alignment of business layers (Al-Debei and Avison, 2010)



While business model alignment is highlighted from an internal perspective – concerning the alignment of the organization according newly developed business models or the alignment of strategy with business processes – others approach business model alignment from an external perspective. Accordingly Smith et al. (2010) argue that organizations analyze the external environment and strategize their course of action accordingly, consequently business models needs to be aligned with the external environment. In a similar vein Svejenova et al. (2010) note that business Models need to be aligned with changes in venture needs, stakeholder priorities, and the external environment. Business model realignment is required due to environmental changes (Wirtz et al., 2010).

From the strategic management perspective designing and aligning business models is considered to be a dynamic capability (Teece, 2007). Dynamic capabilities are organizational routines – such as strategic decision making, product development, and alliancing – by which firms gain, reconfigure, integrate, and dismiss their resources (Eisenhardt and Martin, 2000). According to Eisenhardt and Martin (2000) dynamic capabilities routines have been researched extensively in related literature streams. For example, gaining resources can be achieved through knowledge creation routines such as Research and Development and alliancing and acquisition routines "whereby managers and others build new thinking within the firm" (Eisenhardt and Martin, 2000, p. 1108). The reconfiguration of resources can be achieved through replication and brokering routines in order to copy, transfer, and recombine the resources. Resource allocations enable the distribution of scares resources within an organization. Resource reconfigurations are also achieved through coevolving which is about reconnecting "webs of collaborations among various parts of the firm to generate new and synergistic resource combinations among businesses" (Eisenhardt and Martin, 2000, p. 1107). Resource integrations could be achieved by product development and strategic decision making routines. Both routines integrate personal skills, expertise, and backgrounds of organizational actors. Finally dismissing resources could be achieved by routines that enable abandoning resources that do not longer provide competitive advantage. Ultimately the goal of dynamic capabilities regarding business model alignment is therefore to gain, reconfigure, integrate and dismiss resources of value network actors amongst each other and align their business models accordingly – altering their resources base to initiate new value adding activities and achieve competitive advantage.

2.2 VALUE NETWORKS

Value networks consist of multiple organizations that collaborate and utilize their resources and capabilities to produce and deliver a product or service to an end customer and create value for the organi-

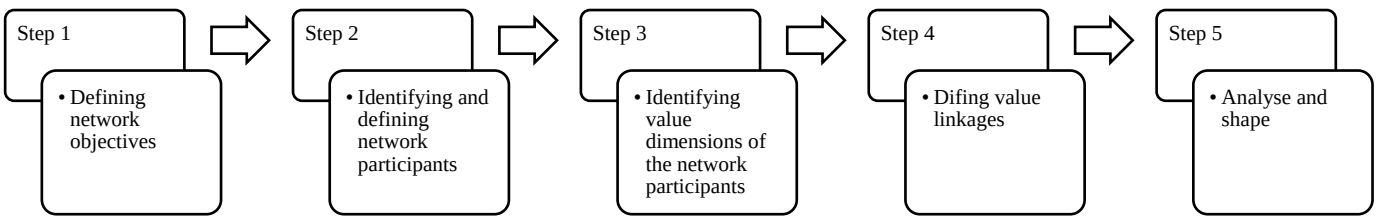
zations within the value network (Helander and Rissanen, 2005; Peppard and Rylander, 2006). In the following sections two value network development methodologies are described to answer the second research question; What methodologies exist for the development of value networks? For the purpose of this study value network development methodologies are examined in order to determine their usage combined with business models. The respective value network development methodologies have been selected based on their expected suitability for an application in practical settings. For instance, Allee (2009) also discusses value network analysis. She defines value networks as "any purposeful group of people or organizations creating social and economic good through complex dynamic exchanges of tangible and intangible value" (p. 3). While her approach enables the analysis of value creating roles and relations and the utilization and conversion of tangible and intangible assets, for the purpose of this study Allee's value network analysis techniques are considered less suitable due to the emphasis on value conversion, in contrast to the business oriented emphasis on value exchange for the purpose of this study. Furthermore, other research on value networks is considered to be less suitable for this study due to their theory testing (such the paper of De Reuver and Bouwman (2012) where hypotheses are developed and tested to determine governance mechanisms of value network) and theory developing (such as the paper of Möller and Rajala (2007) that classifies types of value networks to structure the theoretical field) natures. Therefore, to my best knowledge the hereafter described two methodologies for value network analysis of Peppard and Rylander (2006) and Al-Debei et al. (2013) are the most up-to date and practice oriented papers on value network development available. These two papers are found through searching the electronic databases that are used for this study (Google Scholar, EBSCO Information Services, SCOPUS, and Web of Knowledge).

2.2.1 THE NETWORK VALUE ANALYSIS APPROACH

Peppard and Rylander (2006) describe the value network as an interconnected network of organizations that form a value creating systems in which providers, partners and customers work together to co-produce value. The authors suggest the Network Value Analysis methodology of which the aim is to indicate where value lies in the network and how it is created. Network Value Analysis consists of five steps (Figure 10) and is meant to clarify implications for value network development. Through the application of Network Value Analysis the following questions supposed to be answered (Peppard and Rylander, 2006, p. 134):

- What roles (or groups of players) are benefiting most in the configuration?
- What are the key resources they need to have?
- Could an actor build the resources and capabilities required to compete in its role?
- Which roles are appropriate for each actor?

Figure 10: Network Value Analysis methodology



The purpose of the first step is to define the network and its boundaries from the perspective of the network focal. The network focal is the organization whose business model is dependent upon the network. Step two requires the identification of the organizations that could influence the value which is delivered through the value network to the customer. Step three involves clarifying the perceived values that participants may acquire when participating to the network such as access to new, complementary resources; reducing costs; reducing time to market; access to new markets; risk reduction and risk sharing; access to new technologies; and learning (Oksanen et al., 2010). According to Peppard and Rylander (2006) investigating perceived advantages and disadvantages of actors regarding their participation in the value network is important because "perceived value is a key driver of behavior… it is the perceived values that steer what people and firms are willing to do and not do" (Peppard and Rylander, 2006, p. 135). The investigation of positive and negative effects of the value network perceived by participants is in particular advantageous for opportunity networks which are emerging networks of which "no one knows what they will look like in the future" (Peppard and Rylander, 2006, p. 135).

Opportunity networks are classified as emerging business nets that are managed through an informal leadership style and self-coordination and where collaboration is based on trust and norms (Möller and Rajala, 2007). Furthermore Möller and Rajala (2007) state that emerging business nets have a low level of determination – which is the extend that value activities of the business net and the resources of the participant to carry them out are clarified (Möller and Rajala, 2007). The fourth step involves the identification of influences such linkages between network members and concern what flows in the network. Finally in step five the value network is analyzed and shaped. Peppard and Rylander (2006) indicate that the behavior of the network should also be examined, for instance by describing different types of networks, network participants and their roles and future scenarios which may be contingent upon external factors such as market, regulation and technology (Kijl et al., 2005).

2.2.2 THE VALUE NETWORK DEVELOPMENT MODEL

Al-Debei et al. (2013) describe the value network in the context of mobile operators. They state that different parties who need to collaborate to develop mobile data services form the value network instead of a single telecom operator. These parties often have different strategic objectives and therefore need to be aligned when a value network is developed. They aim of the value network is to collectively create value for the customer and the involved stakeholders. Based on previous works (Al-Debei and Fitzgerald, 2010a, 2010b) Al-Debei et al. (2013) propose a value network-model which contains seven design constructs that support the development of a value network. The design constructs are network-mode, actor, role, relationship, flow communication, channel, and governance. Value network development and design constructs enable the development of complex, collaborative and interconnected value networks that foster innovation in changing and competitive environments (Al-Debei et al., 2013). Through the development and analysis of value networks design constructs the following questions are supposed to be answered:

- How do actors need to collaborate within the value network?
- Who are the primary actors within the value network and what roles do they fulfill?
- What misalignments may occur between objectives of actors?
- What information flows occur between the actors?

The network-mode refers to the understanding of the way in which the value network is established and expanded. The network-mode can be open or closed. An open network-mode refers to the possibility of participation of any actor to the vale network while a closed network-mode refers to the participation of only a selected number of actors. The choice for a network-mode is dependent upon the purpose of the value network. For instance an open network fosters innovation within the value network because it allows new actors to propose ideas and knowledge. In contrast a closed network-mode is easier to manage and less expensive and time consuming in terms of actor screening and alignment of different objectives of actors. Determining the network-mode requires the consideration of the purpose of the value network and evaluating the trade-offs between open and closed network-modes.

Governance defines the actors who manage, control, and/or directs the value network. At the industry level governance involves the influences of regulations and legal institutions and their power and control over the characteristics of the value network. Value networks themselves can be governed hierarchically or in a flattened mode. The hierarchical governance mode involves one or few actors who dominate the power in the value network. A flattened governance mode implies that all value network actors share costs, risks, knowledge, capabilities, etc. more equally. Al-Debei et al. (2013) adapted the network-mode and governance form design constructs from Pisano and Verganti (2008) who formulate and discuss four collaboration modes that might be adapted by cooperating organizations.

Actors refer to the involved parties that realize the value network. Identifying value network actors is based on the previous step, especially the determined network-mode. In a closed network-mode specific actors need to be identified who need to collaborate to deliver the product or service of the value network. In an open network-mode the potential contributions of an extensive set of actors have to be screened in order to determine the delivered value of the network.

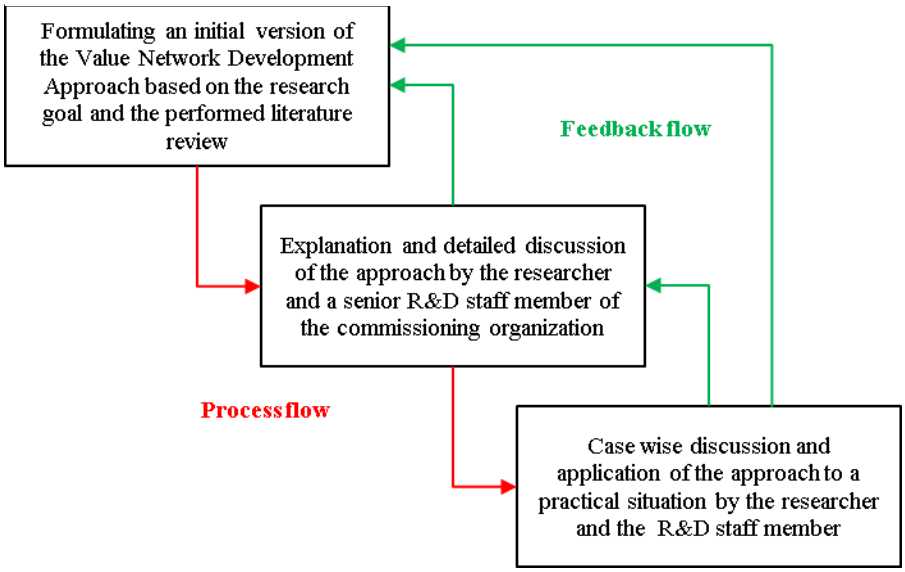
Each value network actor fulfills functional or strategic roles which indicate the importance of different actors within the value network. Functional roles are fulfilled by actors that contribute to the value network through their knowledge, experience, and specialties. Such roles are considered from an operational point of view. Strategic roles are fulfilled by actors who contribute directly to a key objective or function of the value network. Al-Debei et al. (2013) identify eight strategic roles for mobile telecom operators – Resources allocation; Efficiency; Risk mitigation; Effectiveness; Time-to-market; Agility; Intelligence and Creativity; and Enlarging customer base.

Relationship refers to the relationships which could be established between value network actors. Flow communication and refers to objects communicated between the actors of a value network. In order to understand flow communications of a value network, visual maps could be employed. The channel design construct involves the channels actors of a value network might use to facilitate flow communications. The channel construct is related to the flow communication construct since it channels are needed to be designed for flow communications between value network actors.

3 A VALUE NETWORK DEVELOPMENT APPROACH

For this study a methodology is formulated for the development of value networks and alignment business models. The Value Network Development Approach is proposed which consists of five activities. By formulating the detailed activities of the Value Network Development Approach the third sub-question (How can representations of a value network and related business models be demonstrated and evaluated?) and main question (How can the Business Model Canvas support a methodology for the development of value networks?) of this study are answered. The Value Network Development Approach is formulated through a synthesis of the theoretical insights gained by the researcher and discussions with the commissioning organization. The overall process of the theory synthesis and the development of the approach consist of three iteration steps (Figure 11).

Figure 11: The process of theory synthesis and development



As indicated in Figure 11, first based on the goal of this study and the knowledge that is gained through the literature review in chapter 2, the researcher formulated an initial version of the Value Network Development Approach. Accordingly, the literature review enabled the researcher to consider key dimensions and constructs of value networks and business models for the formulation of the Value Network Development Approach.

Second, the formulated approach is explained by the researcher to a senior R&D consultant of the commissioning organization to initiate discussions regarding the approach and retrieve feedback from the R&D consultant. During this step the presented approach was discussed in detail by the researcher and the R&D consultant.

Third, the application of the approach to fictional value networks and the single case study of this research are discussed by the researcher and de R&D consultant. For instance, the first version of the Value Network Development Approach consisted of six activities. When the researcher and the R&D consultant discussed the approach for an application on a business situation where multiple actors collaborate to produce a service (e.g. a value network), it became apparent that the approach lacked detailed application templates for the majority of its activities. Such discussion results are used as feedback by the researcher to reformulate the Value Network Development Approach.

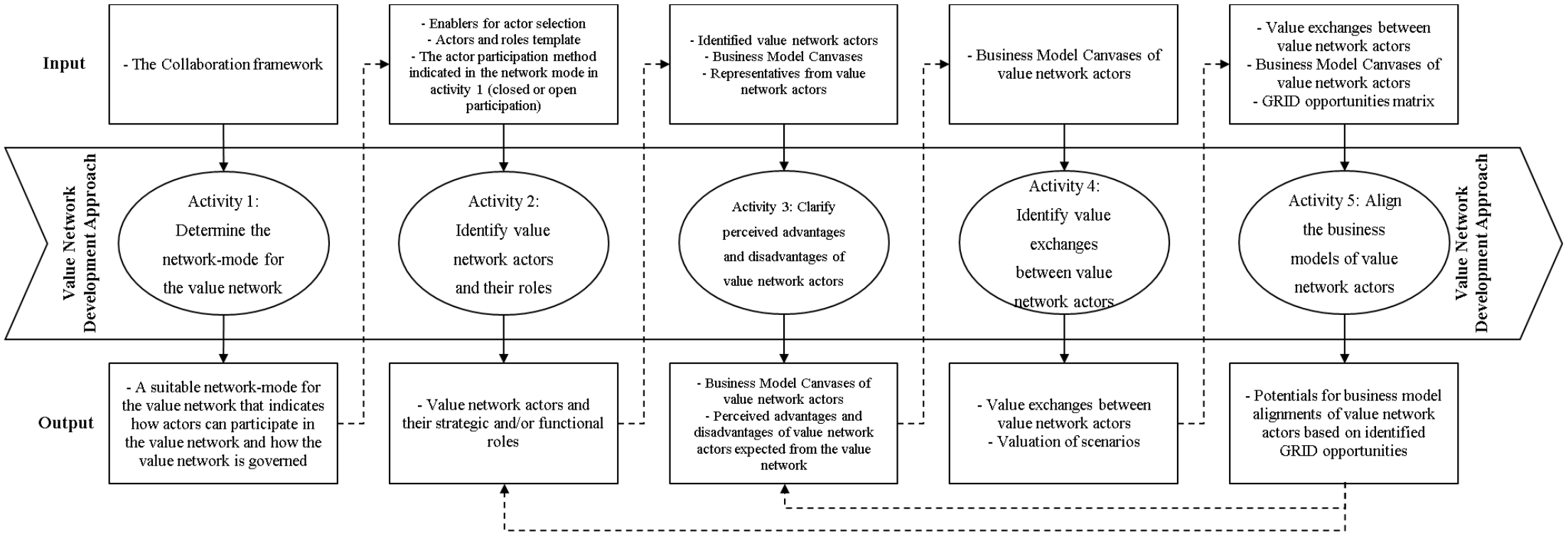
The synthesis and development cycle was repeated until the current Value Network Development Approach was produced. The five activities of the Value Network Development Approach, their descriptions and used theories are summarized in Table 5. Detailed descriptions all five activities are provided in chapter 3.1 – 3.5. Subsequently the application of each activity is demonstrated by means of a single case study in chapter 5. Finally all activities are evaluated in chapter 6.

