

# **Capturing and maintaining value by innovation intermediary organisations**

Boosting pre-competitive inter-organisational collaboration  
while innovating for  
water-infrastructure-solutions in the Dutch delta

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## Preface & Acknowledgements

In 2005 I finished the MSc in Land and Water management at Van Hall-Larenstein. Managing water systems has interested me throughout my life. As a young boy I went fishing for weeks on end. And when I was at home I watched either David Attenborough or Jacques Cousteau. When in high school, I was digging fish ponds in peoples gardens. And when moving into college and university, I learned all there is to learn about ecology in relation to landscape and water management. Dul & Hak (2008) emphasize that the ‘exploration and defining the research topic’ is a very important phase. I had ideas, but while choosing a thesis-topic found it very difficult to apply this prescription. I am self-employed, so I can choose whatever I like. I experienced this to be an enormous privilege. It also made choosing challenging, because of the many interesting topics throughout the last semesters at the RSM and during my fifteen years of working that preceded it. ‘Going back to where I was coming from’, turned out to be the solution. I was going to study the concept of Building With Nature.

In September 2017 I started the part time master of science program in Business Administration (MScBA). The first three semesters have been intense, but I would not have wanted to miss them for the world. It has been a true enrichment of my life. This document contains the final assignment in this life changing program, the master thesis. Thinking back, finding a fitting **research** topic has been a **search** on itself for me, a soul-search. I am nevertheless pleased with the topic this journey turned out guiding me towards. In this regard, I was very much charmed and surprised by the somewhat disillusioning closing line of Evanschitzky et al; “*of course, that is why science calls it research and not just search*” (2012, p.30). That, is the very essence of me signing up for the program.

I say a word of thanks to my coach, Dr. Wim Hulsink and co-reader, Dr. Koen Dittrich for their expertise and the important feedback they have given me along the way. I also thank my interviewees located in various different organizations. I chose to interview a variety of people, the fact that they were all willingly cooperating, providing me with valuable and practical information, enabled me to make this research project a success. I want to explicitly thank my parents Willem and Willemien Morijn, who are always unconditionally supportive and interested in my endeavours and progress in life. Furthermore, I thank my brother John Morijn, who is a very sharp thinker, very critical in his opinions and who has given me many examples of how to accomplish what you wish for in live. It comes down to having guts, being perseverant and don’t being bothered about what other people think of you too much. Finally, I address Martijn Kampshoff and Dianne van Essen. As both my business partners and friends, they have facilitated me in remarkable ways.

## Executive summary

Innovation intermediary organisations are one (of more) organisation types and mechanisms aiming to influence and improve inter-organisational collaborations innovation outcomes. Management of resources - mainly knowledge and its subsequent distribution - plays an important role in value creation through innovation. Therefore inter-organisational collaboration is important for the innovation process. This thesis leans on two main theories - (social) network theory and system theory - that represent different paradigms about how inter-organisational collaboration relates to innovation outcomes. Both theories are 'incommensurable', they "*look at the same thing, but see something different*" (Essers, 2006, p.24). Both however acknowledge that 'supporting services provided by third actors in pursuit of lubricated inter-organisation collaboration' are valuable for improved innovation outcomes.

To classify innovation intermediary organisations, Klerkx & Leeuwis (2009), Howells (2006) and Dhanasai & Parkhe (2006) provide startling comparative insight in terminology and synonyms used. "*There is much terminological redundancy and sometimes confusion*" (Klerkx & Leeuwis, 2009, p.851). Theory on **value** of innovation intermediary organisations - both external and internal - also exists. To enable future impact, Howells (2018) predicts that innovation intermediary organisations need to more explicitly create, capture, maintain and communicate their (internal) value. Subsequently, capturing and maintaining value by innovation intermediary organisations is this thesis's main topic. To guide this theory-driven, theory-oriented and theory-building qualitative comparative case study, the following research question was defined. "***To what extent can 'capturing, maintaining and communicating the internal value of innovation intermediary organisations' contribute to 'improvement of their perceived added value within connected innovation ecosystems'?***"

Dul & Hak's (2008) nine-step-research-sequence was followed. Focus was created by zooming in on the Dutch top sector Water & Maritime and subsequently on sub-sector Delta technology. Within that, Knowledge and Innovation Cluster (KIC) Eco-engineering & nature based solutions was demarcated specifically. Three (3) funding-type-based-cases were selected. 1) Public-Private funded; Knowledge articulation in creative innovation projects by government driven innovation intermediary organisations. 2) Privately-Publicly funded; Creating new knowledge in creative innovation projects by market driven innovation intermediary organisations. 3) Commercial; Facilitating involved parties in knowledge articulation and knowledge creation from within a brokerage niche market by specialised commercial innovation intermediary organisations. Besides that three (3) building with nature experts were consulted for insights in the sectoral cultural and behavioural aspects regarding the involvement of innovation intermediary organisations. In line with Van de Ven (2004) the challenge of fully understanding, seeing the finer points and unveiling the essence of each selected case was approached via process theory. More specifically the pathway case study technique advocated by Jaspers (2007, p.211) - which aims to refine theory itself, not to adjust a hypothesis - was applied. Embracing this retrospective pathway case study approach, using multiple semi-structured and expert interviews and a multitude of sources, enabled 'turning cases inside out'.

Operationalization combined the “*swiss army-knife applicability*” of Obstfeld’s **BKAP** model (2017, p.194) with impact measurement provided in **additionality** literature (Davenport, Grimes & Davies 1998; Falk 2007; Clarysse, Wright & Mustar 2009; Hulsink & Scholten 2017). Variables **Brokerage** (independent), **Knowledge Creation & Knowledge Articulation** (independent) and **Projects** (dependant) combined with **output** and **behavioural** additionality allowed in debt understanding of ‘how and why’. Combining BKAP and additionality served various purposes. 1) specify and unravel the meaning of internal value within innovation intermediary organisations 2) specify and unravel the meaning of their (perceived) external value in innovation ecosystems. 3) understand the interrelation between internal value within innovation intermediary organisations -and- their (perceived) external value in an innovation ecosystem. 4) understand ‘communication about’ added value. 5) understand the organisational set-up of innovation intermediary organisations (and cases). 6) guide and organize the interview process. 7) organized and file-recorded case data. And, 8) code and analyse the data.

Findings show that utilisation of innovation intermediary organisations is an effective mechanisms to influence and improve innovation outcomes of inter-organisational collaborations. It is a very practical way to facilitate a positive experience with inter-organisational collaboration. Examples of successful ways to combine both paradigms (system theory and network theory) via innovation intermediary organisations were encountered. Supporting evidence for Howells (2018), claiming a lack of internal focus by innovation intermediary organisations was found. Knowledge storage regarding innovation intermediary organisations craftsmanship heavily depends on individuals and should be internally captured much more extensively. Findings also supports claimed “*lack of the interaction between value generation for both the clients of intermediaries and intermediaries themselves and how this shapes the trajectory of the market or the sector*” (Howells, 2018, p.80). This study explicitly shows the importance of communicating about ‘the effectiveness of the endeavours’ and ‘the true added value’ of innovation intermediary organisations. This very obviously influences the ‘outside perception’ of their added value. Theoretical implications above have been processed to managerial ones and translated into logically resulting sectoral recommendations.

To specify (added) value of innovation intermediary organisations, combining BKAP with additionality-impact-measurement works well. It can be of future inspiration in different (sectoral) contexts or can be completely reused for future operationalizations. A (sector specific) finding that should be internalized when studying ‘value created by innovation intermediary organisations’, is required awareness of the applicable I) step in the pre-defined sequential building phase, II) theme focussed on and III) geographical area an innovation intermediary organisation is active in. Awareness regarding ‘the corner of the golden triangle’ (government, knowledge institute and market) that an innovation intermediary organisation sprouts from also improves the outcome when studying ‘value created by innovation intermediary organisations’. Previously reported risks of “*terminological redundancy and sometimes confusion*” (Klerkx & Leeuwis, 2009, p.851) are very much alive and need to be accounted for when studying innovation intermediary organisations in general.

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# 1. Introduction

This chapter introduces the research topic, motivation, literature, objectives, problem & question and its methodology. As a thesis reading guide, it closes with a content paragraph.

## 1.1 Research Topic

Recently the Dutch secretary of state for economic affairs and climate provided the government with an update on mission driven top sector and innovation policies aiming at *“the utilisation of Dutch innovative power for tackling major societal challenges and for strengthening the competitiveness of our country”* (Ministerie EKZ, 2019, p.1). Missions are 1) Energy transition & sustainability, 2) Agriculture, Water & food, 3) Health & healthcare and 4) Safety. Beside these four (4) missions, the Dutch government has defined eight (8) society challenges and ten (10) key technologies (Ministerie EKZ, 2017a). The Dutch government takes a layered approach to innovation by relating the national level to nine (9) top sectors. Each will deliver top sector specific Knowledge & Innovation Agendas (KIA) 2020-2023. *“In these KIA’s top sectors will indicate how they can contribute to achieving these missions as well as their priorities. This means that sharp choices must be made about the tasks we will focus on”* (Ministerie EKZ, 2019, p.4). This research takes place within top sector Water & Maritime.

In their future exploration of the Dutch and Belgian Dredging industry, Van den Ende et al (2018) contemplate on competition, inter-organisational collaboration and novel ways to innovate. Working together, rather than against each other, is important because of increased ingenuity of proposed solutions, shortened development timelines and increased international competitiveness. In the sectoral (Water & Maritime) approach to innovation, the Dutch government provides similar directions. Maintain existing connections, renew old ones and create new ones is the bottom line. This is, where ‘innovation intermediation’ fits in. Organisations that enable and boost maintaining connections between ‘those parties in need of innovations’ and ‘those who have been working on smart and ingenious - but yet unknown to that other party - solutions’. While looking across sectors, regions, countries and cultures, ‘innovation intermediary organisations’ find the dots and draw the lines connecting them, create and manage knowledge and make sure new things get done. *“The deceptively complex coordinative work associated with bringing parties together”* is however often overlooked and unrecognised and is even referred to as *“Invisible work”* Obstfeld (2017, p.21). Up till now the focus of innovation intermediary organisations has primarily been on value creation for partners and clients that are active in the served innovation ecosystem. This, rather than focussing on their own internal value as well, enabling themselves to sustain having long term impact (Howells (2018)). This thesis concerns (internal) value in relation to innovation intermediation. Focus was created by placing the research framework / outline around the Knowledge and Innovation Clusters (KIC) Eco-engineering & nature based solutions, that works on the Building With Nature concept. This KIC is part of ‘Top consortia for Knowledge and Innovation’ (TKI) Delta technology, which in turn is one of three (3) TKI’s that - together - embody the Dutch top sector Water & Maritime.



## 1.2 Research Motivation

Main topics incorporated in my choice of study are: Water; After my water-filled-childhood, BSc Landscape architecture & environmental management and MSc Land and water management, I worked in the global heavy transport industry. Marine and salvage jobs fascinated me by nature. After that I deep dived into the tendering and (project) risk management of several dredging and civil-construction companies. Via projects, I was introduced to dirty-to-clean-water processes, energy-from-water processes and, obviously, protecting our Dutch delta country against the rising water. In the future, clean fresh water will be scarce in the world and wars will continue to be fought over it. Global warming, exhaustion of exhaustible sources (sand for example) and circular economy are topics that interest me. For me, these sustainability topics can be roughly fused together around the topic water. Innovation; During my master trajectory, management of change, stakeholder management and the co-creation of value caught my (above average) attention. They are all in some way related to identifying (your) value and communicating about it with networked peers.