Table 5: A brief description of the Value Network Development Approach

Activity	Description	Authors of used method or theory
Activity 1: Determine the network-mode for the value network	A network-mode that suits the purpose of the value network has to be determined. The network-mode clarifies the ways in which actors could participate in the value network. In addition the network-mode clarifies how the value network is governed. This activity also clarifies the purpose of the value network.	(Al-Debei et al., 2013; Pisano and Verganti, 2008)
Activity 2: Identify value network actors and their roles	The purpose of activity two is to identify the participants of the value network and their roles. This activity is dependent on the outcomes of the previous activity. Specifically actor identification is based on the collaboration form that is selected in the first activity from the collaboration framework. Strategic and/or functional roles of value network actors should also be determined in order to produce a clear picture of the positions and importance of actors.	(Al-Debei et al., 2013; Pisano and Verganti, 2008)
Activity 3: Clarify perceived advantages and disadvantages of value network actors	The purpose of this step is to identify the perceived values that actors intend to capture from the value network. In this study the Business Model Canvas is suggested as a basis from which actors will be able to identify relevant perceived advantages and disadvantages that they expect to retrieve from the value network as clarified in the previous activities. The Business Model Canvas is used because it is (a) required by the commissioning organization and (b) because it is a simply applicable and understandable business model representation.	(Osterwalder and Pigneur, 2010; Peppard and Rylander, 2006)
Activity 4: Identify value exchanges between value network actors	In this activity the individual Business Model Canvases of value network actors (from activity 3) are used to clarify the exchanges and economic potentials of actors.	(Gordijn and Akkermans, 2001; Osterwalder and Pigneur, 2010)
Activity 5: Align the business models of value network actors	The goal of this activity is to align the business models of value network actors with each other by identifying opportunities to gain, reconfigure, integrate, and/or dismiss resources amongst value network actors. The exchanges between value network actors that have been identified in activity 4 are used to perform this activity.	(Eisenhardt and Martin, 2000; Osterwalder and Pigneur, 2010)

As mentioned in Table 5 and explained in more detail in chapter 3.1 through 3.5, dependencies occur between several activities. Specifically, to perform activity 2 the output of activity 1 is required. Similarly activity 3 requires the output of activity 1 and 2. Furthermore, activity 4 requires the output of activity 3 and activity 5 requires the output of activity 4. Finally activity 5 enables iterations to activities 2 and 3. Figure 12 illustrates the inputs, outputs and iterations for the 5 activities of the Value Network Development Approach.

Figure 12: Dependencies between activities of the Value Network Development Approach



As described in chapter 1.3 the second activity of the Design Science Research Methodology requires the formulation of solution objectives that indicate the key features that need to be covered by the design artifact – in this study the Value Network Development Approach. Objectives can be quantitative, such as measures of the better performance of the desired solution compared to current ones or qualitative such as the description of how the design artifact will support the solution of the addressed problem definition. In this study solution objectives have been formulated through discussions between the commissioning organization and the researcher. In addition the researcher's own insights, gained through studying relevant theory, have been considered for the formulation of solution objectives. Similar to the previously discussed synthesis and development cycle (Figure 11) several iterations have been performed by the researcher in collaboration with the commissioning organization to formulate the solution objectives. During such iterations firstly, the researcher presented and explained the initial version of the solution objectives. Subsequently, a senior R&D consultant of the commissioning organization reviewed the solution objectives. The feedback provided by the R&D consultant is used by the researcher to reformulate the solution objectives. Again, this presentation and review cycle continued until satisfactory solution objectives were achieved. The solution objectives are five descriptions of criteria that need to be met as much as possible by the Value Network Development Approach (Table 2). In chapter 6 the Value Network Development Approach will be evaluated by comparing its application to the solution objectives.

Table 6: Solution objectives

Solution objective	Description
Clarification of value exchanges	Following the motivation of Gordijn and Akkermans (2001) the approach needs to be suitable to clarify value exchanges between actors in order to emphasize the potential economic viability of the value network for all actors. Therefore a representation of cash flows and profits for each actor within the value network are required.
Clarification of value network design constructs	The analysis and development of feasible value networks requires the consideration of critical design constructs (Al-Debei et al., 2013). In this study value network design constructs are assumed to be critical success factors that need to be considered when analyzing and developing a viable value network. Therefore it is preferred to include relevant value network design constructs in the approach.
Use of Business Model Canvas	In line with the research question and purpose of the paper, it is highly preferred to include the Business Model Canvas in the developed approach. First of all, the main goal of the research is to support the business model management proposition of the commissioning organization. Since this proposition is based on the Business Model Canvas it is necessary to include the Business Model Canvas in the method. Second, the importance of including the Business Model Canvas in the approach is also due to the popularity and ease of use of the Business Model Canvas experienced by business practitioners and consultants (Andersson et al., 2006; Gordijn et al., 2005; Jiménez et al., 2005; Loss and Crave, 2011; Meertens et al., 2012).
Use of visualizations	Visual representations allow a comprehensive picture of what needs to be communicated. For example the Business Model Canvas is valued by business practitioners and consultants because it is a handy and easy to use tool that shows the entire business on a single sheet paper and digitally (Kraaijenbrink, 2012a, 2012b). Visual representation allows humans to overcome their cognitive limitations and identify patterns, relations in data and structure the total picture (Basole, 2009). The graphical representation of business models is valuable since it is suitable to communicate key information and acquire in-depth understandings (Pateli and Giaglis, 2004). Visualizations therefore are required for the proper communication of information. Consequently, one of the objectives of the design artifact is to represent results through visualizations as much as possible.
Practice oriented approach of method	The commissioning organization intends to include the Value Network Development Approach-approach in its business model management value proposition. Especially for consulting services the approach needs to be used by consultants in practical situations during client assignments. Therefore it is preferred that the approach is practice oriented. It should provide useful results for consultants and clients. Furthermore, the approach should be based on known theories and practices.

3.1 ACTIVITY 1: DETERMINE THE NETWORK-MODE FOR THE VALUE NETWORK

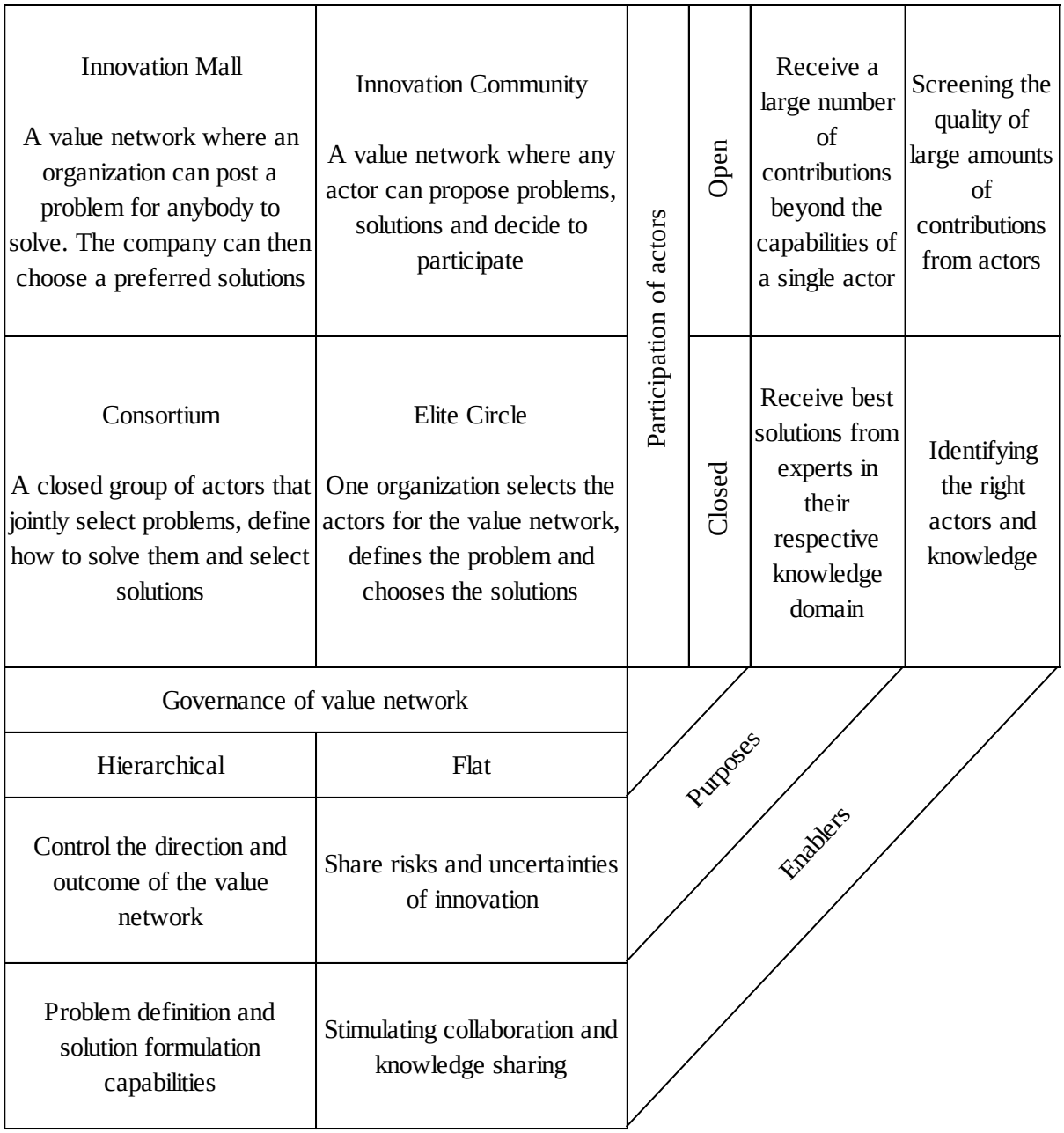
The purpose of this first activity is identifying the goal of the value network and determining a feasible network-mode that fits the goal of the value network. The network-mode is classified as they ways in which actors can participate in the value network (closed vs. open participation) and the governance form (hierarchical vs. flat governance) for guiding and steering the functioning of the value network (Al-Debei et al., 2013). The network-mode is introduced by Al-Debei et al. (2013) and is based on the four collaboration forms of Pisano and Verganti (2008). For each of the four collaboration forms Pisano and Verganti (2008) describe purposes and enablers that in this study are regarded as critical success factors for the successful collaboration within a value network. Hence, this activity identifies the proper collaboration form for value network actors.

Figure 13 illustrates the collaboration framework that is suggested as a template for performing this activity. The collaboration framework contains the purposes and enablers that need to be examined for the value network. The four blocks at the right upper corner of the framework concern purposes and enablers for open and closed participations modes. The four blocks at the lower left corner of the framework contain purposes and enablers for hierarchical or flat governance forms. To perform this activity the following sub-steps are suggested:

1. Determine goal of the value network. Select a network-mode that matches the goal of the value network. Network modes (Innovation Mall, Innovation Community, Consortium, and Elite Circle) and their characteristics can be found in the four blocks at the upper left corner of the framework.
2. Each network mode corresponds to a distinct form of actor participation and governance form. For the selected network-mode, the absence or presence of enablers for participation modes and governance forms need to be elaborated with regard to the value network.
3. When a proper network mode, and related actor participation and governance form for the value network are selected, the framework could be used to represent a brief description of the enablers for the governance form and actor participation of the value network.

For a value network an initial and future network-mode could be elaborated. Whereas the initial network-mode refers to the proper collaboration form of the value network in an early stage, the future network-mode refers to a desired future collaboration form of the value network.

Figure 13: The collaboration framework (Pisano and Verganti, 2008)



3.2 ACTIVITY 2: IDENTIFY VALUE NETWORK ACTORS AND THEIR ROLES

This activity involves identifying value network actors and their roles. While actors refer to the involved parties that make up the value network, roles indicate their strategic or functional purposes within the value network.

Actor identification for a value network is necessary because mechanisms need to be utilized to enable proper actor selection and participation. The identification of actors is based upon the results of activity 1 since different strategies need to be followed to identify actors for open or closed actor participations. In a network-mode with open actor participation many actors can participate in the value network. Therefore mechanisms that enable the identification and selection of relevant actors are im-

portant. In a network-mode with closed actor participation a select group of actors form the value network. Here it is important to be able to identify the right knowledge and the actors that possess such knowledge. Accordingly in this activity the identification of actors for the value network that is developed could be determined based on the clarification of enablers as exemplified in Table 7.

Table 7: Enabling factors for actor selection (Pisano and Verganti, 2008)

Enabling factors for actor selection in different network-modes	
Closed network-mode	**Open network-mode**
Identify the right knowledge domains and the actors who can provide that knowledge	Determine how to attract actors, enabling their quick contributions to the value network, and screen actors contributions

After the identification of value network actors, their roles need to be clarified. According to Al-Debei et al. (2013) it is important to align conflicting strategic objectives of actors within the value network. For instance while one actor may have the objective to produce and sell as much as possible against the lowest operational costs, other actors may have the objective to produce customized product and services and differentiate their offering among customers. Al-Debei et al. (2013) argue that such potentially conflicting objectives need to be aligned to ensure a certain degree of consistency in the value network. However, the authors do not explain how alignment could be achieved. Al-Debei et al. (2013) formulate strategic and functional roles of actors that determine the strategic or functional contribution of actors to the value network and might indicate the position and power of actors within the value network. Furthermore, actor roles indicate their purpose and activities within the value network. Table 8 illustrates eight strategic roles, and an example of a functional role adapted from Al-Debei et al. (2013).

Table 8: Actor and roles template

	Actor roles	**Description**
Strategic roles	Resources allocation	When scares resources of specific actors are needed
	Efficiency	Costs saving through the utilization of resources of actors
	Risk mitigation	Sharing development costs and investments related to the value network
	Effectiveness	Actors that positively affect the performance of the service or product offered by the value network
	Time-to-market	Actors that are able to quickly introduce products and service to markets
	Agility	Actors that enable the value network to respond to changing needs
	Intelligence and Creativity	Actors that are able to explore new opportunities for services or product
	Enlarging customer base	Access of potential customers through an actor
Functional roles	Suppliers	Suppliers of services based on their expertise

3.3 ACTIVITY 3: CLARIFY PERCEIVED ADVANTAGES AND DISADVANTAGES OF VALUE NETWORK ACTORS

Perceived advantages and disadvantages of value network actors are classified in this activity in order to determine what actors expect to gain from participating in a value network. As noted by Peppard and Rylander (2006) perceived advantages and disadvantages of value network actors guide their

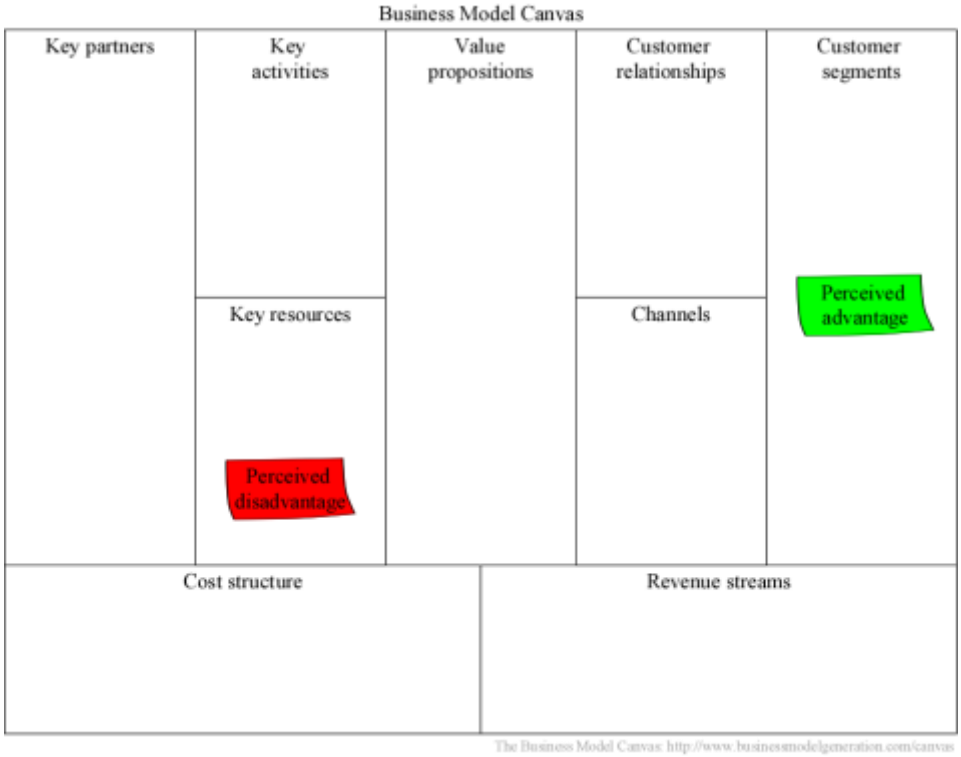
behaviors. Peppard and Rylander (2006) argue that especially in the case of an emergent network, of which no one knows exactly how it will be like, it is important to identify perceived advantages and disadvantages.

For this activity the Business Model Canvas is proposed as a basis to guide the identification of perceived advantages and disadvantages of value network actors. Since the Business Model Canvas represents the core business logic of the actor only relevant advantages and disadvantages that may affect the business logic of the actor are identified. Furthermore, the Business Model Canvas is a simple tool which is easily understood and applied by business people. Establishing the Business Model Canvas of actors could be achieved through individual workshops. During such workshops only a brief explanation of the Business Model Canvas is sufficient for the actor to understand how it should be applied.

While Peppard and Rylander (2006) notice that identifying the perceived advantages and disadvantages is important, they do not provide concrete subjects that might be perceived as an advantage or disadvantages by value network actors. Oksanen et al. (2010) investigate the motives that thrives actors to participate in a value network. Oksanen et al. (2010) summarize the key motives that thrives actors to participate in value networks based on the works of Ellram (1995); Hamel (1991); Narula and Hagedoorn (1999); Nielsen (2003); Parkhe (1993); Townsend (2003); and Wognum and Faber (2002). For this activity the motives formulated by Oksanen et al. (2010) are considered as potentially perceived advantages of actors. The motives of Oksanen et al. (2010) are formulated as potential benefits that actors might consider when participating in a value network. In contrast, to identify perceived disadvantages, the opposite outcome of each motive is considered. By doing so, eight subjects are considered as perceived advantages and disadvantages. In addition to these subjects perceived advantages and disadvantages that are mentioned by actors should not be neglected. The sub-steps to perform this activity are described below and need to be performed for each value network actor that is identified in activity 2.

1. Fill in the current Business Model Canvas of the value network actor during a workshop session (interactive collaboration with the actor is highly recommended since the actor possesses all the knowledge regarding his business model).
2. Inform the owner of the Business Model Canvas (the actor) about the value network, value network actors and their roles (as clarified in activity 1 and 2).
3. Identify perceived advantages and disadvantages of the actor with regard to its participation in the value network and position these perceptions on related building blocks of the Business Model Canvas. Figure 14 illustrates that perceived advantages could be indicated by a green color while perceived disadvantages could be indicated by a red color in the Business Model Canvas of a value network actor.

Figure 14: Identification of perceived advantages and disadvantages identification in the Business Model Canvas



After having identified the perceived advantages and disadvantages of value network actors, a template such as illustrate in Table 9 could be used to structure the total perceived advantages and disadvantages of each value network actors. The metrics that are retrieved from this template might indicate the overall perceptions (either positive or negative) of actors from participating in the value network. Furthermore, similarities and differences between perceptions of different actors need to be considered with regard to the initial purposes of the value network. For example, a majority of value network actors might perceive to benefit from access to a large number of potential partners through the value network. However, if a closed network-mode is maintained for the value network (as determined in activity 1) actors might not get access to large numbers of potential partners (since no additional actors can participate in a closed network). As a consequent, either actor perceptions or the network-mode need to be adjusted.

Table 9: Perceived advantages and disadvantages template for value network actors

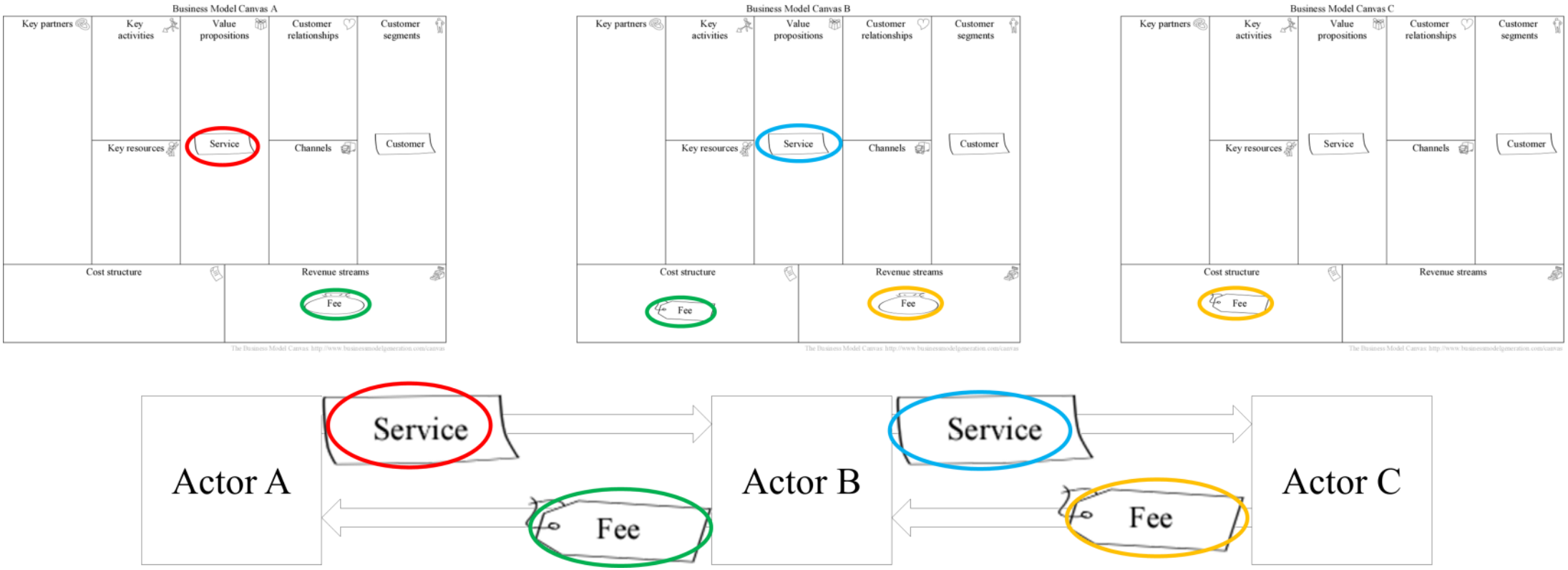
		Actor A	Actor B	Actor C	Totals occurrences of actor perceptions
Perceived advantages	Access to new, complementary resources	✓		✓	2
	Reducing costs				
	Reducing time to market	✓			1
	Access to new markets		✓	✓	2
	Risk reduction and risk sharing				
	Access to new technologies		✓		1
	Learning				
	Additional advantages				
Totals occurrences of advantages per actor		2	2	2	
Perceived disadvantages	Decreased access to new, complementary resources				
	Increase of costs				
	Increase of time to market	✓	✓		2
	No access to new markets				
	Increase of risk reduction			✓	1
	No access to new technologies				
	No opportunities for learning				
	Additional disadvantages				
Total occurrences of disadvantages per actor		1	1	1	

3.4 ACTIVITY 4: IDENTIFY VALUE EXCHANGES BETWEEN VALUE NETWORK ACTORS

In this activity value exchanges between value network actors are retrieved to highlight the economic feasibility of the value network. A key question behind the clarification of the value exchanges among value network participants is “What’s in it for me” (Beckett, 2005, p. 329)? Consequently the analysis of value exchanges of value network actors is a necessity. The Business Model Canvases of actors that have been established during activity 3 are reused in this activity. To highlight the economic feasibility for value network actors, the individual Business Model Canvases are linked through value exchanges and economic valuations of scenarios are performed in order to indicate the benefits of the value network for each participating actor. Accordingly, the purpose of this activity is to perform basic analysis of value exchanges in order to indicate the benefits of the value network for the participating actors.

First, from the individual Business Model Canvases value exchanges between value network actors need to be retrieved. In Figure 15 the Business Model Canvas of actor A contains a value proposition that is offered to a customer (actor B). In the Business Model Canvas of actor B, actor A is indicated to be a key partner and costs are defined as a fee that is paid by actor B to actor A, indicating that when actor B receives a service from actor A, actor B needs to pay a fee in return. The fee that is paid by actor B (indicated as costs in the actor's Business Model Canvas) is considered a revenue stream in the Business Model Canvas of actor A. Based on such reasoning the Business Model Canvas of actor A shows that a service (value proposition) is delivered to actor B and the Business Model Canvas of actor B shows that a fee is paid for the service that is delivered by actor A. The same reasoning is valid for all value network actors. Therefore, by analyzing the Business Model Canvases of value network actors in such manner the exchanges between value network actors can be retrieved.

Figure 15: Deriving value exchange from the Business Model Canvases of value network actors



After having retrieved the exchanges between value network actors the economic feasibility of the value network needs to be highlighted for different scenarios. Scenarios may differ based on deviating values of metrics such as the number of purchases made by actors and costs and fees related to services and products. Different scenarios might also highlight the involvement of different actors in the value network. Scenarios might also indicate the economic feasibility over a period of time. In the following section, two scenarios are compared for the actors from Figure 15.

Suppose that, in one scenario (the current scenario) actor B pays a fee of €10 to actor A for the provided service. Actor B complements the service and sells it for a fee of €12 to actor C. actor C performs 12 monthly purchases and resells these purchases for €13 to its customers. Following the E3-value reasoning profits for value network actors are calculated by subtracting total costs from total benefits for each actor. For example, actor B receives a fee from actor C and provides a fee to Actor A (Figure 15). Therefore the profit of actor B is calculated by subtracting the fee that is provided to A from the fee that is received from actor C. For the current scenario the monthly profits of value network actors is highlighted in Table 10.

Table 10: Economic feasibility of scenarios

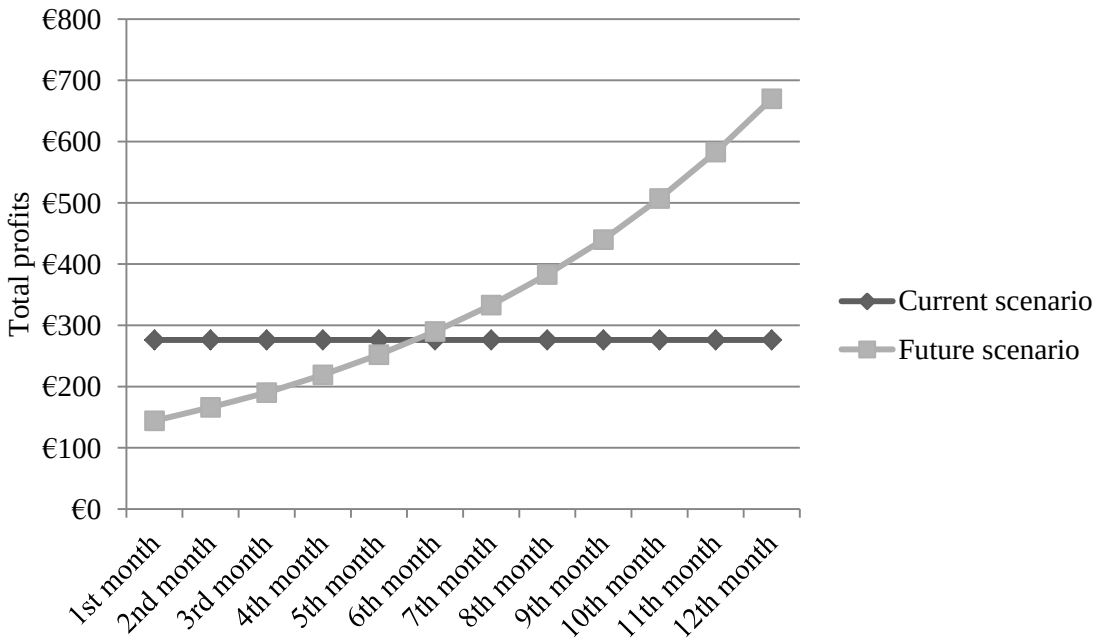
	Profits for value network actors			
Scenario	**Actor A**	**Actor B**	**Actor C**	**Total profits of value network actors**
Current scenario*	€240	€24	€12	€276
Future scenario**	€120	€12	€12	€144

* Profits are based on 12 reoccurring monthly purchases

** Profits are based on 6 purchases in the first month. Actor C expects to gradually increase its monthly purchases by approximately 15% from the second month

In another scenario (a future scenario) actor C expects to increase its reoccurring purchases gradually on a monthly basis. However, actor C requires a reduction of €1 from actor B in order to increase its reoccurring purchases. In addition actor C indicates that it will start with 6 purchases in the first month (Table 10). Analyzing the costs and benefits of value network actors for the two scenarios clarifies the potential profits for all value network actors in the both scenarios (Figure 16). The graphs in Figure 16 indicate that compared to the current scenario profits are lower in the future scenario in the first five months. However, from the sixth month and further profits will increase in the future scenario. Therefore, value network actors could consider implementing the future scenario to increase their overall profits on the long term.

Figure 16: Annual total profits of value network actors in current and future scenarios



3.5 ACTIVITY 5: ALIGN THE BUSINESS MODELS OF VALUE NETWORK ACTORS

The goal of this activity is to align the business models of value network actors with each other by identifying opportunities to gain, reconfigure, integrate, and/or dismiss resources amongst value network actors. The alternation of the resources based of value network actors could be achieved through dynamic capabilities which are routines – such as research and development, resource allocation, coevolving, patching, knowledge creation, mergers, acquisitions, and alliancing – that enable organizations to gain, reconfigure, integrate, and/or dismiss resources. For example, in order to gain resources firms could use knowledge creation, alliancing and acquisition routines to produce new knowledge. Resources could be integrated through product development and strategic decision making routines based on heterogeneous skills, expertizes and personal experiences of organizational members. Similarly, resource reconfigurations are performed through routines by which resources are connected to generate synergistic (new) resource configurations. Finally, resources which are not viable to the organization anymore may be dismissed.

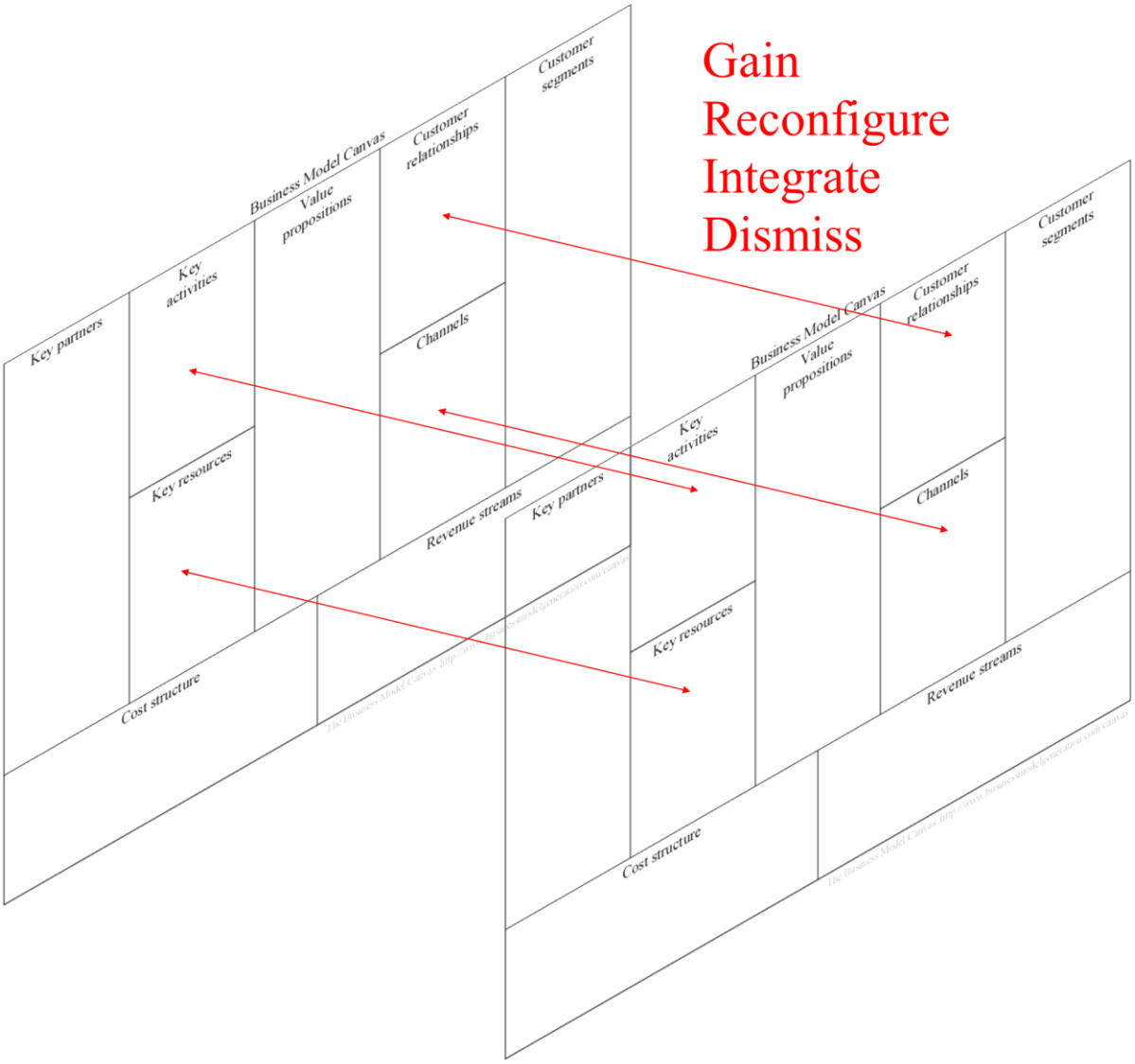
For the purpose of this study the goals of dynamic capabilities – that is identifying opportunities for value network actors to Gain, Reconfigure, Integrated and/or Dismiss (GRID) resources amongst each other and thus align their business models accordingly – are adapted for this fifth activity (Table 11).

Table 11: Definition of GRID

Opportunities to be identified for business models alignment	**Definition**
Gain resources	Acquiring new resources (especially intangibles such as knowledge) from other value network actors in order to use in own business model.
Reconfigure resources	Recombine cross-actor resources such that benefits such as efficiency, effectiveness, cost reduction, and quality improvement can be achieved.
Integrate resources	Merging similar resources of value network actors for achievements such as scale advantages or cost reduction.
Dismiss resources	Abandoning resources that are redundant across value network actors.

For each value network actor GRID opportunities for several Business Model Canvas building blocks could be identified. Although it seems that only the Key Resources building block is suitable for identifying GRID opportunities – since the Key Resources building block concerns the actor's resources – the Key Activities, Channels, and Customer Relations building blocks might also be considered for the identification of GRID opportunities since these building blocks might consist of bundles of resources. For instance, human resources and intellectual knowledge is needed to perform a Key Activity such as Research and Development. Similarly the customer Channels building block also might consist of separate resources such as a customer relationships management system and account managers. Finally, Customer Relations are also enabled by resources. For instance, personal relations with customers are maintained face-to-face by employees. Because the four Business Model Canvas building blocks – Key Activities, Key Resources, Customer Relations, and Channels – are directly or indirectly enabled by resources, GRID opportunities across the Business Model Canvases of value network actors could be identified for each building block as visualized in Figure 17.