Based on an analysis of available vacancies, Linked-In searches and visits to divergent trade fairs, I have concluded that the future is bright for ‘those professionals that see through business networks’ and for ‘those who know how to influence and affect them’. My acquaintance with Innovation Intermediation has been refreshing for me. I have learned about ‘networks’, ‘systems’ and about ‘playing the networked game’. While utilizing this knowledge, I will become ‘one of those bright-futured-professionals’. The water sector combines the old and new me, which I experience to be a good thing. Intuitively, and because - as I have learned along the way - combining old and new is what makes breakthroughs happen (Hargadon, 2003).

## 1.3 Literature

Theory on value of innovation intermediaries - both external and internal - exists. Overarching that, theory on innovation, value creation and knowledge management, as well as social networks and innovation systems is widespread. This paragraph introduces these theories, takes position on their interrelation and applies them to this thesis’ research framework.

Using Edison’s Menlo Park lab as an example, Hargadon (2003) explains how innovation is as much social as it is technical. He explains how breakthrough innovations are more likely to build on the existing, rather than to sprout as if to be something totally new. Schumpeter (1934), who is known to be a prophet of innovation, defined innovation as “*new or improved products, new methods of production, new markets and new ways to organize businesses*”. Obstfeld’s (2017) book title also sheds a clear light on the matter, it’s about “*getting new things done*”.

Management of resources - and mainly knowledge - plays an important role in the creation of value through innovation. This is also true for specifying required new knowledge and its subsequent distribution. Inter-organisational collaboration it therefore important for the innovation process. This thesis considers two main theories - (social) network theory and

system theory - both representing different paradigms about how inter-organisational collaboration relates to innovation. Both theories are ‘incommensurable’ or ‘not common in size’. They “*look at the same thing, but see something different*” (Essers, 2006, p.24).

(Social) network theory considers communication in (business oriented) social networks from a dyadic point of view. This means, the smallest social group, a group of two. Ties between these actors, either strong or weak, influence trust and respectively information advantages. Maintaining (numerous) relations with other (external) actors is challenging. Topics like ‘the significant resources required from management for monitoring and maintaining relations’ are elaborated risks. This is also true for ‘the unintendedly receiving - but not giving back - of actors called freeriding’ and for ‘the difficulty of searching for and selecting potential partners’ (Coleman (1994), Granovetter (1973) and Rogers & Kincaids (1981)).

Related to strong ties, Georg Simmel introduced the triad, or simmelian tie, to (social) network theory. A triad exist when three or more of mutual strong ties exist in a group. It is believed to be ‘a much stronger tie than a regular strong tie’ for that reason. In the innovation context, Krackhardt (1999) further developed this concept. While triads strengthens the relationships (ties) between actors, it also introduces the restriction of being locked in. The more simmelian ties one has, the more constrained one ends up to be. As opposed to strong ties, in his theory of structural holes, Granovetter (1973) indicates “*the strength of weak ties*” for this is where information advantages lie. When analysing a drawn network picture, Burt (2005) refers to structural holes as those locations where ties in social networks are few and weak. Put in Burt’s words, structural holes “*separate nonredundant sources of information, sources that are more additive than overlapping*” (p.16).

Operating within the network structures described above, Obstfeld (2017) explains three brokerage orientations towards innovative action. In these brokerage orientations ‘a third actor’ forms a (new) triad with two existing actors. The first orientation is conduit brokerage, being the third party that relays knowledge or information without attempting to change the relationship between the alters. Tertius iungens, the third who joins, is the second. The third orientation is Tertius gaudens, the third who enjoys or benefits (Obstfeld, 2017, p.11).

All the above, approaches management of inter-organizational relations for innovation from a (social) network theory perspective. Opposing that, the national system of innovation - and building on that the innovation ecosystems approach – give substance to system theory. Freeman (1995) defined the national system of innovation as “*the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies*” (p.5-24). It can be defragmented in smaller entities in different ways. By regional or sectorally for example. Structures and strategies of national system of innovation diverge amongst different economically successful countries. This makes defining a meaningful universal applicable best practise recipe difficult (OECD (1997)).

Building on the national system of innovation, Moore (1993) used a natural ecological ecosystems analogy, whilst analysing networks in a business contexts. Accordingly he defined the term business ecosystem as *“how companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations”* (p.76). In 2006, Adner applied this line of thinking to innovation with the ‘innovation ecosystems’ concept.

Although incommensurable, both (social) network theory and system theory acknowledge supporting services provided by third actors in pursue of improved inter-organisation collaboration for innovation. To classify third actors, Klerkx & Leeuwis (2009), Howells (2006) and Dhanasai & Parkhe (2006) provide startling comparative insight in terminology and synonyms used. *“There is much terminological redundancy and sometimes confusion”* (Klerkx & Leeuwis, 2009, p.851). To study and refer to the third actor, this thesis will continue to use the term innovation intermediary organisation. In 2018, Howells shared new findings related to the (internal) value creation and capturing by innovation intermediary organisations, which is the main topic of this thesis research.

#### **1.4 Research objectives**

This paragraph explicates how this qualitative comparative case study is theory-driven, theory-oriented and theory-building. It closes by summarising the research objectives.

Strong grounding in academic literature enables high quality empirical research. Theory for the capturing and maintaining of value by innovation intermediary organisations exists. This enables identifying a research gap, a derivative research question and makes this research theory-driven. To perform high quality theory-driven research *“a researcher has to frame the research within the context of this theory and then show how inductive theory building is necessary”* (Eisenhardt & Graebner, 2007, p.26). Offering insight in the way innovation intermediary organisations add value to innovation in an inter-organisation collaboration, requires *“the ability of qualitative data to offer insight into complex social processes that quantitative data cannot easily reveal”* (Eisenhardt & Graebner, 2007, p.26).

Howells (2018) highlights a lack of understanding of the way innovation intermediary organisations generate (internal) value in the context of their engagement in collaborative innovation. He refers to this as an understudied issue. His *“research points to a lack of the interaction between value generation for both the clients of intermediaries and intermediaries themselves and how this shapes the trajectory of the market or the sector”* (Howells, 2018, p.80). This thesis is a theory-oriented research, focussed on the academic community. It seeks to *“to analyse relationships, to compare what is going on in different research settings, to predict outcomes and to generalise”* Saunders et al. (2009, p.38).

Although lack of understanding exists (Howells (2018)), literature does currently however allows theory-building from comparative cases using preliminary proposition below. This is an example of variance theory, enabling this research to reveal “*what the patterns of linkages between these variables are*” (Voss et al, 2002, p.198) and to thoroughly understand them. This justifies the qualitative theory-building approach via empirical comparative case study, resulting in a more solid proposition. “*The results is fresh theory that bridges well from rich qualitative evidence to mainstream deductive research. This is the hallmark of building from case studies*” (Eisenhardt & Graebner, 2007, p.30).

Independent variable	Dependent variable
<i>Value capture within innovation intermediary organisations.</i>	+ <i>Sustainable continuation of innovation intermediary organisations existence, enabling continuation of (perceived) positive impact on innovation outcomes of innovation ecosystem.</i>

This study has two core scientific objectives. Firstly, Unlike most previous theory on the effectiveness of innovation intermediary organisations in inter-organisational collaboration for innovation, Howells (2018) explicitly relates external and internal value. Backed up by empirical evidence, this study contributes by providing an in debt understanding of this relation resulting in a firm proposition. Secondly, theory regarding the effectiveness of innovation intermediary organisations is explicit in stating the importance of communicating about the true added value of their endeavours. Obviously this influences their ‘perceived’ added value. What this external communication exists of, how it should be done and how it exactly adds to ‘perceived’ value, remains unspecified however. This thesis uses empirical evidence to provide new insights in externally communicating internal value established, captured and maintained within innovation intermediary organisations.

Clarifying how innovation intermediary organisations capture internal value is the practical objective of this study. By means of this clarification, these organisations can better equip themselves towards the future. Internally, by being more efficient, knowing ‘what it is exactly’ that adds value to their innovation ecosystem and by ‘focussing on that’. Externally, by being able to communicate their precise added value in understandable ways within the innovation ecosystem they serve. This, consequently, enables their clients and partners to continue or start their mutual (inter-organisational) collaboration ‘for understandable reasons’. This in turn contributes to best possible innovation ecosystems solutions.

## 1.5 Research Problem & Question

Obstfeld highlight difficulties to measure and visualize the specific impact and added value created by innovation intermediary organisations. Their contributions have been very visually referred to as “*invisible work*” (2017, p.21). As he explains “*the deceptively complex coordinative work associated with bringing parties together*” (Obstfeld, 2017, p.20) is often overlooked and unrecognised. According to Howells (2018) - up till now - focus of innovation

intermediaries organisations has been primarily on value creation for partners and clients active in the innovation ecosystem served. This, rather than simultaneously focussing on their own internal value. Enabling future impact, Howells (2018) predicts that innovation intermediary organisations needs to more explicitly create, maintain and communicate their internal value. To further guide this research, the following research question was defined.

*To what extent can ‘capturing, maintaining and communicating the internal value of innovation intermediary organisations’ contribute to ‘improvement of their perceived added value within connected innovation ecosystems’?*

## **1.6 Research Methodology**

In line with the first four (4) steps by Dul & Hak (2008), academic literature was studied for theoretical backgrounds. To understand the sector, information published by the Dutch government, public-private partnerships (innovation intermediary organisations) involved in the sector, knowledge institutes, NGO’s and several commercial parties was reviewed. To fathom the Building With Nature concept, on which the innovation intermediary organisations studied focus, both academic sources and information created and provided by the sector were analysed. Theory-building research changes as the research process evolves. To deal with this, focus with flexibility was applied (Stuart et al. (2002)). Focus was obtained by utilising the BKAP model by Obstfeld (2017). This was the structured theoretical starting point for the underlying empirical qualitative comparative case study research. It consists of the two (2) independent variables Brokerage and Knowledge Articulation and one (1) dependent variable, being Projects (getting things done) – served as the conceptual model. BKAP enriched with additional literature was used as the main research structure and for its operationalisation. In the process of understanding the relationship in a thorough and in dept manner, one learns however. That is why flexibility is required, the research design might change. In the end, step 5) - select instances to investigate - resulted in the selection of three (3) Innovation intermediary organisation research cases active within Building With Nature to investigate and three (3) Building With Nature experts to interview. Collect data / conduct measurement (step 6), analyse the data (step 7) and specify the results / specify answer to question (step 8) were taken in line with standard academic practices regarding executing qualitative business research. Discussing the implications of findings given the research objective (step 9) was via extensive cross checking of the very rich instance-data provided by fifteen (15) interviewees.

## **1.7 Table of Content**

In line with Dul & Hak’s (2008) nine-step-sequence the first three chapters explore the topic, define the research objective and specify the research question. Chapter 4 described the methodology and specifies the build-up of the research cases. Collected (within case) data is presented in chapter 5 after which chapter 6 is used to (cross case) analyse it. Chapter 7 answers the research question, concludes - in relation to this thesis’ research objective - and discusses the implications of its findings.

## 2. Literature Review – Innovation Intermediation

The picture below structures the academic literature review. It visualizes how innovation intermediation combines two incommensurable main theories as well as how it interlinks yet unconnected parties while collaborating inter-organisationally in pursue of innovation.

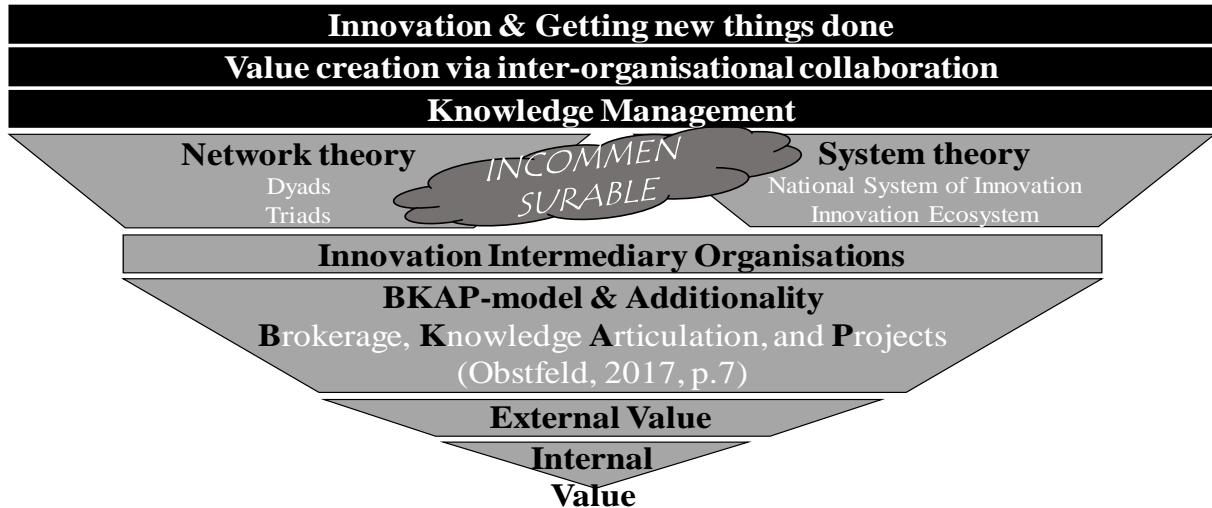


Figure 01 – Academic literature review (own illustration)

Establishing this literature review was done and inspired by Webster & Watson (2002). Working from wide to small, the first layer starts with innovation in general, getting new things done. After this, the use of resources in value creation is related to innovation. An important resource in the innovation process is knowledge, hence the subsequent elaboration on that. In the approach to inter-organisational collaboration amongst, and the coordination between, actors that have differing (economic) stakes and interests in the outcome of the innovation process, two main theories are considered in this thesis research. These are (social) network theory and system theory. Both represent different believe systems or paradigms. Differing believes, of how inter-organisational interaction and collaboration between actors related to innovation works. Both theories are for that reason incommensurable, which means as much as “not having a common size” (Essers, 2006, p.30). (Social) network theory is first contemplated on. By looking into dyads and thereafter describing triads. After that, the literature review zooms out again and continues to explain (business) system theory. Starting with the national system of innovation, followed by an explanation of business and subsequently innovation ecosystems. As a bridge between the first and second layer in the literature study, innovation intermediation is introduced. This bridge symbolises how innovation intermediation combines two incommensurable main theories in literature, as well as how it interlinks yet unconnected parties in pursue of innovation. As a second layer, the concept of innovation intermediation - aimed at smoothening the inter-organisational collaboration processes - is further elaborated on. Their purpose, their types, their benefits and their challenges will be taken into consideration. Presorting towards the research topic, the creation and capturing of value by innovation intermediary organisations is subsequently reviewed. Both (perceived) external value within the innovation ecosystem and internal value within innovation intermediary organisations internally are discussed. Via a clarification of the gap identified in literature, the latter will be ultimately defined as the theoretical core/essence of this thesis.

## 2.1 Innovation & Getting new things done

One of the first examples that comes to mind when thinking about innovation is Thomas Edison and his Menlo Park lab. Using the Edison example, Hargadon (2003) explains how innovation is as much social as it is technical. And that breakthrough innovations are more likely to build on the existing, rather than to sprout as if to be something totally new. He refers to the process of combining the existing in new ways as recombinant innovation. Some eighty five years ago Schumpeter (1934), who had a reputation of being a prophet of innovation, states innovation to be about ‘being new’ or ‘being improved’. In his definition he applies this newness to products, methods of production, markets and ways to organize businesses. With his book title “*Getting new things done*”, Obstfeld (2017) substantiates the same message. His book also starts to describe the outcome (innovative action), rather than the process of getting there. He furthermore explains that innovation reveals itself in the form of “*organizational routines or creative projects*” Obstfeld (2017, p.8). In most cases, same as in science, innovations are incremental and fairly routine. When new action is periodically and deliberately mobilized, ‘creative projects’ are born however.

## 2.2 Knowledge Management

Obviously innovation creates value. To be able to add value for its customers, partners and personnel, any organisation requires access to resources. “*Older resource-based views holds that the competitive advantage which a firm seeks has roots in its capabilities to produce and adapt its human, physical and organizational competencies in relation to its environmental surroundings. Valuable and necessary resources for the creation of customer value must be in some form secured*” (Bentivegna, 2014, p.1). External resources can be made available to an organisation via inter-organisational relationships. Resource dependency theory describes how “*inter-organizational linkages enable the organization to manage some of its environmental constraints and control some of the contingencies it confronts*” (Pfeffer & Salancik, 1978, p.398). This means that having and maintaining links with other organisations, is an easy way to improve access to external resources, required for the creation of value while innovating.

Knowledge plays an important role in the creation of value via innovation. Knowledge-based approaches to management consider organizations to be social communities that can excel while creating and transferring knowledge. “*Ultimately, it is the management of this knowledge which leads to a competitive advantage for a firm*” (Bentivegna, 2014, p.1). Obstfeld (2017) also clearly distinguishes the difference between ‘individual knowledge’ and recognizes the importance of combining and recombining this knowledge. In this statement he heavily relies on other academic publications throughout the last two decades. Especially when knowledge needs to be transferred from one organisation to another, inter-organisational relationships and collaboration are important. Besides ‘individual knowledge’ Obstfeld explains the important ability of organisations to “*communicate what they know to others whom they wish to enlist*” (2017, p.12). He refers to this skill of making knowledge more explicit, useable or relevant to a specific situation as ‘knowledge articulation’.

## 2.3 Network theory

Previous paragraphs described dependency on resources and knowledge in an inter-organisational context. When thinking about that further, the dependency on social skill within social structure becomes obvious. *“The ability to manage one’s relationships, and the resources that those relationships afford, has always been a central concern of strategic actors. It’s therefor worth examining how our networks and the means by which we orchestrate them have evolved over the past decades”* (Obstfeld, 2017, p.2). To understand this more thoroughly Obstfeld (2017) explains the importance of social skill as a tool for strategic actors. While exchanging resources and knowledge with yet existing connections for example, but also in endeavours to create new ones. He defines social skill as *“the ability to induce cooperation by appealing to and helping to create shared meanings and collective identities”* (p.6-7). When utilising social skill, social capital is created. The term social capital has become a core concept in business, political science and sociology and refers to *“the advantage created by a person’s location in a structure of relationships”* (Burt, 2005, p.4). Obviously ‘person’ in the quote above, should be interpreted as ‘organisation’ in the context of this thesis. The advantage refers to (new) resources and (new) knowledge coming within reach. (Social) network theory explains the way in which relationships between organisations influences its behaviours and the resulting outcomes. It *“deals with how social structure constrains and enables behaviour and performance of actors, as well as the behavioural and social psychological factors that influence the formation and dissolution of ties between them”* (Özman, 2017, p.7). So, inter-organisational ties between organisations are the pathways through which communication about sharing of resources and knowledge flows. That is what (social) network theory academics agree on. It is the way these ties influence social capital of organisations in inter-organisational network structures however, that researchers have ongoing debate about (Wilkinson & Young, 2002). Coleman (1988, 1994) advocating benefits of network closure while focussing on dyads, while Burt (2005) contradictorily pleads for the opportunities structural holes provide while elaborating on triads.

### **Dyads – strong relations vs network closure (idea problem)**

Coleman (1994), Granovetter (1973) and Rogers & Kincaids (1981) discuss communication in (business oriented) inter-organisational networks from a dyadic viewpoint. This means, the smallest social group; a group of two. They also explain how the strength of ties between these actors positively influences trust and respectively bring information advantages. They advocate strong ties to be beneficial. Insides in how maintaining (numerous) relations with other (external) actors comes with challenges are provided. Topics like the unintendedly receiving - but not giving back - of actors called freeriding or unintended spill over, the significant resources required from management for monitoring and maintaining relations, but also, the difficulty of searching for and selecting potential partners are elaborated on as risks. Obstfeld (2017) underwrites the fact that strong ties enable fast mobilization and coordination of action. However, such close network relations are far less likely to produce novel and new ideas, which is the very essence of innovation. He calls this ‘the idea problem’.



### **Triads – access to new information vs structural holes (action problem)**

Related to strong ties, Georg Simmel was one of the first academics to introduce a concept used in social network analysis called a triad. Due to its origin, in literature triads are often referred to as a simmelian tie. When three (hence triad) or more of mutual strong ties exist in a group, such a simmelian tie exist. For that reason it is viewed and believed to be a much stronger tie than a regular strong tie (dyad). Krackhardt (1999) developed this concept of the strength of simmelian ties further. While simmelian ties strengthens the relationship between actors, it still introduces the same ‘being locked in in the network restriction’ described for dyads. Because the more of such ties one has, the more constrained one appears to be, causing Obstfelds’ (2017) ‘idea problem’ still to be applicable to this situation.

As opposed to strong ties, in his theory of structural holes, Burt (2005, 2015) further developed Granovetters’ (1973) initial ideas about “*the strength of weak ties*”, for this is where he finds information advantages to be. When drawing a network-picture for analytical purposes, Burt refers to ‘those locations where ties in social networks are few and weak’ as structural holes. Put in Burt’s words “*structural holes separate nonredundant sources of information, sources that are more additive than overlapping*” (2005, p.16). Brokerage is a concept to close these holes or to bridge these gaps. Before moving into that later in this thesis, another way of contemplating network structures in which inter-organisational collaboration for innovation arises - called system theory - is discussed in the next paragraphs.

## **2.4 System theory**

“*Networks give a birds-eye view of different industrial or organisational landscapes*” (Özman, 2017, p.xvii). When visiting big cities subway system today, this very same phenomenon will provide you with easy insight in complex webs of connections. Modern day water managers create structured water maps, providing others similar insights in space-and-mass-ratio or thematic views of the water landscape. All intended to enable others to understand the networked landscape better. This thesis deals with inter-organisational collaboration in business networks for the purpose of innovation. Özman (2017) explains that a network perspective is particularly valuable when contemplating on and managing innovation. This is due to the fact that innovation is heavily dependent on the inter-organisational flow of resources and knowledge. Good understanding of network systems enables management the bird’s-eye view of locations and connections between organisations, technologies and people. Systemised networks enable innovators to get familiar with the roles and identities of other actors. Besides that, by accessing and combining complementary resources and knowledge, networks facilitate the accomplishment of innovators goals. Required resources and knowledge flows through relations. “*In an innovation network relations imply conceiving and creating a novelty and disseminating it to a wider audience*” (Özman, 2017, p.12). Bentivegna (2014) created insight in the benefits of systemised innovation networks and in their areas of concerns. Amongst other things reported organizational benefits of innovation networks that gain to a competitive advantage are; being more innovative and collaborative ready, being more ambidextrous and able to react, uncovering hidden business opportunities before competition, allowing synergies

to be released within the organization, helping organisations to locate experts and leading organisations to become more (long-term) secure. Reported areas of concern when dealing with multiple partners in a collaborative effort are; lack of clear incentives motivating partners to share knowledge, lack of efficiency while ensuring the right knowledge to end up with the appropriate network partner, insufficient boundary crossing: cultural, time and knowledge gaps are obstacles and, finally, free riding: some companies do learn, but don't share (Bentivegna 2014, p.9, p.14).