Figure 17: GRID opportunities across Business Model Canvas building blocks of value network actors



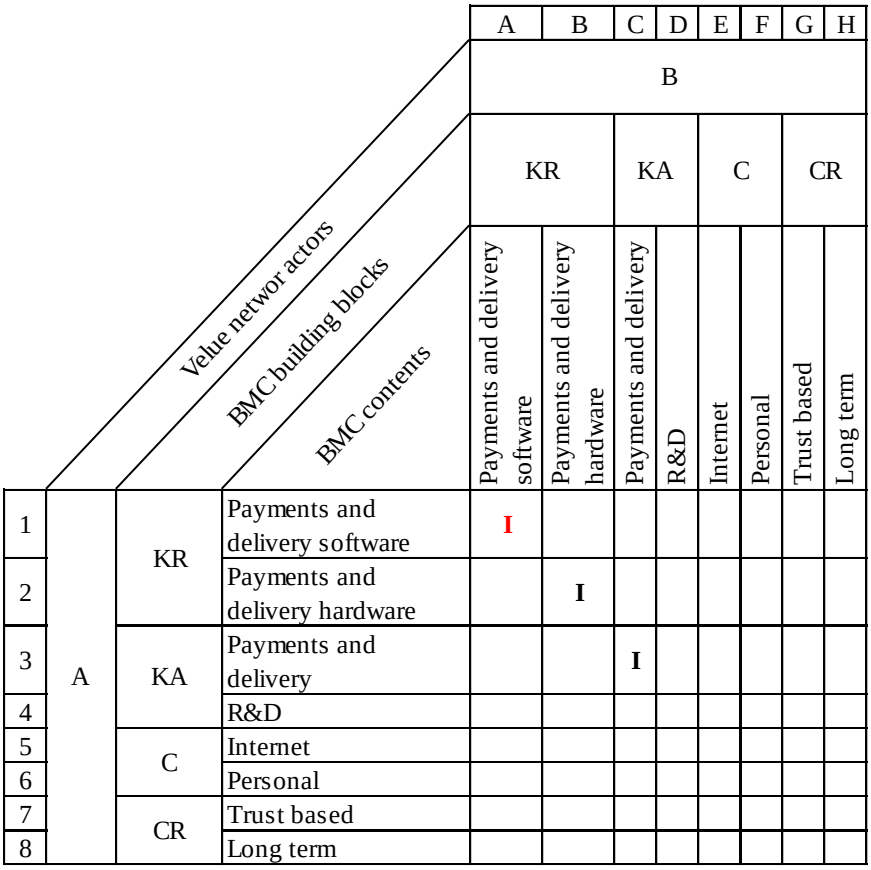
GRID opportunities need to be identified for value network actors that are connected through a value exchange. Investigating GRIP opportunities for connected value network actors is feasible since within a value network the business models of actors need to be aligned for the successful operation of the value network. The previously established Business Model Canvases (in activity 3) of value network actors and the identified exchanges between actors (from activity four) are required for this activity. The following steps highlight how the identification of GRID opportunities for value network actors could be achieved with the help of the GRID opportunities matrix (Figure 18).

1. Select and include two value network actors based on the exchanges that occur between them (as identified in activity 4) in the GRID opportunities matrix (Figure 18). For example, as illustrated in Figure 15, actor A and B are connected through value exchanges. Therefore both actors need to be included in the GRID opportunities matrix (Figure 18).
2. Include the Business Model Canvas building blocks of the selected value network actors. While GRID opportunities could be identified for all four building blocks – Key Resources,

Key Activities, Channels and Customer Relationships – value network actors might be interested to investigate GRID opportunities for only one, two of three building block(s).

3. Identify cross actor GRIP opportunities between the Business Model Canvas building blocks of actors. As exemplified in chapter 3.4 (Activity 4: Identify value exchanges between value network actors) the economic valuations of two scenarios (current scenario and future scenario) are compared. Considering the increase of exchanges of all value network actors (though the increase of purchases of actor C) in the future scenario, actor A and B might be required to align their business models in order to improve the efficiency of reoccurring exchanges. For instance, actor A and B might integrate their key activities by establishing an automated delivery and payments systems that is shared and managed by both actors. Related Key Resources might also be integrated in addition. The opportunity to integrate the delivery and payments activities and the resources of actor A and B needs to be marked in the corresponding cell of the GRID opportunities matrix (Figure 18). The matrix is a-symmetric meaning that a GRID opportunity might not necessarily be relevant for both actors. For example, actor B might not prefer to share its payments and delivery software due to political forces within the organization. A-symmetry is indicated whenever the content a cell is marked in red (such as applicable for cell A1 in Figure 18).
4. Motivate identified GRID opportunities and their importance for actors as illustrated in Table 12. Indicate whether actors assess the respective opportunity positively or negatively in the third column of the table. Especially when identified GRID opportunities do not hold for both actors, a well elaborated motivation needs to be provided.
5. Initiate business model alignments between actors by implementing identified GRIP opportunities. If necessary iterate to refine activity 2 and 3 of the Value Network Development Approach. The identified opportunities and their motivation can serve as reasoning for value network actors to confirm or dismiss earlier formulated perceived advantages and disadvantages (activity 3), refine previously defined actor roles (activity 2), and explore potential business model alignments of value network actors amongst one another. Implementing GRID opportunities enhances the competitive advantage of value network actors and the value network as a whole.

Figure 18: GRID opportunities matrix



				A	B	C	D	E	F	G	H
				B							
				KR		KA		C		CR	
Velue networ actors	BMC building blocks		BMC contents	Payments and delivery software	Payments and delivery hardware	Payments and delivery	R&D	Internet	Personal	Trust based	Long term
1	A	KR	Payments and delivery software	I							
2			Payments and delivery hardware		I						
3		KA	Payments and delivery			I					
4			R&D								
5		C	Internet								
6			Personal								
7		CR	Trust based								
8			Long term								

The purpose of the GRID opportunities matrix in Figure 18 is to structure the identification of GRID opportunities for value network actors in order to align their business models. The GRID opportunities matrix plots the business model canvas building blocks of two value network actors that are connected through a value exchange, against each other. Accordingly, for each cell of the matrix a potential GRID opportunity can be identified.

Table 12: Motivation of GRID opportunities

GRID opportunities and corresponding cells	**Actor**	**Positive or negative assessment of opportunity**	**Actor motivation**
Integrate (A1)	A	✓	Related software systems need to be shared
	B	✗	Actor B does not prefer to share its software systems
Integrate (B2)	A	✓	Related hardware systems need to be shared
	B	✓	Related hardware systems need to be shared
Integrate (C3)	A	✓	Integrating the activities of both actors that are performed for payments and delivery of services lead to efficiency benefits in the business models of both actors
	B	✓	Integrating the activities of both actors that are performed for payments and delivery of services lead to efficiency benefits in the business models of both actors

4 RESEARCH METHOD

As discussed in chapter 1.3 the fourth activity of the Design Science Research Methodology is Demonstration which refers to demonstrating the application of the design artifact (e.g. the Value Network Development Approach). Demonstrating the performance of the Value Network Development Approach can be achieved through different methods such as experiments, case study, workshops, and any other empirical prove and is necessary to know how to the approach supports the development of a value network. The single case study methodology is chosen to demonstrate the application of the Value Network Development Approach because the case study methodology fits the type of research question of this study. Since the research question is a 'how' questions it concerns an explanatory investigation (Yin, 2008). The case study methodology allows the researcher to investigate different perspective and explanations of the same phenomena and explore the phenomena under investigation (Verschuren and Doorewaard, 2010). Another reason for the choice of the case study approach is that the research method enables the researcher to obtain a general picture of the research object (Verschuren and Doorewaard, 2010) which is valuable due to the multidisciplinary nature of the business model concept (Al-Debei and Avison, 2010; Palo and Tähtinen, 2011; Zott et al., 2011).

The case study methodology is a flexible method which allows the researcher to change the course of the research during the project as required (Verschuren and Doorewaard, 2010). The biggest disadvantage of case study is that the external validity of the research is less because results are retrieved from only one or few cases (Verschuren and Doorewaard, 2010). Moreover, the case study is time consuming because data collection activities have to be conducted by the researcher.

Access to data sources for the analysis of the case is made available through the commissioning organization of this study. The case study is performed based on guidelines to ensure the correct application of the research method (Yin, 2008). First, multiple data sources are used to retrieve relevant information regarding the application of the Value Network Development Approach to the case. Second, guidance for data collection and analysis is provided by case study questions that act as guidelines for the researcher to collect relevant data during the investigation (Yin, 2008). Case study questions indicate the main issues the researcher tends to acquire. For this study the case study questions are based upon the Value Network Development Approach. For each activity of the approach guiding questions have been formulated for the purpose to provide focus for the researcher and search for the right information during the case study. Table 13 shows the case study questions that are based on the activities of the Value Network Development Approach.

Table 13: Case study questions and corresponding Value Network Development Approach activities

Value Network Development Approach activities	**Case study questions**
Activity 1: Determine the network-mode for the value network	• What is the network-mode (open or closed) and governance form (flattened or hierarchical) of the value network? • What is the motive for the identified network-mode and governance form? • What is the purpose of the value network?
Activity 2: Identify value network actors and their roles	• Which actors need to collaborate within the value network? • What roles do collaborators fulfill?
Activity 3: Clarify perceived advantages and disadvantages of value network actors	• What advantages and disadvantages do actors perceive based on their participation in the value network?
Activity 4: Identify value exchanges between value network actors	• What value exchanges occur between participants? • How do value network actors benefit from exchanges? • What metrics are needed to evaluate the economic feasibility of different scenarios for the value network?
Activity 5: Align the business models of value network actors	• What GRID opportunities could be identified for the Business Model Canvases of value network actors? • How do GRID opportunities affect value network actors?

5 THE TOKO CASE STUDY

In September 2011 the TOKO research project (Training environment for large scale multidisciplinary value chain performance) was initiated by several Dutch profit and non-profit organizations. The research project is subsidized with €1.5 million by the Dutch Ministry of Economic Affairs, Agriculture and Innovation. Project members consist of Dutch based commercial companies, non-profit Research Organizations and a university. The duration of the project is approximately 21 months (from September 2011 till mid 2013).

The main goal of the TOKO research project is to investigate opportunities for improvement of crisis and disaster management in The Netherlands. The research project aims at the development of efficient and effective training services that could be offered to Dutch crisis management organizations, teams, and principals that are responsible for countering crisis and disaster situations. Furthermore, the project also aims at reducing the production costs of training services and increases the frequency by which training services could be offered. Goals related to business oriented issues are:

- investigating commercial opportunities for Dutch providers of training services;
- investigating and stimulating innovation opportunities for training services;
- increasing market transparency regarding the supply and demand of training services;

The work breakdown structure of the TOKO research project is formulated in five work packages. Specific activities are formulated for each work package. The work packages are divided among project members who are therefore responsible for the deliverables that is assigned to them through the respective work packages. Table 14 illustrates the five work packages and related deliverables of the TOKO research project. This study is related to the deliverables of work package five. In return for the opportunity to conduct the case study, this report will be provided as a contribution for the deliverables of work package five.

Table 14: Work packages and deliverables for the TOKO-project

Work package	Deliverable
1. Domain– and learning models	A model that clarifies how crisis and disaster management actors develop their competencies through training services
2. Formal crisis and disaster management models	A formal model that clarifies crisis and disaster management
3. Practice– and learning environment	A training service for crisis and disaster management actors
4. Training and evaluation process	A implementation roadmap for the developed training service
5. Deployment and further development of TOKO	The potential application, business model, business plan, and exploitation roadmap for TOKO

The TOKO case is analyzed through interviews, workshops, document studies, and observations in project meetings. Accordingly triangulation of data sources is applied. Triangulation refers to the use of multiple data sources to support 'the evidence' and leads to more convincing evidence because it corroborates information from multiple sources to support findings (Yin, 2008). Sources for the case study are made available by the commissioning organization of this research. All participants of interviews and discussions that have been approached for this study requested that that their personal and organizational names should not be included in this report. Table 15 summarizes the characteristics of data sources used during the research.

Table 15: Summary of data sources

Data source	Occurrence	Average participants	Average length	Date	Corresponding activities of the Value Network Development Approach
Documents	1	n/a	30 pages	September 2011	Activities one, two, and four
Meeting participation	4	5 – 15	2 – 4 hours	May 2012 – Feb 2013	Activities one, two, and four
Interviews and discussions	4	1 – 3	1 hour	May 2012 – Dec 2012	Activities one, two, and four
Workshops	6	1 – 3	2 hours	Sep 2012 – Oct 2012	All activities

The main goals and background information of the TOKO research project is summarized in a project plan document (further referred to as the project plan). The project plan contains a general description of the TOKO research project. In the project plan it is argued why the TOKO research project is useful and intended results of the project are discussed.

By participating in project meetings information was maintained by the researcher unobtrusively. Multiple project meetings held during the second half of 2012 of which four were attended by the researcher. The project manager of the TOKO research project and the leads of work packages attended these meeting. Furthermore, semi structured interviews were held among different project members. These interviews clarified the activities and intended results of the TOKO research project.

Six Business Model Canvas workshops are conducted between September and October 2012. The results of one workshop were omitted from the research due to the minor role of the respective actor in the TOKO research project. The workshops were conducted with key actors of the TOKO research project. Each workshop started with a presentation of the goals and intended results of the project. Then the Business Model Canvas is introduced and finally the Business Model Canvas of the organization that is represented by the workshop participant is established by the researcher and the workshop participant. The resulting Business Model Canvases are included in the appendix of this report.

5.1 Application of Activity 1: Determine the network-mode for the value network

Two types of network-modes could be identified for the TOKO case. One type of network-mode is applicable to the project performance phase of TOKO (further referred to as TOKO-project). The other network-mode is applicable to the exploitation phase of TOKO (further referred to as the TOKO-platform).

Actor participation and governance form of the TOKO-project

For the network-mode of the TOKO-project closed actor participation and a flat governance form are applicable. To achieve the objectives of TOKO-project different knowledge domains have to be accessed. These knowledge domains include knowledge about learning and competencies development, the development of training services, the organization of trainings, and descriptive modeling techniques. These different knowledge domains are distributed among the project members of the TOKO-project. Within the project deliverables are divided in three sub-research topics – training models, descriptive methods, and training service – which form the basis for project activities. Project partners for the TOKO-project are selected based on their knowledge in one of the three sub-research topics.

This indicates that, within the project the knowledge domains (e.g. sub-research topics) and parties (e.g. respective project members) are well known. None of the project members possesses all the knowledge of the combined project members. Each project participant is an expert in its respective knowledge domain. Therefore the best knowledge about the respective domain will be made available, which is an advantage of a closed network-mode. This is also applicable for the TOKO-project as motivated in the project plan:

> "The project will involve a unique combination of project partners that have proved to own capabilities regarding their knowledge of the specific domain of TOKO, similar to previous projects in the defense domain" [project plan]

Based on the identified network-mode, the TOKO-project is considered to be a consortium of a select group of partners who jointly determine objectives, select problems and decide how to perform activities and develop solutions (Pisano and Verganti, 2008). The classification of the TOKO-project as a consortium is also indicated by one of the workshop participants:

> "We deliver our knowledge and expertise to the TOKO consortium because eventually, we tend to improve the public safety and security performance in The Netherlands [workshop participant of Research Organization]"

The governance form of the TOKO-project is classified as flattened. During project meetings activities and results were mutually formulated by project members and shared among each other. Activities of project members are dependent upon activities of other project members. As highlighted by a description of the project plan:

> "The TOKO-project consists of highly related work packages. Each work package provides results that are used as input for a subsequent work package" [project plan]

Actor participation and governance form of the TOKO-platform

In the exploitation phase TOKO should be considered as a platform for providers and customers of training services. Open actor participation and a flat governance form are applicable in the TOKO-platform. Actor participation is open since potentially all Dutch Training Services Providers and Training Scenarios Writers need to be able to participate in the TOKO-platform. Providers of training services and scenarios should be able to join TOKO – a primary requirement of the project emphasized in the project plan:

> "TOKO is an open-hub where everyone can join who has to offer training services or scenarios for the disaster and crisis management domain" [project plan]

In the TOKO research project open actor participation is referred to as "the open-hub principle" referring to the TOKO-platform as an open-hub where many actors can participate. The preference for open actor participation for the TOKO-platform is also indicated during project meetings and discussions. As one project members explains:

> "The aim of TOKO is that no one should be left behind. Al sorts of Training Services Providers should be able to participate in the TOKO-platform and offer their training services, even though these might differ. A training service could be a brochure or booklet about disaster

> and crisis management, or a full blown virtual training simulation. All types of training services should be offered through the TOKO-platform [lead of work package two]"