*“There are several different frameworks/structures within which innovation networks can function”* (Bentivegna,2014, p.13). The rise of the national innovation system reflects this systemic approach (OECD, 1997). After describing the national system of innovation framework in the next paragraphs, business and innovation ecosystems will follow naturally.

**National System of Innovation**

Previous paragraph drew the comparison between business networks and bird's-eye views, clarifying the importance of looking at networks systematically. Freeman (1995) and Lundvall (1992) applied this same line of thinking while developing the national system of innovation in which the flow of technology and information is considered to be key to the inter-organisational innovative process (OECD, 1997, p.7). *“The central idea is that the innovative performance of an economy depends on the innovative capabilities of firms and research institutions, and on the ways they interact with each other and public institutions”* (Doloreux, 2002, p.243). What stands out, and needs to be understood very well, is the fact that this framework encloses not only the company system, customers and producers. The financial, political, research and educational system are incorporated in the-mapped-playing-field as well. Intermediaries – positioned in between the company and education/research system – were given a place in the generic network drawing as well. In the context of this thesis, the latter obviously is a very important player, for it is the level of analysis of the research question at hand. As figure below shows, from this bird's-eye view, attempts to obtain insight in mutually influencing mechanisms becomes more insightful and easier to comprehend.

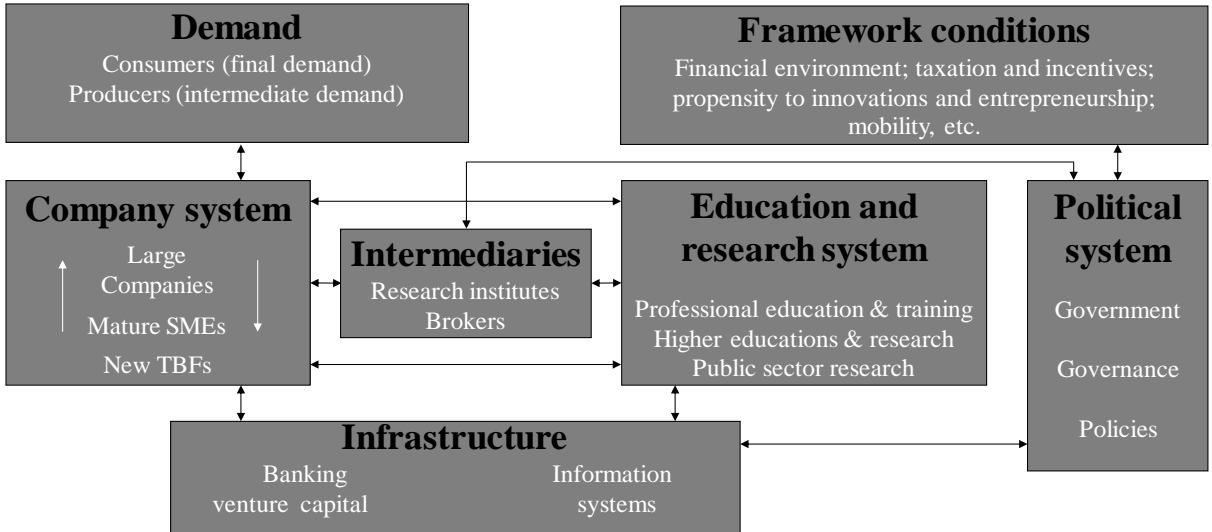


Figure 02 - The generic model of national innovation systems as presented in OECD (2005, p.7)

As mentioned in the introduction, *“the base of an innovation ecosystem is the concept of a national innovation system”* (Pilinkienė & Mačiulis, 2014, p.366). Before moving on to that, it is relevant to understand the national innovation framework a little better. In 1997 the Organisation for Economic Co-operation and Development (OECD) made published diverse definition given by several authors. The most extensive one given, is Metcalfe’s (1995) below.

*“.. that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies”* (OECD (1997, p.10)).

Resuming this definition, it is very important to understand that the National Innovation System is about ‘the elements/actors’ and their positioning on the one hand, and ‘the inter-organisational relationships between them’, on the other. *“The interactions among the actors involved in technology development are as important as investments in research and development. And they are key to translating the inputs into outputs”* (OECD, 1997, p.3). This means that *“Innovation and technology development are the result of a complex set of relationships among actors in the system”* (OECD, 1997, p.7).

There are many different ways in which the concept of the National Innovation System framework can be applied to map, analyse and understand existing (innovation) networks. At different geographical levels for example; locally, regionally, nationally or even internationally. Obviously mapping existing networks based on discipline, work field and specialisation, often referred to as a (industrial) sector, is another way to apply the concept. (Firm) ownership structures, or sources of financing are other examples of factors that can potentially unite actors in a networks. To specify the view point, from which to approach (innovation) networks of actors, Porter (1998) introduced the term ‘cluster’. In essence his clusters and the specification of geographical region or (industrial) sector on which to apply the National Innovation System concept, as specified by Freeman (1995) and Lundvall (1992), have big similarities. The OECD adopted the term cluster and explains that *“cluster analysis focuses on the interactions between particular types of firms and sectors, which can be grouped according to their technological and networking characteristics“* (OECD, 1997, p.7-8). Clusters are, put in other words, ways to specify what is included and what is scoped out while studying, understanding and influencing inter-organisational (innovation) networks. Intended to indicate the link with the research topic of this thesis, below, both the geographical clustering and sectoral clustering are explained in some more detail.

*“Innovation systems can be analysed at different levels: sub-regional, national, pan-regional and international. While the national level may be the most relevant due to the role of country-specific interactions in creating a climate for innovation, international technology flows and collaborations are taking on growing significance”* (OECD, 1997, p.7-8). Obviously these

innovation systems are interconnected and mutually related as well. Chung (2002) explains that a national innovation system should be analysed as an assembly of individual sectoral or regional sub-systems. He illustrated how the regional innovation system concept has proven to be *“a good tool to generate an effective national innovation system, as it can effectively create different sectoral innovation systems in different regions”* (p.485). He also explains how regional and sectoral innovation systems co-exist and how the concept is used to geographically map a variety of innovation actors, which helps to understand innovation systems in different regions. Sectors obviously often overlap geographical regions, which is why *“the concept of regional innovation systems can be a good tool to formulate sectoral innovation systems, as regions should concentrate specific industrial sectors for the effective development of their regional economies”* (Chung, 2002, p.487). The relevance of understanding innovation systems by central and regional governments is also evident, for it guides them towards active and appropriate supportive policies. In sum this improves a nations innovative performance.

### **Innovation Ecosystems**

Because this thesis elaborates on innovation ecosystems, it is important to broader introduce and understand the origin of analysing systemic business networks from an ecosystem perspective. As Anggraeni, Den Hartigh & Zegveld (2007, p.11) explain, it is *“most interesting and useful to use the business ecosystem concept as a perspective to understand business networks, rather than as a new organizational form”*. It is all about understanding inter-organizational relationships and collaboration from the systemic networked perspective. This is how the ecosystem perspective will be utilized in this thesis.

Obviously the term ecosystem evolves from biology and ecology, the science area that studies the interaction between organisms in networks, living together in the natural world. Moore (1993) has been one of the first to apply this Darwin like way of looking at the natural world, to looking at business networks. He describes *“successful businesses are those that evolve rapidly and effectively. Yet innovative businesses can’t evolve in a vacuum. They must attract resources of all sorts, drawing in capital, partners, suppliers, and customers to create cooperative networks”* (p.75), clarifying the importance of being very aware of the surrounding environment, how it evolves and how it influences business. *“As with biological and ecological ecosystems, business ecosystems are susceptible to change, adaptation, and evolution”* (Zahra & Nambisan, 2012, p.222).

After Moore (1993), several other authors elucidated the successful metaphoric use of business ecosystems, while studying and understanding inter-organizational collaboration constructs within business networks. It is very interesting to ascertain how these *“biological ecosystem analogies”* (Pilinkienė & Mačiulis, 2014, p.368) in itself have evolved over time. Industrial ecosystem, entrepreneurship ecosystems, digital business ecosystems, start-up ecosystems and social enterprise ecosystems are only a random selection of these analogies intended to get grasp off the interaction between interconnected actors. *“Every ecosystem is a community of subjects that interact as a complete system”*, yet *“every analogy has different actors, its*

*environment and various interactions between them” (Pilinkienė & Mačiulis, 2014, p.365). Zahra & Nambisan (2012) specify a business ecosystem as “a group of companies - and other entities including individuals, too, perhaps - that interacts and shares a set of dependencies as it produces the goods, technologies, and services customers need” (p.220). This is interesting because ‘other entities’ are included in this view. Coming back to the focus of this thesis, related to innovation, Moore (1993) explains that “in a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations” (p.76). This implicates looking at the actors in the world around us as being ‘full of opportunities’, rather than being ‘full of threats’.*

The same metaphorical equation that is used to describe the inter-organisational interactions in business ecosystems, has been applied successfully to reveal inter-organizational cooperation’s within innovation ecosystems. Once again, *“the base of an innovation ecosystem is the concept of a National innovation system” (Pilinkienė & Mačiulis, 2014, p.366). The national innovation system concept was described in the previous paragraph, enabling more closely looking into innovation ecosystems in this paragraph. To do so, exactly defining a biological ecosystem, and, how its mechanisms can be compared with innovation in inter-organisational networks seems appropriate.*

In 2007, Papaioannou et al explained *“there has been some shift in the academic and policy debate on innovation from a more traditional systems approach to ecologies and/or ecosystems. The latter are concepts transferred from the world of biology to the social world in order to explain the evolutionary nature of interrelations between different individuals, their innovative activities and their environments” (P.1). Jackson (2011) elucidates that “a biological ecosystem is a complex set of relationships among the living resources, habitats, and residents of an area, whose functional goal is to maintain an equilibrium sustaining state. In contrast, an innovation ecosystem models the economic rather than the energy dynamics of the complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation” (p.1-2). Earlier, Adner (2006) defined innovation ecosystems as “the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution” (p.98). In 2014 Pilinkienė & Mačiulis similarly outlined that “ecosystems analogies are not a matter of individual actors, but of interacting populations of subjects residing in the same environment and creating value that no single firm could make alone”(p.366-367).*

Comparable to the national innovation system concept from which it originates, the innovation ecosystem concept combines ‘different worlds’ in one system. *“The innovation ecosystem comprises two distinct, but largely separated economies, the knowledge economy, which is driven by fundamental research, and the commercial economy, which is driven by the marketplace” (Jackson, 2011, p.1-2). Durst & Poutanen (2013) shed light on how to bridge this gap between these weakly connected economies, by explaining that “the successful*

*implementation of innovation ecosystems can be assigned to synergy in the area of resources, governance, strategy and leadership, organizational culture, human resource management, people, partners, technology and clustering”* (p.1). This is where innovation intermediations plays an important role.

## **2.5 Innovation Intermediary Organisations**

As a first layer in this literature review, previous paragraphs explained (communication) network theory in terms of dyads and triads. It also discussed (business) system theory in terms of systemic frameworks and specified this by means of the National System of Innovation and business & innovation ecosystems. These theories introduced main actor types and ‘the fact that and the way in which’ they are connected (ties). What interaction happens within those connections and how inter-organisational collaboration within these social networks is displayed and coordinated, is what eventually determines a successful innovation outcome.