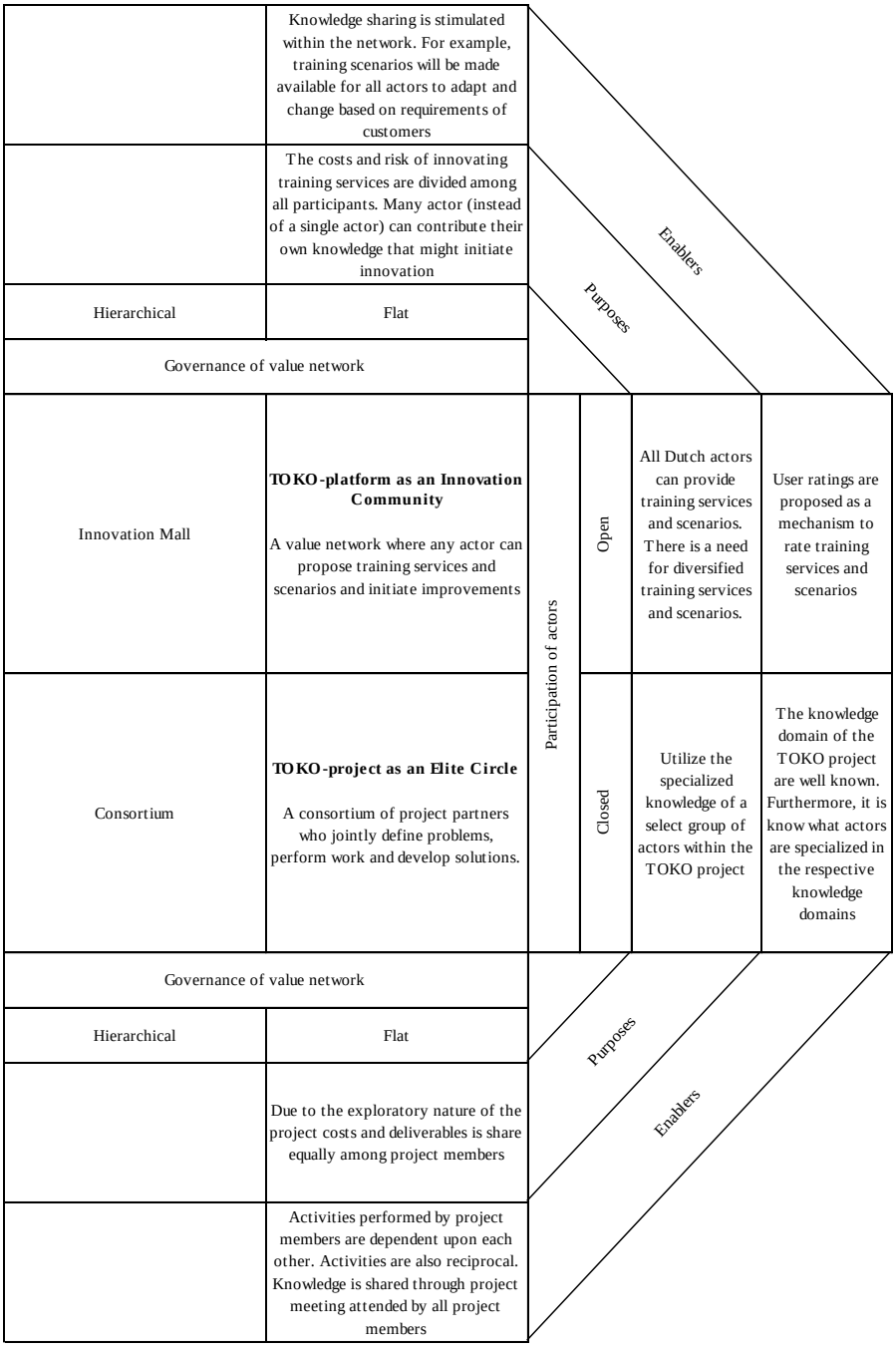
A flat governance form is suitable for innovation oriented value networks because the costs, risk, and technical challenges of innovation will be distributed amongst the participants of the value network (Pisano and Verganti, 2008). In the TOKO-platform value network actors such as Training Services Providers, Training Scenarios Writers, and Research Organizations possess bits of knowledge that when combined and used in collaborations may initiate the development of innovative training services. The TOKO-platform is supposed to facilitates actor interactions and collaborations. The TOKO-platform is expected to develop into an innovation community for the development of training services and knowledge sharing. As one participant of the workshops indicates:

> "It is not hard for me to image that the TOKO-platform might develop into an innovation community, allowing our company to get to know other Training Services Providers. If such potential is available, I believe that the TOKO-platform will form an innovation community for the development of innovative training services" [workshop participant Training Services Provider].

Classification of actor participation and governance forms for TOKO

As explained actor participations and governance forms differ based on the stages in which TOKO is considered. First in the project performance stage, actor participation and the governance form of the TOKO-project is considered to be closed-flat. The TOKO-project is considered as a consortium of project partners. Second, actor participation and the governance form of the TOKO-platform is indicated to be open-flat. In addition the TOKO-platforms value network is considered as an innovation community. The network-modes and governance forms of the TOKO-project and TOKO-platform and key enablers for successful collaborations within the respective value networks are illustrate in Figure 19.

Figure 19: The collaboration framework of TOKO



5.2 APPLICATION OF ACTIVITY 2: IDENTIFY VALUE NETWORK ACTORS AND THEIR ROLES

Based on the identified network-modes for the TOKO-project and TOKO-platform the selection of actors could be conducted in two ways – for closed and open participations. Similarly, actor roles have been defined for the TOKO-project as well as the TOKO-platform.

Actor selection

First, the TOKO-project value network is classified as a consortium of specific project partners who collaborate to perform the project. For the closed network-mode a challenge is to identify the needed knowledge domain of the value network and the actors that possess such knowledge. In the TOKO-project the identification of relevant knowledge domains and project members that possess that knowledge is mainly based on past collaborations between actors. The project plan argues that all project members are familiar with each other due to past collaborations. As indicated in the following description:

> "Project participants have cooperated successfully during past projects and are therefore familiar with collaboration with each other" [project plan]

Second, for the TOKO-platform open actor participation is suggested in activity 1 where many actors are allowed to participate and provide their training services and scenarios. The management and coordination of the value network is considered to be a challenge for a network-mode with open actor participation. According to Pisano and Verganti (2008) the two major challenges in a network-mode with open actor participation is idea collection and screening. While potentially all Dutch Training Services Providers and Training Scenarios Writers can join the TOKO-platform, it is necessary to clarify why they would do so. After all, participation in the TOKO-platform is voluntarily for actors. Furthermore, according to Pisano and Verganti (2008) actors that can contribute high quality services prefer to join closed networks because there they have a greater chance to fully exploit their services. Therefore for the TOKO-platform it is necessary to clarify how high quality actors are attracted for participation. As indicated by one workshop participant, sufficient efforts should be spend on the marketing strategy of the TOKO-platform:

> "It is important to spend sufficient attention to the marketing of the TOKO-platform in order to attract contributing actors" [workshop participant Trainee Organization]

Another challenge in a network-mode with open actor participation is idea and actor screening. A network-mode with open actor participation is feasible if participants and their contributions can be screened with low costs and participants can join the value network easily (Pisano and Verganti, 2008). Many actors can participate in the TOKO-platform. It is therefore time consuming and costly to screen all ideas of actors. In the TOKO-platform this issue and its potential solutions is highlighted during a one of the workshop sessions:

> "The rating of the quality of training services is necessary due to the large number of potential providers. Therefore, in the TOKO-platform, the quality of training services should be guaranteed by formulating obligatory quality criteria that need to be covered by the offered training services" [workshop participant Training Organizer].

Since the Training Organizer has obligations by the Dutch law to ensure the quality of training services this actor is willing to invest in the development of evaluation and screening mechanisms for

training services and their providers in the TOKO-platform. Another screening method is also mentioned to be viable for ensuring the quality of offered training services and screening Training Services Providers. This is indicated to be a user rating system. As discussed during project groups meetings:

> "The quality of training services and the performance of Training Services Providers could be ensured by trainees themselves. They can rate and review a training service and its provider. Such ratings and reviews will be made available to other trainees. Accordingly training services are rated and their providers will be stimulated to offer high quality services" [participant project meeting].

Such quality enhancing activities are labeled as reputation systems elsewhere (Müller et al., 2011). Reputation systems include the ability of end users to rate the product or service which is used. Subsequently such ratings will be made available to other end users. For the TOKO-platform such quality rating systems enable the identification of high quality services. Moreover, providers Training Services Providers will be stimulated to offer high quality services in order to maintain a good reputation.

Table 16 summarizes the enabling factors for actor selection within the TOKO-project and TOKO-platform.

Table 16: Actor selection for the TOKO-project and TOKO-platform

Enabling factors for actor selection for the TOKO-project and TOKO-platform	
The **TOKO-project** value network is classified as a consortium of select project partners who collaborate to perform the project (closed actor participation)	The **TOKO-platform** as an innovation community where knowledge sharing and collaboration is facilitated (open actor participation)
Identification of relevant knowledge domains and project members that possess that knowledge is mainly based on past collaborations between actors	• To attract actors for participation in the TOKO-platform sufficient attention should be spend on marketing. • Screening Training Services Providers and their training services in the TOKO-platform could be facilitated through end-user rating systems

Classification of actor roles

As described in the first part of this activity closed actor participation is applicable for the TOKO-project. To determine value network actors for the TOKO-project a preliminary list of six actors was formulated by the researcher after studying the project plan and engaging discussions with project partners. Subsequently the preliminary list of actors was confirmed by the project manager of TOKO resulting in the following actors for the TOKO-project: Training Scenarios Writer, Training Services Provider, Research Organization, Training Organizer, and Trainee Organization. The same actors are considered to be the participants in the TOKO-platform. Therefore in the following sections roles are described for the actors of the TOKO-project as well as the TOKO-platform.

In the TOKO-project the role of the Training Services Provider is determined to be strategic since the goals of this actor is to develop training services. Training services that are developed with the help of the Training Services Provider contribute to the effectiveness of the final product that is delivered by the TOKO-platform. Accordingly this actor is important due to his contribution to the TOKO-project through effectiveness. However, in the TOKO-platform many Training Services Providers are al-

lowed to participate and contribute their training services. Therefore the role of the Training Services Provider becomes functional since potentially many similar actors can provide their training services to the TOKO-platform. Therefore, the Training Services Provider fulfills a strategic role in the TOKO-project, while in a later stage, in the TOKO-platform the same actor becomes one of many and fulfills a less important, functional role. Hence, the transition from a strategic role to a functional for the Training Services Provider might result in conflicting objectives for this actor.

The Training Scenarios Writer also fulfills a strategic role by providing training scenarios to the TOKO-project. It is difficult (if not impossible) to develop training services without proper training scenarios. Therefore the Training Scenarios Writer fulfills a strategic role due to the resource allocation that he enables. However, this role could change in the TOKO-platform. While in the TOKO-project a strategic role is fulfilled due to the resource allocation of the Training Scenarios Writer, in the TOKO-platform the Training Scenarios Writer fulfills a functional role because many Training Scenarios Writers are allowed to provide their scenarios to the TOKO-platform. This may result in conflicting objectives for the Training Scenarios Writer.

Within the TOKO-project, the Research Organization fulfills a strategic role due to its effectiveness. This actor provides models for the development of competencies of trainees. These models are of key value for the quality of training services. Due to training models, the Training Services Provider is able to develop training services which affect the learning results of trainees positively. If the Research Organization was left out of the TOKO-project, key knowledge about how to train trainees will be absent. This could eventually affect the quality of training services. In the TOKO-platform the Research Organization is also important from the point of view of resource allocation. The knowledge provided by this actor may be considered specialized and scares. Therefore the Research Organization facilitates resource allocation because through this actor access to knowledge about training models is provided to the TOKO-platform.

The Training Organizer fulfills a strategic role in the TOKO-project. The Training Organizer allocates resources in the form of knowledge. During the past couple of decades, the Training Organizer has obligations by Dutch law for ensuring the competencies of crisis management actors in The Netherlands. Therefore the Training Organizer possesses well established relations in The Netherlands with all actors that are in one way or the other related to crisis management. The Training Organizer possesses a broad range of knowledge regarding crisis management and accordingly contributes to the TOKO-project by providing this knowledge. In the TOKO-platform, the Training Organizer contributes to efficiency due to its ability to pool the demand and supply of training services. By pooling and matching the demand and supply of training services the Training Organizer also enlarges the customer base of other TOKO-platform actors such as Training Services Providers and Training Scenarios Writers.

The Trainee Organization is no project partner of the TOKO-project because it is does not perform project activities nor is this actor responsible for project deliverables. However, the Trainee Organization can provide relevant feedback regarding the developed training services due to the actor's knowledge of end users experiences with training services. Therefore the Trainee Organization improves the effectiveness of the training services that are developed in the TOKO-project by providing its feedback. In the TOKO-platform the Trainee Organization also fulfills a strategic role because it can enlarge the customer base of TOKO-platform actors since the Trainee Organization has tight relations with end users of training services which are Dutch crisis management actors. Actor roles within

the TOKO-project and the TOKO-platform are summarized in Table 17. Potentially conflicting roles of actors are marked bold. Hence, the transition from a strategic role to a functional for the Training Services Provider might result in conflicting objectives. Similarly, while in the TOKO-project a strategic role is fulfilled by the Training Scenarios Writer, in the TOKO-platform the Training Scenarios Writer fulfills a functional role because many Training Scenarios Writers are allowed to provide their scenarios to the TOKO-platform. This may result in conflicting objectives for the Training Scenarios Writer.

Table 17: Actor roles within the TOKO-project and TOKO-platform

		Actor roles in the TOKO-project	Actor roles in the TOKO-platform
Strategic roles	Resources allocation	**Training Scenarios Writer**	
		Training Organizer	Research Organization
	Efficiency		Training Organizer
	Risk mitigation		
	Effectiveness	**Training Services Provider**	
		Research Organization	
		Trainee Organization	
	Time-to-market		
	Agility		
	Intelligence and Creativity		
	Enlarging customer		Trainee Organization
Functional roles	Suppliers of training services and training scenarios		**Training Services Provider**
			Training Scenarios Writer

5.3 APPLICATION OF ACTIVITY 3: CLARIFY PERCEIVED ADVANTAGES AND DISADVANTAGES OF VALUE NETWORK ACTORS

For this activity the core business logic of each actor is established through the Business Model Canvas in a workshop session. The results of each workshop in the form of a Business Model Canvas are included in the appendix. Subsequently, perceived advantages and disadvantages of actors are determined based on their participation in the TOKO-platform. Perceived advantages and disadvantages of actors are considered for the TOKO-platform only, since actors are already participating in the TOKO-project. According to Peppard and Rylander (2006) examining perceived advantages and disadvantages of actors is especially feasible in opportunity networks of which now one knows how they will look like. The TOKO-platform reassembles an opportunity network due to several characteristics:

- Project partners classify the TOKO-platform as a “feasibility research” where activity boundaries are loose and emphasis lies on investigating new ideas and possibilities instead of achieving concrete results for further implementation.
- No clear goals have been set for the performance of the TOKO-platform.
- The result of the TOKO-platform is uncertain due to the exploratory nature of the project.

Since the TOKO-platform reassembles an opportunity network, it is valuable to investigate the perceived advantages and disadvantages of actors because their perceptions can indicate what the TOKO-platform could look like. Furthermore, the consideration of perceived advantages and disadvantages of actors is important because without actors the TOKO-platform could not be established. The perceived advantages and disadvantages of actors are summarized in Figure 20. Each advantage and disadvantage is indicated in green and red colors respectively in the Business Model Canvases of value network actors (see appendix).

Figure 20: Perceived advantages and disadvantages of value network actors of the TOKO case

			Training Services Provider	Training Scenarios Writers	Training Organizer	Research Organization	Trainee Organization	Totals occurrences of actor perceptions
Perceived advantages		Access to new, complementary resources	✓		✓			1
		Reducing costs						
		Reducing time to market						
		Access to new markets	✓	✓	✓	✓		4
		Risk reduction and risk sharing						
		Access to new technologies						
		Learning		✓				1
	Additional advantages	Through TOKO we might be able to connect to potential partners in order to benefit from innovation opportunities (innovation opportunities)	✓		✓	✓	✓	4
		A revenue increase is possible through the increasing customer base that is accessed through TOKO (increase of revenue)	✓	✓	✓	✓		4
		TOKO could enhance market transparency of demand and supply of training services (increased market transparency)	✓		✓	✓	✓	4
		The quality of service can be improved significantly through feedback mechanisms that could become available through TOKO (quality improvements)	✓		✓	✓	✓	4
Totals occurrences of advantages per actor			6	3	5	5	3	
Perceived disadvantages		Decreased access to new, complementary resources						
		Increase of costs					✓	1
		Increase of time to market						
		No access to new markets						
		Increase of risk						
		No access to new technologies						
		No opportunities for learning						
	Additional disadvantages	By participating in the TOKO value network we might be forced to perform certain activities that are not viable for our business. Furthermore, we perceive a risk that only limited services will be offered through TOKO that are obligatory to use (compliance).			✓		✓	2
		It is uncertain who will be powerful actors in TOKO. No actor should be able to influence or force other actor through power (uncertainty regarding power distribution)					✓	1
		The pricing mechanisms that will be applicable in TOKO might be incompatible with our current pricing mechanisms (incompatible pricing mechanisms)	✓					1
		A concern is that you are only allowed to participate in TOKO if you are able to fulfill certain criteria (obligatory criteria)		✓				1
Total occurrences of disadvantages per actor			1	1	1		3	

The analysis of perceived advantages and disadvantages show that Access to new markets; Innovation opportunities; Increase of revenue; Increased market transparency; and Quality improvements are perceived to be the biggest advantages while Compliance is perceived to be the biggest disadvantage. Actors need to be able to determine whether perceived advantages and disadvantages hold or do not

hold in the TOKO-platform. For instance, value network actors can confirm the validity of their perceptions by iterating results of this activity to the earlier defined network-mode of the value network in activity 1 where the network-mode of the TOKO-platform is determined to be open-flat. An open-flat network-mode of the TOKO platform allows additional actor to participate. Therefore, perceptions of value network actor that are identified in this activity – such as accessing new markets and potential partners – might be confirmed by arguing that the network-mode of the TOKO platform is feasible to realize such benefits.