### **Purpose and functions of innovation intermediary organisations**

Innovation intermediation is as a concept describing the endeavours to optimize inter-organizational collaboration, leading to shared innovation success. While executing the literature review one discovers that *“there is much terminological redundancy and sometimes confusion”* (Klerkx & Leeuwis, 2009, p.851). In his meta study Howells (2006) discloses how previous studies examine and distinct innovation intermediary organisations as ‘organizations’ on the one hand and innovation intermediation as ‘a process’ on the other. This leads to differences, both in approach as well as in terminology. Klerkx & Leeuwis (2009), Howells (2006) and Dhanasai & Parkhe (2006) provide startling comparative insights in the varied terminology and synonyms used. To describe innovation intermediation as a process, academics have used terms like: innovation consultancy services, technology brokering, innovation bridging and knowledge brokering. Describing innovation intermediary organisations was done earlier in terms of: intermediaries, third parties, knowledge or technology brokers, intermediaries, intermediary agencies, intermediary firms, knowledge intermediaries, bridge builders, bricoleurs, superstructure organisations and boundary organisations (Howells, 2006). In a wide variety of possible terms to use for the classification of the type organizations that put themselves to use - by influencing ties and closing gaps - for the purpose of inter-organizational collaboration, innovation intermediary organisation is the term used and applied in this thesis.

Recently Obstfeld (2017) has introduced his BKAP model. *“The BKAP model is, named for the model’s three most distinctive features: Brokerage, Knowledge Articulation, and Projects”* (p.7). BKAP has proven to be very useful to create structure around specifying the process of innovation intermediation and the endeavours of innovation intermediary organisations. In line with the distinctive features defined in the BKAP-model, earlier Klerkx & Leeuwis (2008a) had defined the main functions of innovation intermediary organisations as; network formation, demand articulation and innovation process management. Howells (2006) had introduced structure and ways to breakdown the functions of innovation intermediary organisations as well; *“foresight and diagnostics, scanning and information processing, knowledge processing and*

combination/recombination, gatekeeping and brokering, testing and validation, protecting the results, commercialization and evaluation of the outcomes” (p.720). Based on approximately 15 year of prior research by other scholars and himself, Obstfeld (2017) has combined ‘what innovation intermediary organisations do’, ‘how they do it’ and ‘how this creates value’ in the BKAP-model. Figure below shows how his construct is build out of two independent variables, being Brokerage and Knowledge Articulation and one dependent variable, being Projects (getting new things done).

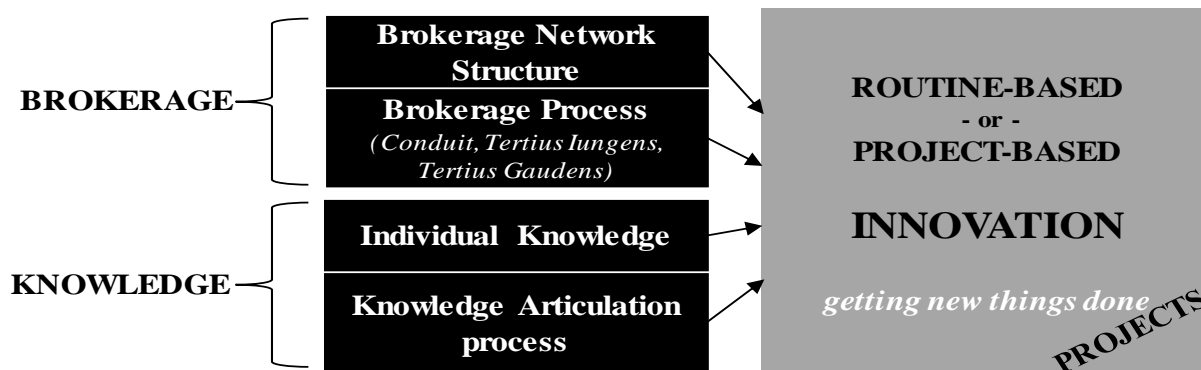


Figure 03 - BKAP-model by Obstfeld (2017, p.8)

Previous paragraphs described ‘innovation’ in general, the routine and project approach to getting new things done. ‘Individual knowledge’ management and ‘knowledge articulation’ were elaborated on as influencers of these achievements as well. Insight in two incommensurable ways to contemplate on ‘brokerage network structure’ were also provided.

Specific to the ‘brokerage process’, Obstfeld (2017) distinguishes three (3) orientations, in which ‘a third actor’ forms a (new) triad with two existing actors. Conduit brokerage, being the third party that relays knowledge or information without attempting to change the relationship between the alters, is the first. Tertius iungens, the third who joins, is the second orientation. The third one is Tertius gaudens, the third who enjoys or benefits. Table below elaborates on these three forms of brokerage.

Form of Brokerage Process		Description
1. Conduit brokerage		“Conduit brokerage is a knowledge transfer phenomenon involving the passing of information between parties” (Obstfeld, 2017, p.31).
2. Tertius iungens brokerage		“The iungens actively pursues coordination and connection between alters” (Obstfeld, 2017, p.38).
3. Tertius gaudens brokerage		“Gaudens refers to situations in which a broker maintains or exploits unfamiliarity, competition, or conflict between parties actively through purposeful inaction” (Obstfeld, 2017, p.35).

Table 01 - Typology of brokerage processes by Obstfeld (2017, p.11, 31, 35, 38 and 57)

### **Types of innovation intermediary organisations**

Literature of the last decades provides insight in the characteristics and properties of different types of innovation intermediary organisations that are involved in innovation intermediation processes described above. Topics like mandates, development in (maturity) phases, customer types and ways of funding have been used as breakdown structures for research. Klerkx & Leeuwis (2008b) provide insight in six (6) design requirements that enhance the credibility of innovation intermediary organisations. These design requirements have proven to be helpful in the analysis of innovation intermediary organisations. These are: 1) visibility and accessibility, 2) credibility, 3) access to appropriate sources of knowledge and information relevant to the innovation process, 4) credibility of the innovation intermediary organization, 5) quick response to requests and 6) complementarity to the weaknesses of the parties served. Same as for the terminology used to specify an innovation intermediary organisation in itself, the description of its functions and typologies is very varied and differs per author. Klerkx & Leeuwis (2009) combined and specified seven (7) types of innovation intermediary organisations for the Dutch agriculture sector. To indicate the differences they specified functions and source of funding. Consecutively the seven (7) types of innovation intermediary organisations are: 1) Innovation consultants aimed at individual farmers and agri-food SMEs, 2) Innovation consultants aimed at collectives of farmers and agri-food SMEs, 3) Brokerage organizations that forge peer (interfirm) networks, 4) Systemic intermediaries for the support of innovation at higher system level (systemic instruments), 5) Internet-based portals and databases that display knowledge and information relevant to farmers and related parties, 6) Boundary organizations that act at the policy/ research/user boundaries in research planning (i.e. research councils with ‘innovation agency’) and 7) Boundary organizations that act at the policy/ education/research interface. For a comprehensive overview of these types of innovation intermediary organisations for the Dutch agriculture sector please consult **appendix I**.

### **Benefits, challenges and added value of innovation intermediary organisation**

Optimizing inter-organizational collaboration via innovation intermediary organisations has several benefits that lead to shared innovation success. Examples of reported contributions to ‘facilitating innovation by innovation intermediary organisations’ are: their impartiality in demand articulation and network brokerage, their easy accessibility for diverse stakeholders involved, their disclosure of knowledge and (weak tied) networks, their context sensitivity and cognitive and cultural proximity for both end-user and sources of knowledge (Klerkx & Leeuwis, 2008a, 2008b, 2009). Regarding (weak tied) networks, Howells (2006) also specifically indicates the benefits of mutual linkages amongst innovation intermediary organisations for innovation in general.

As applicable to any type of organisation, management of innovation intermediary organisations and its processes comes with tensions and challenges. Examples of such challenges are: pressure from shareholders / financiers to realize objectives, limitedness in mandates, incoherent policies with regards to their establishment. As opposed to benefits of being interlinked, both Howells (2006) and Klerkx & Leeuwis (2008a) also highlight



competition between and amongst innovation intermediary organisations as a potential risk. Or even more extreme, being perceived as a competitor by providers of research and development services and by knowledge intensive business services active in the innovation ecosystem. Progressive client bias, focussing too much on innovative entrepreneurs, is another challenge reported by Klerkx & Leeuwis (2008a).

Several of the challenges highlighted in literature, specifically concern ‘the added external value’ provided by innovation intermediary organisations. *“Assessing the impact of innovation brokers is seen to be difficult, given their indirect impact on the business's value chain”* (Klerkx & Leeuwis, 2009, p.857). Challenges mentioned specifically in this regard are: invisibility and immeasurability of service value, difficulty to make added value tangible and visible, unclear images of innovation intermediary organisations’ role, added value of innovation process management not being recognized and difficulties in balancing the expectations of the demand and the supply side. Distinguishing the difference between innovation intermediary organisations tasks that are in the interest of the public, compared to those that are in private interest, is also a reported challenge. Some even consider innovation intermediary organisations to be an illegitimate form of state support to private companies (Klerkx & Leeuwis, 2008a).

Specific calls for future research on ‘impact/value/performance measurement’ of added external value in the innovation ecosystem were made. *“It has become clear that innovation intermediaries have difficulty in showing their impact in absolute terms ... most stick to reporting achievements by using descriptive statistics”* (Klerkx & Leeuwis, 2008a, p.272). In order to protect the credibility and impartiality of innovation intermediary organisations, Klerkx & Leeuwis (2008b) also emphasis that *“a clearer delineation between its different activities has to be made”* (p.364). Klerkx & Leeuwis (2008a) also stress the need for proven effectiveness of innovation intermediary organisations, as public funding decisions *“often rest on assumptions”* (p.272), rather than being fact based. They call for the development of interactive ‘soft’ indicators - for processes like network formation, newly emerged institutional linkages, awareness raising or learning - as well as for ‘hard’ evaluation methods, both qualitative and quantitative. *“As determining the impact of innovation intermediaries is inherently difficult, additional systematic analysis (both quantitative and qualitative) of the effects of the support tools of innovation intermediaries is therefore desirable”* (Klerkx & Leeuwis, 2008a, p.274). Building on this, calls for future research were made as well concerning the ‘communication of (perceived) value created by innovation intermediary organisations and their embeddedness in the innovation ecosystem’. *“Despite being perceived to have a catalysing effect on innovation, innovation brokers have difficulty in becoming embedded as their clients and/or financiers find it difficult to grasp the nature and value of their activities”* (Klerkx & Leeuwis, 2009, p.849). Obviously measuring and quantifying the external added value of innovation intermediary organisation within the served ecosystem is closely related to being able to communicate it to counter parts in understandable ways.

The meaning of 'added value' is an ambiguous one, both externally and internally. This makes measuring it challenging. When mirroring 'external value for the innovation ecosystem served', against the BKAP model framework, this mainly concerns the right side of the model; getting things done. 'Internal value within innovation intermediary organisations' mainly concerns the models left side; brokerage and knowledge. Although this breakdown helps to clarify 'what added value means' in this context, other ways to explicate exist and are in itself of 'added value'. To evaluate additionalities, additionality literature exists (Davenport, Grimes & Davies 1998; Falk 2007; Clarysse, Wright & Mustar 2009; Hulsink & Scholten 2017). Guidance on determining and measuring the (un)intended consequences, or impact, of public assistance on firm's innovativeness is provided. The 'impact function of public assistance to firms' is determined by comparing the situation 'with' or 'without' (Hulsink & Scholten, 2017). Further examining additionality literature exposes it's potential for explicating 'added value of innovation intermediary organisations'. Basically three types of additionalities are presented; input additionality, output additionality and behavioural additionality. Input additionality explicates a firms "*subsequent research and development activity*" (Davenport, Grimes & Davies, 1998, p.55) or "*the added value resulting from actions that would otherwise not have been undertaken*" by the firm "*such as more research activities*" (Hulsink & Scholten, 2017, p.106). Output additionality clarifies the most direct decisive impact (output or result) of public assistance to firms innovations. Examples of indicators are; successful innovations, patents, increased sales, increased competitiveness and enhances productivity (Falk, 2007). Behavioural additionality explicates a firms 'increasing ability (as a result of public support) to initiate new activities' and 'its engagement in networks with potential for new knowledge/information and new opportunities'. Examples of reported indicators are; mind-set change, posture/attitude changes, drastic changes in strategy, engagement in new collaborations, change in the way of undertaking R&D and fast(er) market response (Hulsink & Scholten, 2017). Although 'spin off in extra activity by members of the innovation ecosystem' is relevant (input additionality), it is also influenced by a lot of (uncontrollable) other factors. For 'the determination of added value of innovation intermediary organisations', indicators of output and behavioural additionality seem better suitable. Output and behavioural additionality can be better translated into clean, targeted and well measurable indicators of which the probability of 'actually representing what is intended to being measured' is higher.

Up till now, focus of innovation intermediaries organisations has been primarily on 'the value creation for partners and clients active in the innovation ecosystem served'. This, rather than simultaneously focussing on their own internal value. In 2018, Howells shared findings related to how the (internal) creation and capturing of value within innovation intermediary organisations enables and improves their ability to positively impact the value added within the innovation ecosystem being served. "*Although this, taken to the extreme, might be seen as parasitic or exploitative of their clients, innovation intermediaries need to generate sufficient gains for their long-term survival, without which the generation of value to their clients and their wider systemic benefits would not be possible*" (p.71). Specific calls for future research on internal value within innovation intermediary organisations have been made. "*While the*

*literature focuses on value creation for their client organisations, little is known about how innovation intermediaries create internal value even though this is essential for ensuring their long-term survival and sustaining their key facilitating role in the innovation system”* (Howells, 2018, p.70). He refers to the way innovation intermediary organisations create internal value - the main topic of this thesis research - as an *“understudied issue”* (p.70).

## **Summary**

Theory on value of innovation intermediaries - both external and internal - exists. Overarching that, theory on innovation, value creation and knowledge management, as well as social networks and innovation systems is widespread. While *“getting new things done”* Obstfeld (2017, p.1), or improving products, methods of production, markets and ways to organize businesses (Schumpeter, 1934), Hargadon (2003) explains how breakthrough innovations build on the existing, rather than being something totally new. He also explains how innovation is as much social as it is technical. Management of resources - mainly knowledge and its subsequent distribution - plays an important role in value creation through innovation. Therefore inter-organisational collaboration is important for the innovation process. (Social) network theory and system theory represent different paradigms about how inter-organisational collaboration relates to innovation outcomes. Both theories are ‘incommensurable’, they *“look at the same thing, but see something different”* (Essers, 2006, p.24).

(Social) network theory considers communication in (business oriented) social networks from a dyadic point of view. This means, the smallest social group, a group of two. Ties between these actors, either strong or weak, influence trust and respectively information advantages. Maintaining (numerous) relations with other (external) actors is challenging. (Coleman (1994), Granovetter (1973) and Rogers & Kincaids (1981)). Related to strong ties, Georg Simmel introduced the triad, or simmelian tie, to (social) network theory. A triad exist when three or more of mutual strong ties exist in a group. It is believed to be ‘a much stronger tie than a regular strong tie’ for that reason. In the innovation context, Krackhardt (1999) developed this concept further. While triads strengthens the relationships (ties) between actors, it also introduces the restriction risk of being locked in. As opposed to strong ties, in his theory of structural holes, Granovetter (1973) indicates *“the strength of weak ties”* for this is where information advantages lie. Structural holes *“separate nonredundant sources of information, sources that are more additive than overlapping”* (Burt, 2005, p.16).

Opposing (social) network theory, the national system of innovation gives substance to system theory. Freeman (1995) explained how the national system of innovation can be defragmented into smaller regional or sectoral entities. Successful structures and strategies of national system of innovation diverge amongst different countries (OECD (1997)). Moore (1993) further theorized, using a natural ecological ecosystems analogy in business contexts. Adner (2006) applied this ‘business ecosystem line of thinking’ to the ‘innovation ecosystem’ concept. Although incommensurable, both (social) network theory and system theory acknowledge that ‘supporting services provided by third actors in pursue of lubricated inter-organisation

collaboration' are valuable for improved innovation outcomes. Although "*much terminological redundancy and sometimes confusion*" (Klerkx & Leeuwis, 2009, p.851) exists, this thesis continues to use the term innovation intermediary organisation to refer to the third actor.

Obstfeld (2017) combined 'what innovation intermediary organisations do', 'how they do it' and 'how this creates value' in the BKAP-model. It builds from the variables **B**rokerage (independent), **K**nowledge Creation & **K**nowledge **A**rticulation (independent) and **P**rojects / getting new things done (dependant). Specific to the 'brokerage process', Obstfeld (2017) distinguishes three (3) orientations, in which 'a third actor' forms a (new) triad with two existing actors. These are conduit brokerage, *tertius iungens* and *tertius gaudens* (p.11).

Literature of the last decades provides insight in the characteristics, properties en design requirements of different types of innovation intermediary organisations. Based on Klerkx & Leeuwis (2009) seven (7) types (**appendix I**) this thesis zooms in on type 4) Systemic intermediaries for the support of innovation at higher system level (systemic instruments). Besides numerous benefits, several challenges are highlighted in literature. This thesis specifically concerns 'the added external value' created and provided by innovation intermediary organisations. "*Assessing the impact of innovation brokers is seen to be difficult, given their indirect impact on the business's value chain*" (Klerkx & Leeuwis, 2009, p.857). Klerkx and Leeuwis (2008a) also stress the need for proven effectiveness of innovation intermediary organisations, as public funding decisions - rather than being fact based - "*often rest on assumptions*" (p.272). Measuring and quantifying the external added value of innovation intermediary organisation within the served ecosystem is closely related to being able to communicate it to counter parts in understandable ways. Howells (2018) refers to the way innovation intermediary organisations create internal value - the main topic of this thesis research - as an "*understudied issue*" (p.70). The meaning of 'added value', both externally and internally, is an ambiguous one which makes measuring it challenging.

Additionality literature (Davenport, Grimes & Davies 1998; Falk 2007; Clarysse, Wright & Mustar 2009; Hulsink & Scholten 2017) provides ways to explicate and measure 'added value of innovation intermediary organisations'. Three types of additionalities are presented; input additionality, output additionality and behavioural additionality. Although 'spin off in extra activity by members of the innovation ecosystem' is relevant (input additionality), it is also influenced by (uncontrollable) other factors. For 'the determination of added value of innovation intermediary organisations', indicators of output and behavioural additionality enable better translation into clean, targeted and well measurable indicators. Combined with Obstfeld's (2017) BKAP-model, output and behavioural additionality were used in this thesis. Input additionality was not.

### 3. Water-Infrastructure-Solutions & Building With Nature

This chapter introduces the Dutch governments layered approach to innovation. It does so, by relating the national level to the sectoral (Water & Maritime), the sectoral level to core teams or Top consortia for Knowledge and Innovation (TKI Delta technology), and TKI's to Knowledge and Innovation Clusters (KIC Eco-engineering & nature based solutions – Building With Nature). For each layer, innovation ambitions are summarised. The chapter closes by putting the use of innovation intermediation in perspective of the Dutch innovation approach.



Figure 04 – Water-Infrastructure-Solutions & Building With Nature in the Dutch delta (own illustration)

#### 3.1 Governmental innovation policy

Recently the Dutch secretary of state for economic affairs and climate provided the government with an update on the mission driven top sector and innovation policies aiming at “*the utilisation of Dutch innovative power for tackling major societal challenges and for strengthening the competitiveness of our country*” (Ministerie EKZ, 2019, p.1). This letter provides insight in the latest status of the Dutch governmental innovation approach. This paragraph explains the layered approach to innovation as a whole and breaks down the Dutch economy in sectors, subsequently providing insights in the innovation approach within each layer.

#### Dutch Economy and innovation

The Dutch secretary of state typifies the international top position of Dutch economy as originating from a national necessity, with a prominent role for the government, further developed with research and made lucrative by entrepreneurs. Dutch economy stretches far beyond the national borders, is solution orientated and finds inventive pragmatic solutions for challenging circumstances. To maintain and grow this international top position, the government defined the top sector approach. “*Top sectors are those areas in which Dutch business and research centres excel on global scale. Businesses, universities, research centers and the government work together in the management of knowledge and innovation, internationalization and human capital*”. (Ministerie EKZ, 2018a, p.1). To make our position even stronger, efforts are being made to reduce regulatory pressure. These nine (9) top sectors - characterized by high labour productivity, exports and R&D investments - are Agri & Food, Chemistry, Creative industry, Energy, High tech systems & materials, Logistics, Life science & health, Horticulture & starting materials and Water & Maritime. This research focusses on the last one.

To provide direction in which our country needs to be innovating, the government has defined four (4) missions. By means of these missions, great challenges for society (society themes) are translated into concrete goals and ambitions. Missions are characterized to be a dot on the horizon. Ambitions have an encouraging perspective for them, sometimes, extend beyond the current policy goals. The missions challenge the nine top sectors to work interdisciplinary and to come up with solutions. Simultaneously the missions require government efforts to create suitable preconditions for innovation. Missions are 1) Energy transition & sustainability, 2) Agriculture, Water & food, 3) Health & healthcare and 4) Safety. In the extension of these missions, the government has defined eight (8) society challenges and ten (10) key technologies (Ministerie EKZ, 2017a). This requires Dutch society to make sharp choices regarding tasks to focus on (Ministerie EKZ, 2018b). For the period 2020 to 2023, each of the top sectors will deliver Knowledge & Innovation Agendas (KIA). KIA's outline how top sectors will contribute to mission achievement as well as to society challenges and key technologies. This government driven approach clearly sprouts from the National System of Innovation (see chapter 2).

Together with Sweden, Denmark, Finland, the United Kingdom and Germany, the Netherlands is in the leading group of countries with innovation performance well above the EU average (RVO - Netherlands front runner in innovation, n.d.). The Dutch government finds it important to be a knowledge economy and to be a front runner in innovation. She aims to utilize innovation as an export product and works hard on utilizing its opportunities. Entrepreneurs of innovative companies are considered to be the insurance of economic growth and more future employment. The government believes these innovative companies create new ways for other (normal) entrepreneurs to tap into new markets. She also believes innovation helps entrepreneurs solving social problems in new ways. Innovative entrepreneurship is supported by funding for that reason, allowing entrepreneurs to release their innovative products more quickly (Rijksoverheid – kansen door innovatie, n.d.).

### **Topsector Water & Maritime and innovation**

Out of the nine (9) national top sectors, this research focusses on Water & Maritime. This top sector works on “*solving water challenges to increase global prosperity*” (Topsector water – working on, n.d.). To facilitate the best possible business climate, top sector Water & Maritime is subdivided into three (3) sub-sectors. These are Delta technology, Maritime technology and Water technology. The three (3) sub-sectors are responsible for their own Knowledge & Innovation Agendas (KIA), which in sum subsequently embody the KIA Water & Maritime (Topsector water, 2018). This research further focusses on the sub-sector Delta technology. In sub-sector Delta technology, three (3) main stakeholder innovate together. This interrelation is referred to as ‘the golden triangle’ (Van den Ende et al, 2018). When using the National System of Innovation as an underlayer, these stakeholder groups are responsible for political system, framework conditions and demand (government), education and research system (knowledge institutes) and company system (market). In his Handbook Strategic Surrounding Management, Wesselink (2015), inspired by the Mutual Gains Approach, shares current sector specific state-of-the-art ways of successful interorganisational collaborations amongst the golden triangle.