5.4 APPLICATION OF ACTIVITY 4: IDENTIFY VALUE EXCHANGES BETWEEN VALUE NETWORK ACTORS

Through the individual Business Model Canvases of value network actors, exchanges are identified and economic valuation is performed for two scenarios. In order to determine the cash flows and profits for each value network actor several assumptions need to be formulated such as the annual growth of customers for the TOKO-platform, unit price of training services, and profit margins. These assumptions are necessary due to the exploratory nature of the TOKO case of which the result is the absence of concrete information regarding metrics that are used in this activity. Furthermore, since the purpose of the case study is to demonstrate the Value Network Development Approach, the correctness of assumptions is less important. The assumptions that are adapted for the economic valuation of the TOKO-platform are summarized in Table 18.

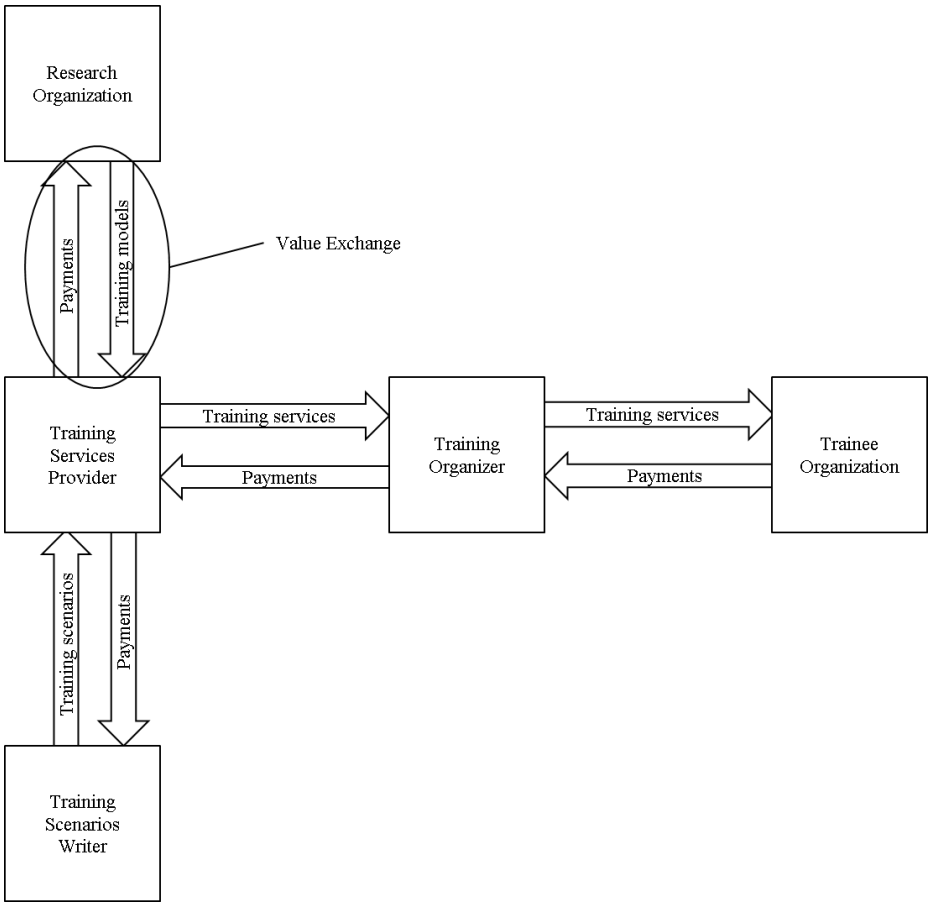
Table 18: Assumptions of metrics for economic valuation of scenarios

Description		**Current scenario**	**TOKO scenario**	
Number of Dutch trainees		500	500	
Annually sold training services per trainee		1	3	
Unit price of training services		€1,800	€300	
Research organization profit margin		20%		
Training organization profit margin		15%		
Training scenario writer profit margin		30%		
Annual increase of the customer base through international customers (percentage increase of total number of Dutch trainees	Year 1	500	500	0%
	Year 2	idem	600	20%*
	Year 3	idem	750	25%
	Year 4	idem	1250	67%
	Year 5	idem	2000	60%
	Year 6	idem	3000	50%
	Year 7	idem	4000	33%
	Year 8	idem	4750	19%
	Year 9	idem	5000	5%
	Year 10	idem	5000	0%

*Increase compared to previous year

Value exchanges between actors of the TOKO-platform are derived from the individual Business Model Canvases of value network actors (see appendix for the Business Model Canvases of value network actors). A simplified overview of value exchanges between actors of the TOKO-platform is illustrated in Figure 21.

Figure 21: Value exchanges between actors of the TOKO-platform



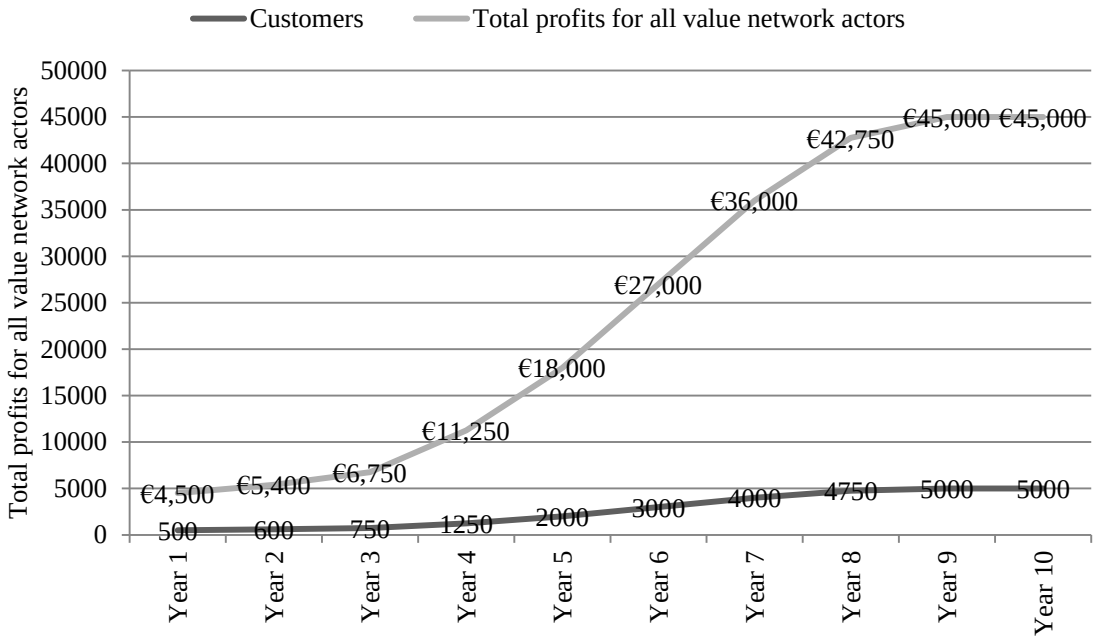
Two scenarios are highlighted over a period of ten years for TOKO (Table 19). The first scenario concerns the collaboration of value network actors without the TOKO-platform (further referred to as the current scenario). The second scenario concerns the same collaboration of value network actors based on the TOKO-platform (further referred to as the TOKO scenario).

Table 19: Estimated profits for TOKO actors

		Actors				
Scenarios	Year	Research Organization	Training Services Provider	Training Organizer	Training Scenar-ios Writer	Accumulated profits
Current	1	€180,000	€315,000	€135,000	€270,000	€900,000
	2	€180,000	€315,000	€135,000	€270,000	€900,000
	3	€180,000	€315,000	€135,000	€270,000	€900,000
	4	€180,000	€315,000	€135,000	€270,000	€900,000
	5	€180,000	€315,000	€135,000	€270,000	€900,000
	6	€180,000	€315,000	€135,000	€270,000	€900,000
	7	€180,000	€315,000	€135,000	€270,000	€900,000
	8	€180,000	€315,000	€135,000	€270,000	€900,000
	9	€180,000	€315,000	€135,000	€270,000	€900,000
	10	€180,000	€315,000	€135,000	€270,000	€900,000
TOKO	1	€90,000	€157,500	€67,500	€135,000	€450,000
	2	€108,000	€189,000	€81,000	€162,000	€540,000
	3	€135,000	€236,250	€101,250	€202,500	€675,000
	4	€225,000	€393,750	€168,750	€337,500	€1,125,000
	5	€360,000	€630,000	€270,000	€540,000	€1,800,000
	6	€540,000	€945,000	€405,000	€810,000	€2,700,000
	7	€720,000	€1,260,000	€540,000	€1,080,000	€3,600,000
	8	€855,000	€1,496,250	€641,250	€1,282,500	€4,275,000
	9	€900,000	€1,575,000	€675,000	€1,350,000	€4,500,000
	10	€900,000	€1,575,000	€675,000	€1,350,000	€4,500,000

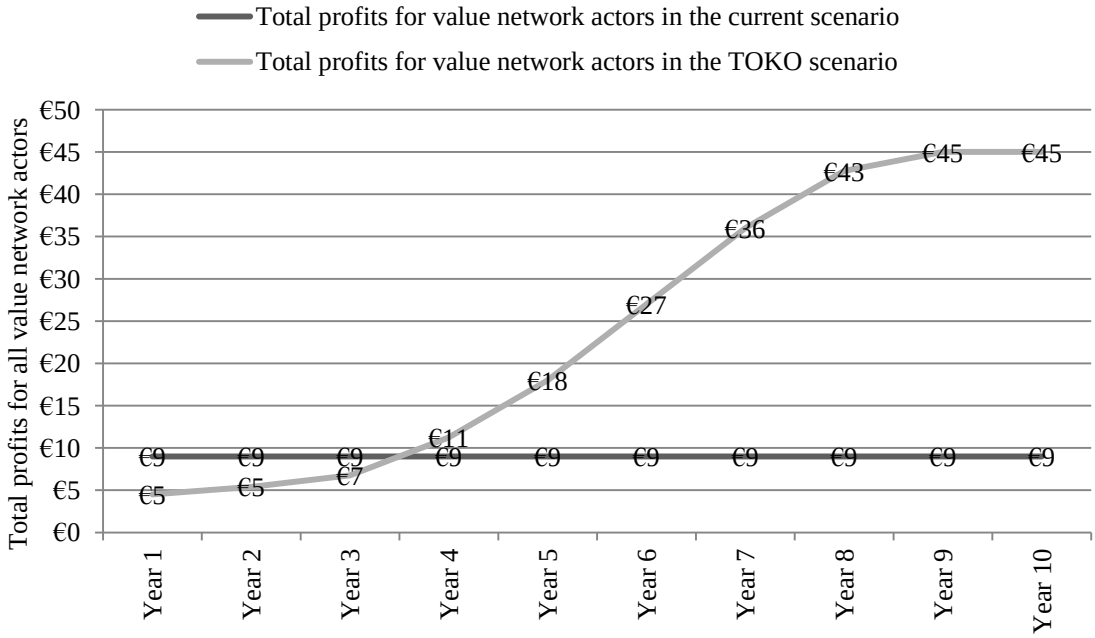
As indicated in Table 19 profits for value network actors remain the same for each year in the current scenario because market saturation is reached for training services and number of customers in The Netherlands. Furthermore, in this scenario training services can be offered only once per year to a total of approximately five hundred customers. In the TOKO scenario profits after the first year are 50% less for all actors compared to the current scenario. Profits for the second and third year will be 40% and 25% respectively less compared to the current scenario. However from year four and further profits will increase compared to the current scenario. Hence, actors need to consider the loss of profits for the first three years as an investment in order to benefit from the economic feasibility of the TOKO scenario. The increase of profits corresponds with the increase of customer for the TOKO platform as illustrated in Figure 23.

Figure 23: Number of customers and accumulated profits for the TOKO scenario (profits * 100)



While only Dutch customers are served by the TOKO platform in the first year, from the second year and further the customer base will increase due to the international expansion of the TOKO platform. Figure 22 illustrates the estimated total annual profits for the involved value network actors of the two scenarios over a period of ten years.

Figure 22: Accumulated profits of current and TOKO scenarios (profits * 100,000)



5.5 APPLICATION OF ACTIVITY 5: ALIGN THE BUSINESS MODELS OF VALUE NETWORK ACTORS

In this activity business model alignment is examined for value network actors that are connected through exchanges. In activity four, four value exchanges have been retrieved for the TOKO value network (Figure 21). For the demonstration purpose of this activity the identification of GRID opportunities and alignment of business models for only two actors (the Research Organization and the Training Services Provider) who are connected through an exchange is highlighted.

As illustrated in Figure 21 the Research Organization and Training Services Provider are connected to each other through a value exchange. The Research Organization offers training models to the Training Services Provider. In return, the Training Services Provider provides payments for training models to the Research Organization.

Due to the complementary nature of training models and training services, research activities of both actors could be integrated. Training models concern the process regarding how individuals capture and process information and improve their competencies. On the other hand, training services are the actual information packed for instance as a computer simulation which is used by individuals during a training. For an effective development of the competencies of end users, training services need to be developed based on training models. Therefore the Research Organization and Training Services Provider might benefit from integrated research activities, for instance in joint research projects in order to achieve synergies in such activities.

In the Business Model Canvas of the Training Services Provider ‘design’ and ‘development’ are indicated as key activities while the Research Organization regularly applies open innovation techniques in its operations. Therefore ‘open innovation’ is indicated as a key activity in the Business Model Canvas of the Research Organization. The Training Services Provider might benefit from the open innovation experience and knowledge of the research organization. For instance, the Training Services Provider could gain knowledge regarding open innovation and apply such knowledge to its design and development activities. While the Training Services Provider might gain knowledge regarding open innovation the Research Organization could access specific knowledge regarding the design and development of training services from the Training Services Provider.

Development and design expertise are indicated as key resources within the Business Model Canvas of the Training Services Provider while within the Business Model Canvas of the Research Organization the brand name is indicated as a key resource. The Research Organization is considered to be a respective authority regarding a variety of subjects in profit and non-profit sectors. The brand name of the Research Organization is therefore well known and highly valued in the Netherlands among various organizations such as commercial companies, governments and universities. Therefore, a reconfiguration opportunity is possible for the Training Services Provider. Specifically, the Training Services Provider could combine its expertise with the brand name of the Research Organization in order to legitimize its image towards the customers of the TOKO-platform. For the Training Services Provider Gaining knowledge about open innovation corresponds with one of the actor’s perceived advantages (as indicated in activity 1 of the Value Network Development Approach) which is to gain access to an innovation community through participation in TOKO. While the Training Services Provider might benefit from this reconfiguration opportunity – by relating the brand name of the Research Organization to its design and development expertise – the benefits of this reconfiguration

opportunity for the Research Organization might be reputation building for its brand name in the market of training services for crisis management.

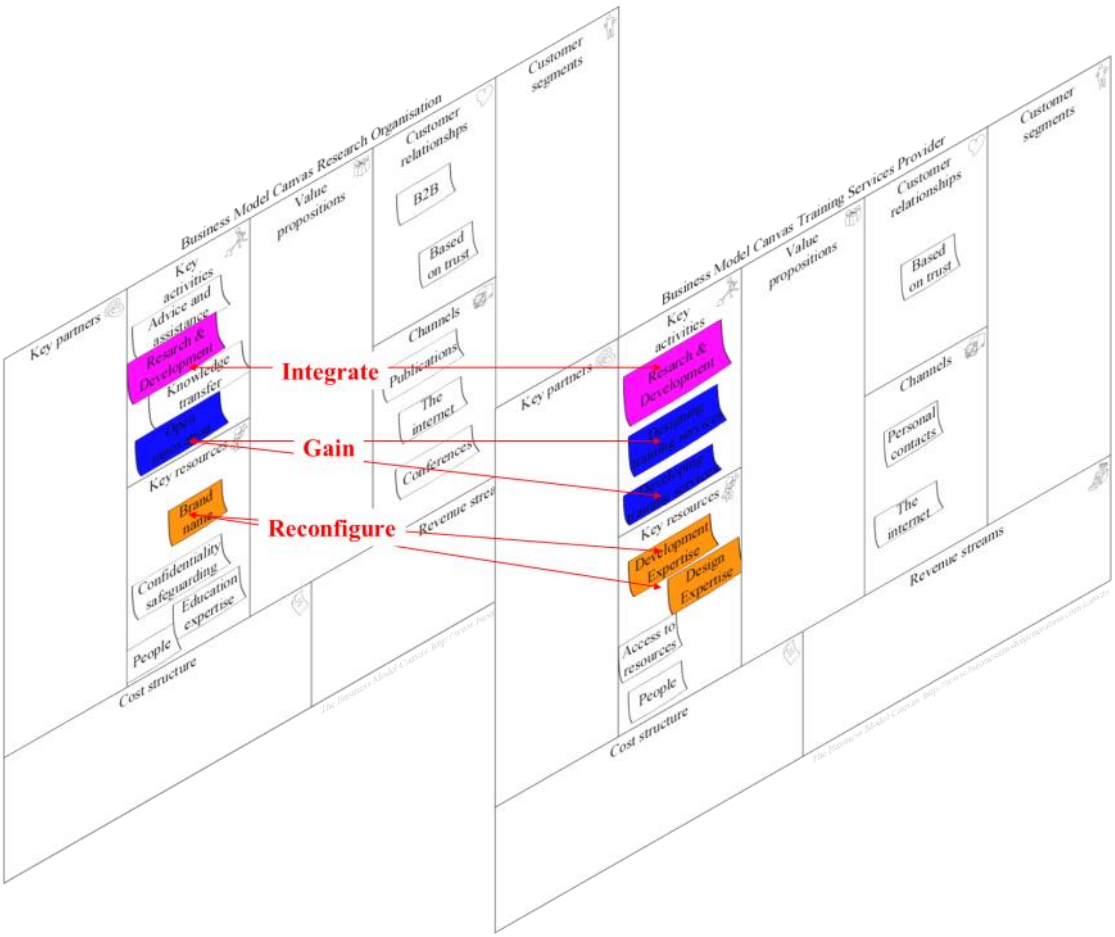
Figure 24 illustrates the application of the GRID opportunities matrix for the TOKO case. The matrix contains three
GRID opportunities for the Training Services Provider and Research Organization; an opportunity to Integrate the key activities of the respective actors (cell F5); an opportunity for the Training Services Provider to Gain knowledge from Open Innovation activities of the Research Organization (cell H6 and H7); and a Reconfiguration opportunity for key resources of both actors (cell A1 and A2).