In general terms, the approach of the top sector Water & Maritime towards innovation is that the sectors knowledge and experience needs to result in revenues, ‘proof of principle’ and ‘proof of practice’ which lead us towards ‘proof of market’ (Topsector water – working on, n.d.). For this, besides the subdivision in sub-sectors, top sector Water & Maritime also employs two (2) top teams that focus on the facilitating topics Internationalisation and Human Capital (Topsector water – working on, n.d.). Where the three (3) sub-sectors have their KIA’s for content, these two (2) top teams explicate their facilitating focus in so called strategy papers. Innovation and innovative entrepreneurship is designated to be a solution direction for the challenges faced within the top sectors. Rijkswaterstaat, one of the Netherlands main project initiators, explicated the need for innovation within Delta technology in a very clear and catchy way. *“Innovation is necessary to keep the Netherlands liveable, accessible and safe in a sustainable and affordable way. Rijkswaterstaat is facing the biggest maintenance task in its history: many bridges, tunnels and viaducts are in need of replacement or renovation. At the same time, climate change and increasing traffic congestion require smart, sustainable and safe solutions. In 2030 we also want to be energy-neutral and work circularly. Innovating together; Rijkswaterstaat is making room for innovations on the road, water, space and sustainability and information provision. For this, we work closely together with companies, knowledge institutes and other authorities”* (RWS – Innovation, n.d.).

### **Water-Infrastructure-Solutions and innovation**

As part of top sector Water & Maritime, this research further focusses on sub-sector Delta Solutions. This sub-sector is also referred to as Top consortium for Knowledge and Innovation (TKI) Delta technology. The knowledge and the innovations developed within TKI Delta technology improves water quantity management, water quality of surface water and flood protection. With these developments, it remains possible to live in the Dutch delta and in deltas elsewhere in the world, today and in the future. As outlined in the previous paragraphs, TKI Delta technology works according to its own Knowledge & Innovation Agenda (KIA). Besides the four (4) main missions of the Dutch government, inspired by the central society challenges and key technologies this KIA addresses several other topics. The KIA does not only cross-references to the national main missions, besides that, it also explicates how the agenda relates to and obeys policies describing “the big Mondial challenges”. The Sustainable Development Goals (SDG’s), Sendai Framework for Disaster Risk reduction and the World Economic Forum Global Risk Report are examples mentioned and elaborated on (TKI Deltatechnologie, 2018).

To subdivide the attention within the Dutch (sub) sectors, the central government introduced so called KICs; Knowledge and Innovation Contracts - or - Knowledge and Innovation Clusters. In KICs agreements are made between governments, the business community, knowledge institutions and other organizations in society. Agreements, about the use and distribution of public and private resources for research, and also about valorisation and market creation. KIC contracts are drawn up on the basis of the knowledge and innovation agendas (KIA’s) described above (Ministerie EKZ, 2019). TKI Delta technology, responsible for Water-Infrastructure-Solutions, particularised the meaning of KICs for its own sub-sector. *“Within the KICs, a*

method is encouraged in which fundamental and strategic research and practice oriented innovations are included from the outset as interconnected activities in the project design. That is, linking practice with theory. This also promotes the flow of new knowledge into practice and accelerates the application of innovations and the translation of foreign experience into Dutch knowledge development / innovations" (TKI Deltatechnologie, n.d.). Within TKI Delta technology ten (10) KICs exist. These are: Water safety, Sustainable delta cities, Wet infrastructure & Civil constructions, Water management, Water & food, Water & energy, Water & ICT, Eco-engineering & nature based solutions (Building With Nature), Sustainable functioning of water systems and Sustainable usage of estuaries, seas and oceans. This thesis further focusses on KIC Eco-engineering & nature based solutions (= Building With Nature).

The way the two top teams from top sector Water & Maritime - Human Capital and Internationalisation - facilitate and interlink with the KICs described above, is symbolically visualised in picture below, which was taken from KIA Deltatechnologie 2018-2021. "The trees symbolize market areas (KICs) of which Netherlands B.V. can harvest the benefits of knowledge developed on a fundamental, strategic and applied level. The knowledge and innovation needs of governments and market areas provide focus and a source of inspiration for new knowledge development within the different layers" (TKI Deltatechnologie, 2017, p.10).

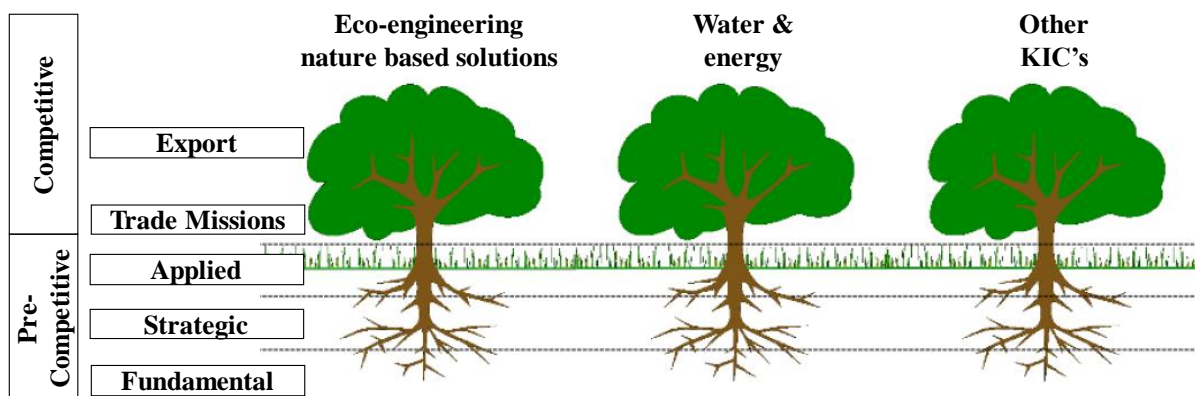


Figure 05 – Schematic representation multi-layer knowledge development & translation to export (TKI Deltatechnologie, 2017, p.10)

### Building With Nature and innovation

One (1) of ten (10) Knowledge and Innovation Contracts - or - Knowledge and Innovation Clusters (KICs) in the sub-sector Dutch Delta Solutions (TKI) Delta technology is Eco-engineering & nature based solutions. To get an impression of the variety of terminology used to describe what this entails, table below enumerates some including their spiritual fathers.

Terminology used for Building With Nature
Building with Nature (BwN) by Ecoshape; Taking advantage of natural processes for realizing hydraulic infrastructure, while at the same time providing opportunities for nature development.
Green Infrastructure (GI) by European Commission; A network of natural and semi-natural areas, designed and managed to enhancing nature's ability to deliver multiple valuable ecosystem goods and services.



Terminology used for Building With Nature
Nature-Based Solutions (NBS) by World Bank; Living solutions designed to address various societal challenges in a resource efficient and adaptable manner.
Engineering with nature (EWN) by US Army Corps of Engineers; Intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaborative processes.
Working with nature (WWN) by PIANC; Approach that considers the project objectives from the perspective of the natural system rather than from the perspective of technical design.
Working with Natural Processes (WwNP) by Environment Agency (England); Protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast”
Building With Nature by Deltares; Using the benefits of nature for society is utilised increasingly worldwide. This large number of initiatives has led to the use of numerous concepts that have a similar meaning

Table 02 - Terminology used for Building With Nature (Deltares – Definition Building With Nature, n.d.).

In relation to KIC Eco-engineering & nature based solutions, the KIA Deltatechnologie 2018-2021 describes *“by including nature as a factor in infrastructure designs, flexibility, adaptability and additional functionalities can be integrated. At the same time, new natural services are being created. Natural services, such as food supply or space for recreational activities; often at lower costs than with traditional engineering solutions”* (TKI Deltatechnologie, 2017, p.19). This thesis will further use the KIC’s Eco-engineering & nature based solutions definition.

To provide a more tangible image, examples of historic Building With Nature projects are the Sand Motor, serving to replenish sand on the Dutch coastline for a long period (Van den Ende et al, 2018). Another historic example is Waterdunen, a *“coastal protection project that combines innovative engineering and ecosystem services for solutions. It combines coastal protection, nature development and the development of a recreation area to improve the economy of the area. It is a development project that covers approximately 5 km by 2 km near Breskens, on the southern bank of the Scheldt estuary in the Netherlands”* (IADC, 2017, p.3). Two examples of currently ongoing innovation projects within the KIC Eco-engineering & nature based solutions are the Material spills from dredge cutter heads while dredging (KIC Eco-engineering & nature based solutions – Material spills while cutter dredging, n.d.) which is about getting insight in the sub-processes of dredging while utilising dredging cutters. These insights are gained by modelling and simulating the dredging process through numerical methods, supplemented by physical experimental tests. The model ultimately delivered, will enable optimization of the cutter head designs and the accompanying working methods. Another currently ongoing innovation project is: Full scale hydraulic and ecological optimisation of a dike-forest combination (KIC Eco-engineering & nature based solutions – Willow forests hydraulic effects, n.d.) which is aims to quantify the effects of willow forests on the hydraulic conditions of dike-bodies. Results could lead to lesser amounts of required ground works for dike and embankment strengthening.

### **3.2 Innovation Intermediation**

Innovation intermediary organisations fulfil a linking pin function between the three corners of the golden triangle (government, knowledge institutes and market). This paragraph describes their role and place in the governmental approach to innovation and specifies this for KIC Eco-engineering & nature based solutions (Building With Nature).

#### **Purpose and functions of innovation intermediary organisations**

National and regional governments actively stimulate innovation efforts done by companies in different innovation themes. For this, national instruments cover the entire knowledge chain, from fundamental research to valorisation (Ministerie EKZ, 2017a). The national plan that glues all these commitments together for the years 2018 to 2019, is the central Knowledge and Innovation Contract. It is signed by companies, social institutions, knowledge parties and governments. This contract continues cooperation's set in motion in earlier years. *"In total, public and private partners put together around 2.4 billion annually, of which around 1.3 billion from private and around 1.1 billion from public funds"*. (Ministerie EKZ, 2017b, p.2).

The government considers public private partnerships to be an important instrument while finding effective solutions - and their subsequent implementations - in society and business. At the same time, she embraces the potential occurrence of necessary social and behavioural changes, while working on the four (4) missions. *"Public-private partnership (PPP) via the top sectors is one important condition to achieve ambitious goals that do not have a immediately-ready-made-solution and that go beyond the beaten track"* (Ministerie EKZ, 2019, p.2). Specifically, this means that more intensive interactions between governmental departments, the top sectors, knowledge institutions, companies, social organizations and regional governments needs to be accomplished. While evaluating the creation and maintenance of (new) public private partnerships the governments concluded the need to *"set priorities that everyone could agree with and to make surprising combinations between sectors. At the same time, the talents we need for this will become clear"* (Ministerie EKZ, 2019, p.3).