Figure 24: Application of GRID opportunities matrix for the TOKO case

				A	B	C	D	E	F	G	H	I	J	K	L	M
	Value network actors			Research Organization												
	BMC building blocks			KR				KA				C		CR		
	BMC contents			Brand name	Confidentiality safeguarding	Education expertise	People	Advice and assistance	R&D	Knowledge transfer	Open innovation	B2B	Based on trust	Publications	The internet	Conferences
1	Training Services Provider	KR	Development Expertise	R												
2			Design Expertise	R												
3			Access to resources													
4			People													
5		KA	R&D						I							
6			Designing training services								G					
7			Developing training services								G					
8		C	Internet													
9		CR	Personal contacts													
10			The internet													

The identified GRID opportunities are highlighted in the Business Model Canvases of the Training Services Provider and the Research Organization (Figure 27 and Figure 26 in the appendix). In Figure 25 the identified GRID opportunities are illustrated for the respective contents of the Business Model Canvases of the two actors.

Figure 25: GRID opportunities for the Training Services Provider and Research Organization



6 EVALUATION

As introduced in chapter 1.3 the fifth activity of the Design Science Research Methodology is to evaluate the design artifact – e.g. the Value Network Development Approach. Therefore, in this study, evaluation concerns observing how well the Value Network Development Approach supports the defined solution objectives that have been formulated in chapter 3. In order to do so the objectives of the solution will be compared to the results of the demonstration. Evaluation can be performed by comparison of the artifact's functionality with the objectives of the solution, satisfaction surveys, interviews, simulations and any other appropriate empirical prove (Peffers et al., 2007). The Value Network Development Approach is evaluated through a semi-structured interview with a business model consultant and the researcher's own reflections.

The evaluation of the method is performed during a 2½ hours lasting semi-structured interview with a practitioner in the field of business models. The respondent has five years of experience with the Business Model Canvas through consulting projects and trainings.

During the interview first of all the Value Network Development Approach-approach is explained briefly with the assistance of PowerPoint slides. Second, the application of the approach is illustrated through the TOKO case study. Finally, for each activity the practitioner is asked to provide feedback based on evaluation questions that correspond to the solution objectives of the approach (Table 20). In addition to the feedback of the respondent the researcher's own reflections are formulated for each activity of the Value Network Development Approach.

Table 20: Solutions objectives and corresponding evaluation questions

Solution objectives	**Evaluation questions**
Clarification of value exchanges	Does the approach emphasize the economic potential of the value network?
Clarification of value network design constructs	Does the approach emphasize critical characteristics for the development of a value network?
Use of Business Model Canvas	Is the application of the Business Model Canvas logical?
Use of visualizations	Does the approach clearly indicate results through visualizations?
Practice oriented approach of method	Is the approach suitable for use in practice by consultants?

In the following sections each of the five activities of the Value Network Development Approach are reviewed based on the feedback of the practitioner and the researcher's own reflections.

Evaluation of Activity 1: Determine the network-mode for the value network

Evaluation by the practitioner

The practitioner noticed that that the first activity of the approach is valuable because "thinking about the dynamics of a network (e.g. by suggesting that one needs to think about how actors participate and collaborate as the network is evolves) emphasizes that a value network is not static, it evolves as time goes by. Therefore it is important to think about the dynamics of the value network". Preferably this activity should not only indicate how actors should collaborate in the value network, but also highlight the effects of the network-mode on the internal organization of the actor. The practitioner valued the provided visualizations. However, the collaboration framework was not recognized for an application in practical situations. The

practitioner also indicated that the collaboration framework emphasized too much on collaboration for the purpose of innovation. A generic framework is preferred instead.

Reflections by the researcher

A relevant advantage of the first activity is that it allows clarifying the purpose of the value network. The collaboration framework indicates that a specific collaboration form is suitable for specific objectives of a value network. In value networks the strategic goals are not always clear to all actors. The collaboration framework clarifies such strategic objectives which then could be communicated to value network actors. Furthermore, the shape of the framework is simple to understand. It contains concrete characteristics of four collaboration forms (e.g. network-modes). In my opinion the collaboration framework is a suitable model for an application in practice. However, like every other model, the collaboration framework needs to be adapted to the specific contexts. It provides only general guidelines that might not hold in every context. Finally, while the collaboration framework is applied in this activity for a value network concerning different organizations, it is also suitable for an application within a single large organization.

Evaluation of Activity 2: Identify value network actors and their roles

Evaluation by the practitioner

The practitioner confirmed that actor selection and the clarification of their roles are important design characteristics for the development of a value network. The practitioner also noticed that through the identification of actors and their strategic and/or functional roles it is possible to argue who has the most strategic position and strong ties in the value network. Furthermore, the practitioner explained that especially the generic roles that are proposed in the approach form a useful scheme for consultants to classify the purposes of actors in a value network.

Reflections by the researcher

In this second activity the goal is to figure out how to select value network actors for the respective network-mode that is determined in activity 1. Accordingly activity 2 is highly related to the outcomes of the first activity. The collaboration framework is reused in this second activity. In the framework specific guidelines are provided for the selection of actors for each collaboration form. Such guidelines are valued during the application of this activity because they clearly indicate how actor selection should be performed. During the application of activity two the activities and goals of value network actors are compared to the generic roles and appropriate roles are assigned to value network actors.

Evaluation of Activity 3: Clarify perceived advantages and disadvantages of value network actors

Evaluation by the practitioner

Articulating perceived advantages and disadvantages is important for value network actors because they often prefer to be informed about how the value network is beneficial for its stakeholders. The practitioner explained that it would be valuable if the degree in which advantages and disadvantages are perceived by actors could be quantified in order to be able to prioritize issues. The practitioner indicated that the method is practical; “I recognize situations from past experiences with clients where I could use such results similar to the ones you got from this activity”. The application of this activity could be improved for practical contexts through increasing the familiarity of the activity among consultants by reformulating perceived advantages and disadvantages into perceived opportunities and threats. The practitioner also explained that a clearer structure to perform this activity is required. For example:

first you determine the current business model of the actor. Second, you formulate the goals of the actor regarding its participation in the value network. Why does the actor participate? What are his goals? Third, you need to relate goals to advantageous and disadvantageous effects of the value network on the Business Model Canvas elements. You need to clarify the relation between a perceived advantage or disadvantage and the respective Business Model Canvas elements that is affected.

Reflections by the researcher

This third activity is applied during a workshop by firstly establishing the current Business Model Canvas of the organization of the workshop participant. After having established the Business Model Canvas, perceived advantages and disadvantages were formulated by envisioning the participation of the actor's organization in the TOKO value network. Especially the simplicity of the Business Model Canvas was valued by workshop participants. They understood the logic of the Business Model Canvas after a brief explanation by the researcher. All workshop participants valued the coherent and complete picture provided by the Business Model Canvas. In addition, workshop participants acknowledged that the Business Model Canvas allowed them to elaborate important perceptions based on their envisioned participation in the TOKO value network. Finally, all workshop participants appreciated the creative mood that was set by applying the Business Model Canvas for their organizations. Although the extensive application of the Business Model Canvas is valued in this activity, a major disadvantage is the preparation that is needed to organize and perform such workshops. For the six workshops that are conducted for the case approximately 18 working days were spend.

Evaluation of Activity 4: Identify value exchanges between value network actors

Evaluation by the practitioner

According to the practitioner this activity emphasizes the economic potential of the value network. However, precise metrics should be used as much as possible. Furthermore, the practitioner explained that using the Business Model Canvas for a translation in E3-value is indeed logical. In addition, result of scenarios could be indicated at first through a graph (for example accumulated profits), then after clicking on a graph a stacked diagram could provide detailed information regarding the distribution of profits among value network actors. Finally, the respondent commented that based on his experiences with clients this activity may indeed be useful in practical situations.

Reflections by the researcher

This fourth activity clarifies the value exchanges between value network actors. A valuable characteristic of this activity is that the previously established Business Model Canvases (in activity three) are reused to determine the value exchanges between value network actors. Value exchanges also indicate which value network actors are related to each other and which ones are not. The preciseness of the results that are produced by this activity is determined by the availability and correctness of metrics for the evaluation of scenarios for the economic profitability of value network actors. Furthermore, this activity requires to retrieve specific information from the Business Model Canvases of actors, such as the specific value offerings and the customers who receive this value offering, specific key partners and the value that is delivered by them, and incoming and outgoing values such as payments and fees. Because such information needs to be retrieved from the Business Model Canvases of actors, in the previous activity during workshops attention needs to be provided to the clarification of such information. In this study this activity is performed by the researcher only. However, this ac-

tivity could also be performed in collaboration with value network actors. In such cases this activity becomes labor intensive due to the necessary preparations for workshops.

Evaluation of Activity 5: Align the business models of value network actors

Evaluation by the practitioner

For the fifth activity no evaluation is performed by the practitioner. The fifth activity of the Value Network Development Approach is formulated after the evaluation session with the practitioner. Due to time constraints for this study, no additional evaluation session is performed.

Reflections by the researcher

For this activity again, the previously established Business Model Canvases from activity three serve as input (see the appendix for the simplified Business Model Canvases of value network actors of the TOKO case). Furthermore, the identified value exchanges of the previous activity (activity 4) are used as input to determine respective value network actors of which the respective Business Model Canvases could be aligned. This activity implies that business model alignments could be achieved between value network actors by highlighting GRID opportunities for Business Model Canvas building blocks of actors. Such opportunities are highlighted in the GRID opportunities matrix which is suggested in this activity as an easily applicable framework. According to the researcher this activity provides a concrete guidance for aligning business models of actors within a value network.

7 CONCLUSION AND DISCUSSION

The Value Network Development Approach that is designed in this study provides an answer to the main research question – How can the Business Model Canvas support a methodology for the development of value networks? The purpose of the Value Network Development Approach is to facilitate the development of value networks by providing five activities and related application templates for:

- the identification of a suitable collaboration and governance form for the value network (activity 1);
- the identification of value network actors and their roles (activity 2);
- the clarification of perceived advantages and disadvantages of value network actors (activity 3);
- the identification of exchanges between value network actor and the valuation of scenarios to highlight the benefits of the value network for its stakeholders (activity 4);
- and the identification of GRID opportunities for value network actors in order to align their business models (activity 5).

Where possible a template is suggested to structure the application of each activity and provide useful results for analysis and application in a subsequent activity. Specifically, the Business Model Canvas is used in three activities – activity three to five. In the third activity the Business Model Canvas is used to clarify perceived advantages and disadvantages of value network actors. In the fourth activity the Business Model Canvas is used to identify value exchanges between value network actors. Finally, in the fifth activity of the Value Network Development Approach the Business Model Canvas is used to align the business models of value network actors.

In addition to the main research question three sub-questions are answered in this study. The answer to the first sub-question – How are business models and value networks defined and related? – clarifies that the main purpose of business models is considered to be capturing the business logic of organizations while value networks concentrate on a group of organizations who are related to one another and aim to achieve a common goal. Some business models mainly concentrate on the business logic of a single firm, other business models incorporate value network actors in the business logic of the firm. Yet other business models concentrate equally on all value network actors. Therefore business models clarify the business logic of organizations from different perspectives ranging from firm-centered to network-centered.

The second sub-question – What methodologies exist for the development of value networks? – clarifies that value networks are examined for different purposes. While some value network theories concentrate on the conversion of intangible assets into tangible assets in social business networks (Allee, 2009). Other value network theories hypothyze the effects of governance mechanisms for the proper functioning of value networks (De Reuver and Bouwman, 2012). Yet other value network theories focus on the classification of different types and management of value networks (Möller and Rajala, 2007). In this study two methods – the Network Value Analysis of Peppard and Rylander (2006) and the Value Network Development model of Al-Debei et al. (2013) – are considered to be concrete business practice oriented methods for the development of value networks. Finally, the third sub-question – How can representations of a value network and related business models be demonstrated and evaluated? – is answered by including application templates in each of the five activities of the Value Network Development Approach. Templates structure the application of each activity and provide brief overviews of the results that are produced by the Value Network Development Approach.

The Value Network Development Approach is demonstrated through a single case study of a governmental subsidized research project; TOKO. The purpose of the TOKO research project is to investigate opportunities for improvement and exploitation of training services for crisis and disaster management in The Netherlands and abroad. The Value Network Development Approach is demonstrated and evaluated through its application to this single case study. Evaluation of the Value Network Development Approach is performed during a semi structured interview with a practitioner in the field of business models. In addition the researches own reflections on the application of the Value Network Development Approach are included in the evaluation.

The Value Network Development Approach helps practitioners to develop or 'model' a value network and experiment with different strategic configurations. Therefore, the Value Network Development Approach indicates that strategic planning might be less feasible in today's highly uncertain and rapidly changing environment, a discovery driven approach based on a modeling methodology (such as the Value Network Development Approach) might be suitable instead. Indeed "strategies are as much about insight, rapid experimentation and evolutionary learning as they are about the traditional skills of planning and rock-ribbed execution. Modeling, therefore, is a useful approach to figuring out a strategy, as it suggests experimentation, prototyping and a job that is never quite finished" (McGrath, 2010). The essence of formulating the practice oriented Value Network Development Approach can be considered as its potential to enable consultants, managers and business owners who are involved in the development of a value network to experiment, acquire insights and learn. The Value Network Development Approach provides guidance for such activities as it provides practical frameworks and methods based one established concepts and theories.

7.1 PRACTICAL IMPLICATIONS

The Value Network Development Approach that is proposed in this study can be used by consultants and managers to structure the development of complex value networks. The methodology offers guidance for the design of key characteristics that need to be considered for the development of a value network. In the following sections several practical implications are discussed which could be considered by consultants, managers and any other practitioner who is involved in the development of a value network.

First, practitioners need to adapt a multi-actor view regarding value networks. Multiple actors are connected to each other and form the network in which value (albeit in monetary forms or in the form of knowledge and information) is exchanged between actors. Practitioners who are involved in the development of such networks need to understand the importance of each actor. It is a prerequisite for practitioners to acknowledge that the success of the value network depends on the coherent collaboration between value network actors. In order to highlight the potentials of economic benefits for value network actors, practitioners need to evaluate scenarios that indicate the potential benefits that the value network has to offer to its stakeholders.

Value network actors need to clearly communicate their expectations from the value network. Furthermore, value network actors need to establish and maintain a base (or current) business model in order to be able to adapt when circumstances change (for instance when change is required for the alignment of the actor's business model within a value network). Business models of value network actors need to be aligned in order to achieve coherency, complementarity and consistency for the successful performance of the entire value network.

7.2 LIMITATIONS AND FUTURE RESEARCH

Several limitations need to be addressed in order to highlight the necessary cautions regarding the application of the Value Network Development Approach. First of all, the demonstration of the Value Network Development Approach is performed through a single case study. A multiple case study would have made cross-case comparisons possible and thus improve the external validity of the Value Network Development Approach. Another limitation is due to the specific context of the case study. The single case study concerns a governmental funded research project for the improvement and exploitation of training services for crisis management. In other words, the single case used in this study concerns a specific context; that of a governmental subsidized research project performed by a consortium of project partners. The Value Network Development Approach might be applicable to different extends when it is used for value networks in other contexts. Furthermore, the demonstration of the Value Network Development Approach through a case study might result in incorrect interpretations of the case study researcher. However, the case study of this research is retrieved through different data sources. Therefore, triangulation of data sources is applied, which increase the validity of the case.

Second, the evaluation of the Value Network Development Approach is performed through a semi-structured interview of a single practitioner. Therefore the generalizability of the validity of the Value Network Development Approach might be limited (since it is evaluated by only one respondent). In addition the evaluation also contains the researcher's own reflections regarding the application of the Value Network Development Approach.

As indicated in the literature review of this study the business model concept is defined by multiple authors in slightly different ways. The Business Model Canvas is no exception. The prerequisite to incorporate the Business Model Canvas in the Value Network Development Approach is mainly based on the preference of the commissioning organization of this study. Therefore the Value Network Development Approach might by limited in its application due to the use of the Business Model Canvas, as a representation of a business model. The use of conceptualizations different than the Business Model Canvas might result in a more valid methodology for the development of value networks.

Future research might complement this study in several ways. In the Value Network Development Approach (specifically in activity four) value exchanges between value network actors are retrieved through the Business Model Canvases of value network actors. The use of the value exchange and actor concepts is adapted from E3-value. Although activity four already indicates a mapping between the Business Model Canvas and E3-value, future research might complement this mapping by elaborating the detailed correspondence between the Business Model Canvas and E3-value. As explained elsewhere, the E3-value (Gordijn and Akkermans, 2001) and Business Model Ontology (Osterwalder et al., 2005) are suitable ontologies to be integrated due to their mutual complementarities (Gordijn et al., 2005).

Future research that complements the Value Network Development Approach with software tools is also valued. Designing a value network requires a structured method since value networks and related business models representations become complex rapidly. Capturing and communicating such representations through verbal or written descriptions become insufficient as complexity increases. Software tool support allows for a structured method to develop complex value networks and related business models.

Finally, since the evaluation in this study is performed to evaluate the applicability of the Value Network Development Approach future research might actually test the results that are produced by the Value Network Development Approach – e.g. the performance of value networks that are developed by the Value Network Development Approach might be compared with the performance of value networks that are developed by other methodologies.

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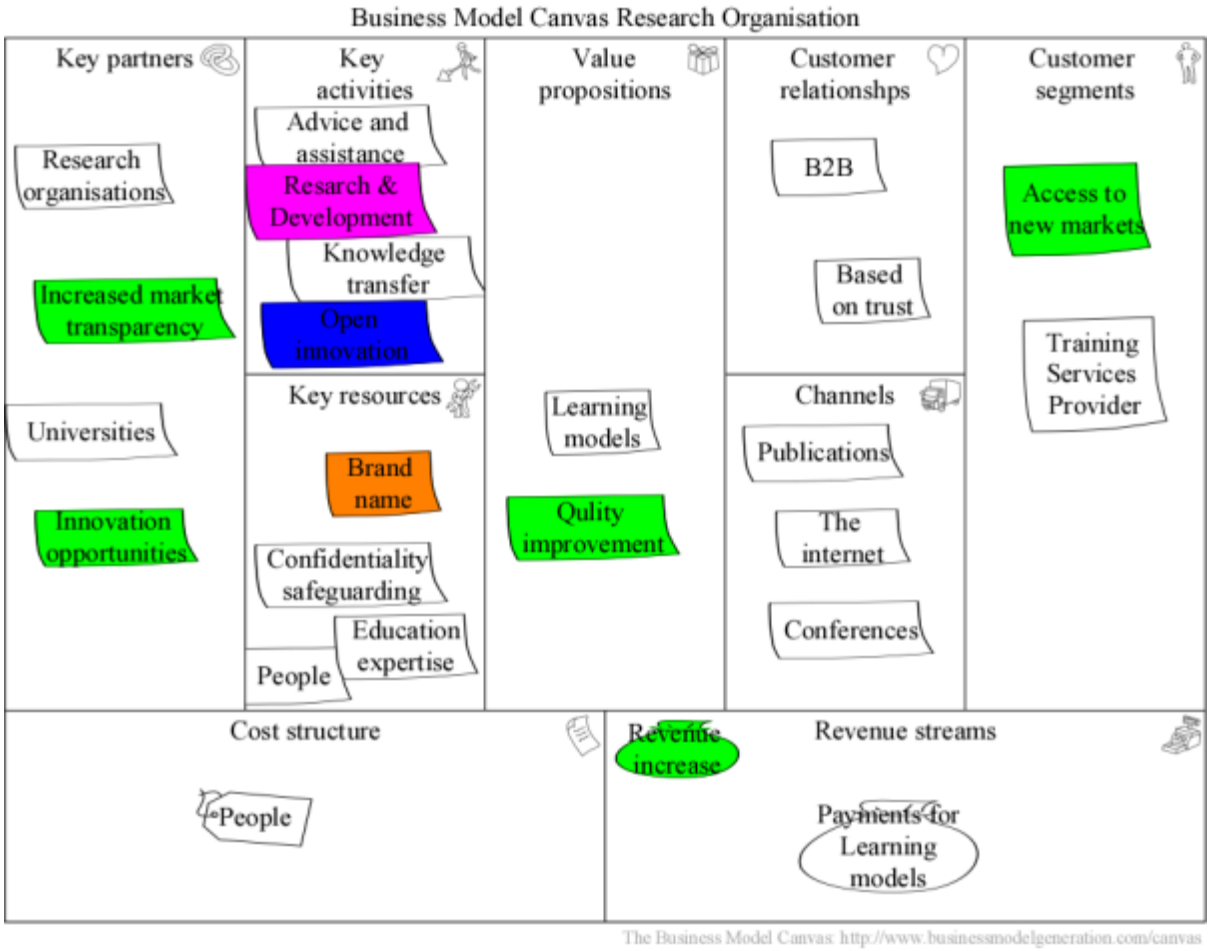
APPENDIX: SIMPLIFIED BUSINESS MODEL CANVASES OF VALUE NETWORK ACTORS FOR THE TOKO CASE

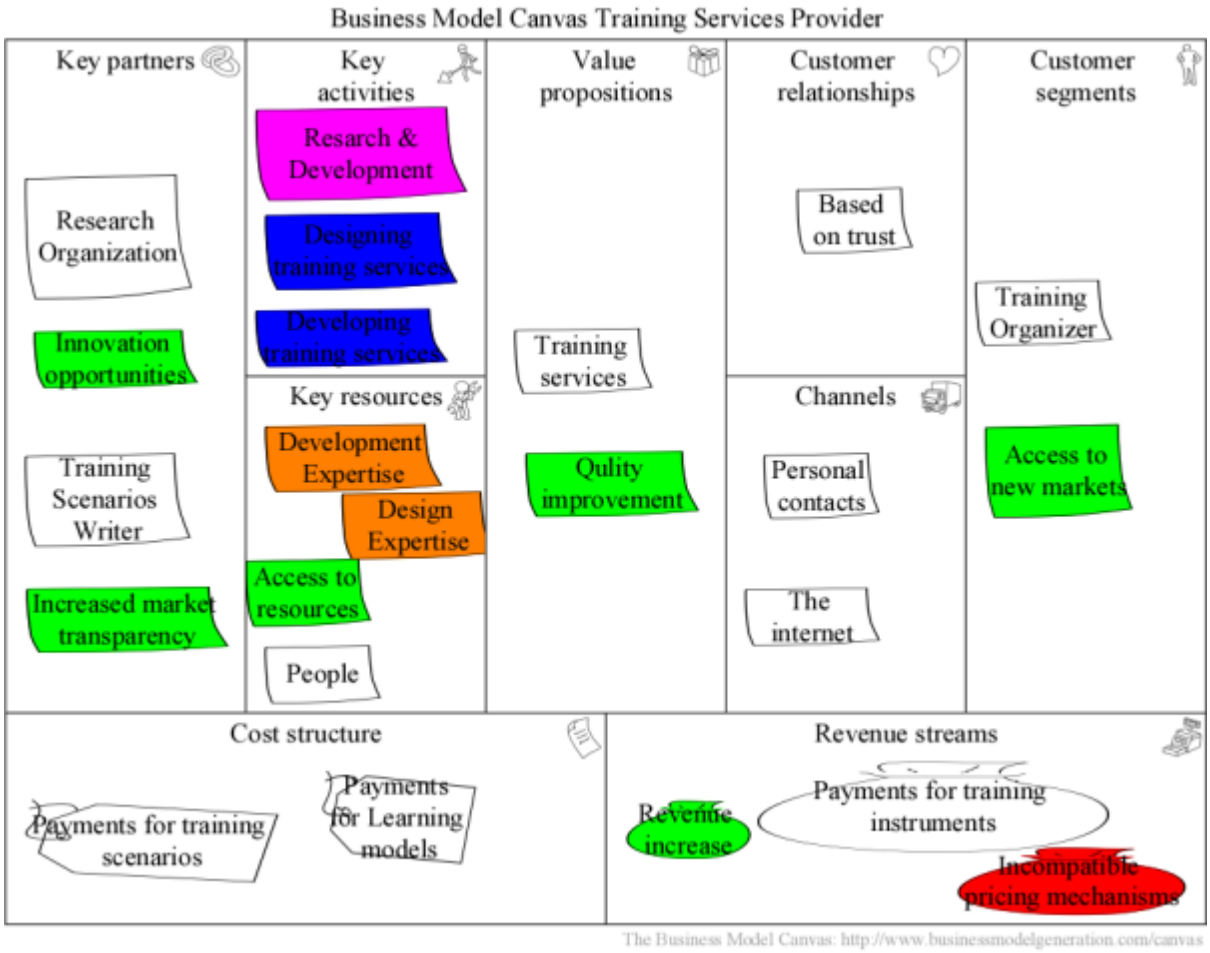
Green contents correspond with the perceived advantages of the Research Organization as indicate in Figure 20 within chapter 5.3. Pink, blue and orange contents are related to the contents of the Business Model Canvas of the Training Services Provider with corresponding colors and are used for the identification of GRID opportunities in activity five in chapter 5.5.

Figure 26: Research Organization Business Model Canvas



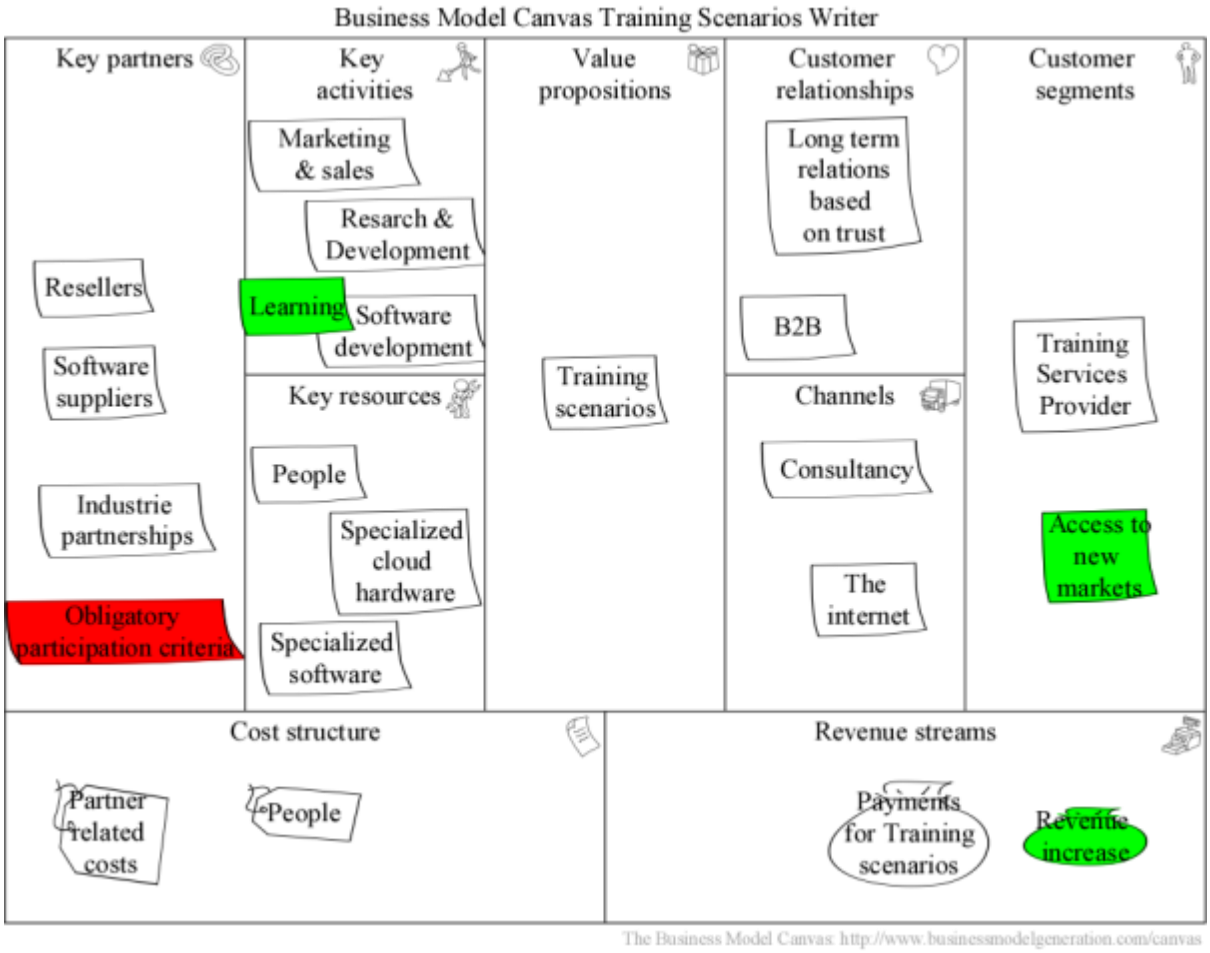
Green and red contents correspond with the perceived advantages of the Training Services Provider as indicate in Figure 20 within chapter 5.3. Pink, blue and orange contents are related to the contents of the Business Model Canvas of the Research Organization with corresponding colors and are used for the identification of GRID opportunities in activity five in chapter 5.5.

Figure 27: Training Services Provider Business Model Canvas



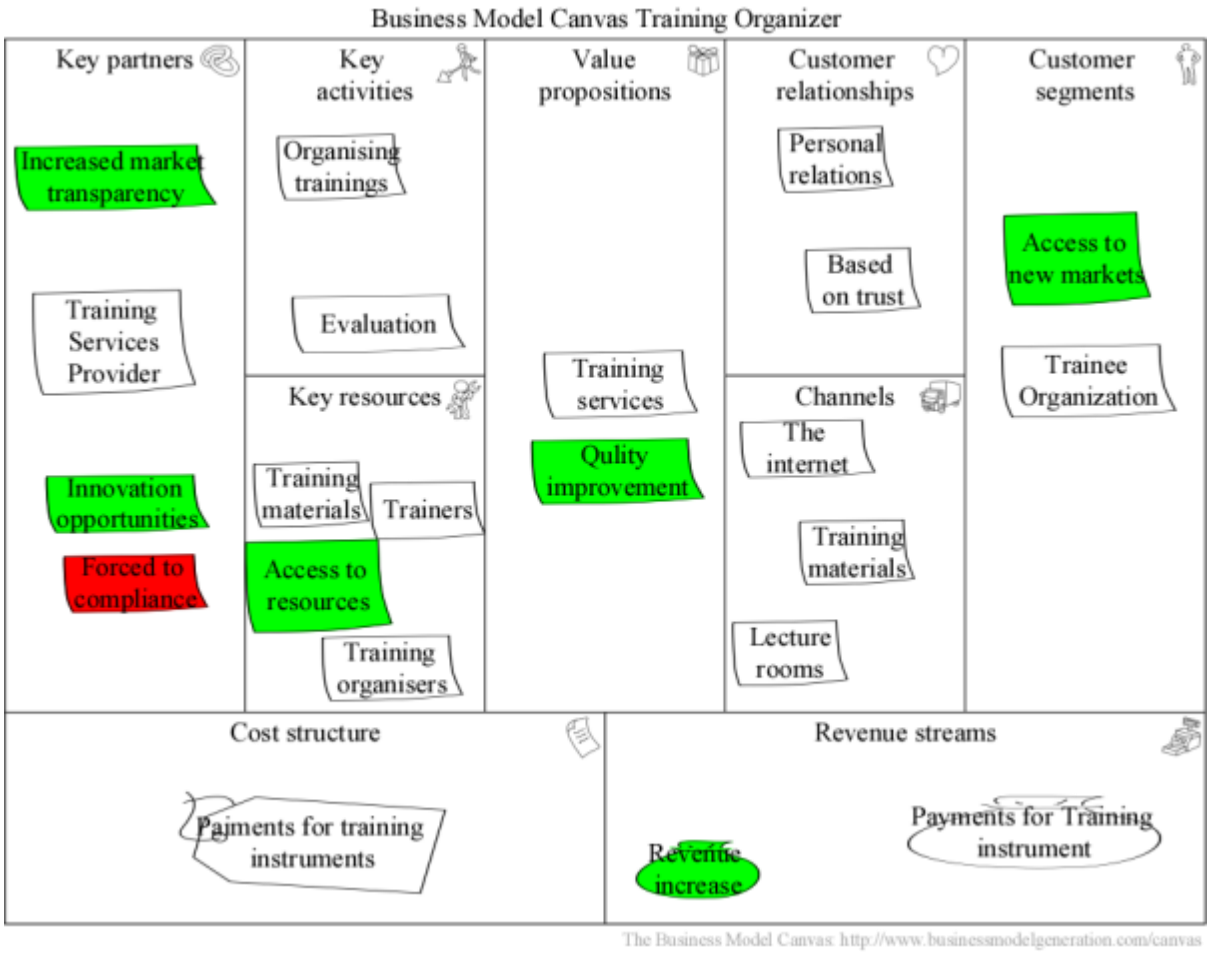
Green and red contents correspond with the perceived advantages of the Training Scenarios Writer as indicate in Figure 20 within chapter 5.3.

Figure 28: Training Scenarios Writer Business Model Canvas



Green and red contents correspond with the perceived advantages of the Training Organizer as indicate in Figure 20 within chapter 5.3.

Figure 29: Training Organizer Business Model Canvas



Green and red contents correspond with the perceived advantages of the Trainee Organization as indicate in Figure 20 within chapter 5.3.

Figure 30: Trainee Organization Business Model Canvas