While utilising talents' opportunities, the government is very keen on stimulating knowledge valorisation, which entails the utilization towards application. On the one hand, the government challenges itself by allowing science to lead towards new innovative solutions and new activities surrounding that. On the other hand, the creation of market for these innovations is required. This is the joint interest of public and private parties, because only then missions are realized. Therefore each of the top sectors will include a specific strategy for valorisation and market creation in their specific knowledge and innovation agendas (Ministerie EKZ, 2019). To encourage valorisation a better circulation of knowledge between SMEs, governments, civil society organizations, consumers and other users is required and important.

Combining the requirements for public private partnerships and valorisation, the government explicates that the mission-driven approach requires the building of new networks including yet uninvolved parties, the involvement of new sectors and the creation of new business

ecosystems. *“The mission-driven approach requires strong cross-sectoral cooperation and a multidisciplinary approach, whereby technological innovation is linked to non-technological innovation”* (Ministerie EKZ, 2019, p.11). Given the importance of SMEs for the implementation of innovation, specific efforts are made to improve cooperation with and networking between SMEs and knowledge institutions. This will stimulate spreading innovations to the wider SME. Furthermore the ambition is to strengthen ecosystems around start-ups and scale-ups and connect them with the top sector networks. This offers them opportunities to meet knowledge partners, investors and potential customers. The role of innovation intermediary organisations in this playing field is obvious.

### **Types of innovation intermediary organisations**

Within sub-sector Dutch Delta Solutions - and for that reason available to and active in KIC Eco-engineering & nature based solutions as well - several types of innovation intermediation parties are active. Based on the way they are funded, public private partnerships can be subdivided in 1) public – privately funded, 2) private – publicly and 3) privately funded. Commercial parties, varying in size are also active. The Dutch government supports the usage of innovation intermediary organisations described above in different ways. By assistance in obtaining European and national subsidies for example. Horizon 2020, the biggest EU research and innovation programme. Or the European Regional Development Fund, called Interreg North Sea Region, fund the innovation intermediary organisations directly. Another way is to take away financial barriers for Dutch SME to hire commercial innovation brokers. For this the government as well made subsidy’s available (RVO – Subsidy innovation broker, n.d.).

### **Benefits, challenges and added value of innovation intermediary organisation**

To create and maintain public private partnerships, to utilize our countries talents and to boost valorisation, to attract new talent, to maintain existing networks and to build new ones, and to eventually bring innovations abroad is why innovation intermediary organisations are set to use in sub-sector Dutch Delta Solutions and for that reason within KIC Eco-engineering & nature based solutions. Given the fact that it is mostly public money that goes around in this sector, the government has an explicit opportunity to guide this process of inter-organisational cooperation. Knowledge events play an important role in maintaining and building networks. Innovation intermediary organisations are often the initiators and facilitators of such events. In the exploration phase of this research (Dul & Hak, 2008) three of such events were visited.

Not only did the Dutch government define what needs to be achieved, what is needed for getting there is also explicated. *“To achieve actual transitions, much more is needed than research alone. The government has important resources and instruments within its current financial frameworks to ensure this, such as regulations, procurement policy or financial and fiscal instruments. It is a government-wide task to realize the missions and to make the innovations focused on them possible”* (Ministerie EKZ, 2019, p.10). Within the top sector Water & Maritime both human capital and internationalisation are seen as important challenges. Both are represented by a top team. *“To be able to grow, business, knowledge & educational*

*institutions and the government are inextricably linked. We need each other when it comes to caring for good quality and flexible staff”* (Topsector Water, 2016, p.2). Top team Human Capital is focussing on implementing this policy which requires many - and also many (re)new(ed) - connections in the golden triangle. For this the top team cooperates with innovation intermediary organisations. The internationalisation challenge is introduced by the top team as *“to achieve pioneering solutions we also require smart factories, strong sensors, powerful biochips and customized technology. That means investing in the development, application and scaling up of key technologies. Originated in the Netherlands, with earning opportunities far beyond the national borders”* (Ministerie EKZ, 2019, p.3). Top team internationalisation described the goal of the internationalization strategy as *“increasing competitiveness, and with that the export, aiming for as much as possible connection with societal challenges in the world”* (Topsector Water, 2017, p.3). The existence and strategies of both top teams indicate how innovation intermediation is part of the defined sectoral way forward.

Human capital, utilizing our countries talents and knowledge, internationalisation, public private partnership networks, maintaining existing networks and to build new ones, knowledge & network events, regulatory, financial and fiscal incentives all focus on ‘the social side of innovation’. Researching the way in which innovation intermediary organisations add value to the innovation ecosystem of KIC Eco-engineering & nature based solutions and how this is perceived, provides valuable insight for sub-sector Dutch Delta Solutions and the top sector Water & Maritime in their endeavours to accomplish and stretch their missions. The same applies to ‘how and why’ internal value capturing within innovation intermediary organisations enables them to do so.

## **Summary**

This chapter described the Dutch layered approach to innovation. After describing the national level, top sector Water & Maritime and sub-sector Delta technology were elaborated on. Subsequently, Knowledge and Innovation Cluster (KIC) Eco-engineering & nature based solutions was demarcated specifically. For each layer, innovation ambitions were summarised after which ‘using innovation intermediation’ was associated with Dutch innovation approach.

The Dutch approach innovation very structured and government fulfils a prominent role. It clearly sprouts from the National System of Innovation (see chapter 2). The top sector approach defined nine (9) top sectors. In interrelation, they work on four (4) missions through which great challenges for society (society themes) are translated into more concrete ambitions and goals. In the extension of these missions, the government has defined eight (8) society challenges and ten (10) key technologies (Ministerie EKZ, 2017a). To outline their contribution to mission achievement, as well as to society challenges and key technologies, all nine (9) top sectors embrace a Knowledge & Innovation Agendas (KIA). Top sector Water & Maritime works on *“solving water challenges to increase global prosperity”* (Topsector water – working on, n.d.). Within sub-sector Delta technology - one of three (3) sub-sectors - government, knowledge

institutes and market innovate in an interrelated ‘golden triangle’ (Van den Ende et al, 2018). Regarding Internationalisation and Human Capital, two (2) top teams facilitate the complete top sector Water & Maritime (Topsector water – working on, n.d.).

Sub-sector Delta Solutions is also referred to as Top consortium for Knowledge and Innovation (TKI) Delta technology and works according to its own (sub) Knowledge & Innovation Agenda (KIA). Besides the missions, central society challenges and key technologies provided by the Dutch government this KIA also explicates specific interpretations of “the big Mondial challenges”. The Sustainable Development Goals (SDG’s), Sendai Framework for Disaster Risk reduction and the World Economic Forum Global Risk Report (TKI Deltatechnologie, 2018). Within TKI Delta technology ten (10) Knowledge and Innovation Clusters (KICs) exist. The two top teams - Human Capital and Internationalisation - from top sector Water & Maritime - interlink with and facilitate the KICs. This thesis focusses on Eco-engineering & nature based solutions (= Building With Nature).

Innovation intermediary organisations fulfil a linking pin function between the three corners of the ‘golden triangle’. Dutch government considers public private partnerships to be an important instrument for finding effective solutions and their subsequent implementations in society and business. Each of the top sectors will include a specific strategy for knowledge valorisation and market creation in their KIA (Ministerie EKZ, 2019). Related to public private partnerships and valorisation, the government explicates that the mission-driven approach requires the building of new networks. This including yet uninvolved parties, the involvement of new sectors and the creation of new business ecosystems. The ambition is to strengthen ecosystems around SME (start-ups and scale-ups) and connect them with the top sector networks. This offers opportunities to meet knowledge partners, investors and potential customers. The role of innovation intermediary organisations in this playing field is obvious.

Innovation intermediary organisations can be subdivided based on funding type. 1) public-privately funded, 2) private-publicly and 3) commercial parties. They often initiate and facilitate knowledge events which play an important role in maintaining and building networks. Strategies of both top team Human Capital and Internationalisation specify Innovation intermediation as part of the defined sectoral way forward. Researching how innovation intermediary organisations add value to the innovation ecosystem and how this is perceived, provides valuable insight for the top sectors in their endeavours to accomplish and stretch the missions. The same applies to ‘how and why’ internal value capturing enables innovation intermediary organisations to do so.

## 4. Methodology

This chapter describes this study's method, case sampling, operationalisation, data collection, analysis, validation and reliability.

### 4.1 Research Method

This qualitative comparative case study is theory-driven, theory oriented and builds theory by answering a 'how and why question'. To do so, a preliminary proposition derived from existing literature, was utilised. Extreme cases were selected and required data was specified, after which collection was done via semi-structured and expert interviews. Besides that additional (managerial) data was made available via interviewees. Pathway case study, which is process theory, was operationalised by combining Obstfeld's (2017) BKAP model and additional literature. For the organisation of data, prior to within and cross-case analyses, a data matrix was deployed after which extensive cross checking of rich instance-data was used to validate.

Independent variable	Dependent variable
<i>Value capture within innovation intermediary organisations.</i>	+ <i>Sustainable continuation of innovation intermediary organisations existence, enabling continuation of (perceived) positive impact on innovation outcomes of innovation ecosystem.</i>

Existing academic literature and variance theory enabled preliminary proposition above. This research reveals "what the patterns of linkages between these variables are" (Voss et al, 2002, p.198) and aims to thoroughly fathom them. This research answers the following question: ***To what extent can 'capturing, maintaining and communicating the internal value of innovation intermediary organisations' contribute to 'improvement of their perceived added value within connected innovation ecosystems'?*** This purpose and question justifies the chosen qualitative theory-building approach via empirical comparative case study, resulting in a more solid proposition.

### 4.2 Case Sampling

Individual innovation intermediary organizations (investigated instances) have been sampled from the population. These samples were combined in three (3) research cases, which are unit of analysis. Besides that three (3) Building With Nature experts were consulted.

#### **Sampling approach - Three (3) cases**

Theoretical sampling, which means "that cases are selected because they are particularly suitable for illuminating and extending relationships and logic among constructs" (Eisenhardt & Graebner, 2007, p.27), was applied. To enable "encountering variation" selected cases were "likely to vary" (Stuart et al 2002, p.425). Because this research aims to understand causal processes (how and why), extremes are most likely to reveal its secrets. Choosing extreme cases was done based on variance theory, while utilising the preliminary proposition above (Jaspers (2007). The domain covered by the preliminary conceptual framework is; 'all innovation intermediary organisations active in KIC Eco-engineering & nature based solutions'. Together,

all unique instances (innovation intermediary organizations) embody the population. Within this domain populations can be subdivided in diverse ways. Dividing the domain in three cases was done based on the following three funding types; 1) Public-Privately, 2) Private-Publicly, and 3) Commercially.

To ensure comparability of the selected instances (innovation intermediary organizations) within these cases, criteria below were applied.

- Active in Knowledge & Innovation Clusters (KIC) Eco-engineering & nature based solutions (BWN), within sub-sector Dutch Delta Solutions, within Water & Maritme.
- Focussing on pre-competition building phase / initiation phase of the building process.
- Type 4 “*Systemic intermediaries for the support of innovation at higher system level (systemic instruments)*” (Klerkx, 2009, p.854-855).
- Tertius iungens brokerage type (Obstfeld (2017)).

In line with the way of (extreme) sampling and the selection criteria above, several innovation intermediary organisations (instances) were selected and assigned to one of three cases. Case 1) Public-Privately (TKI Deltatechnologie, HoogWaterBescherminingsProgramma and Dutch Coastline Challenge), case 2) Private-Publicly (Ecoshape), and case 3) Commercially (Wing, De Laar, Koster innovaties and Alliantie manager). Van de Ven (2004) advises to approach the challenge of fully understanding, seeing the finer points, making a case your own and unveiling the essence of each case via process theory. More specifically, Jaspers (2007) advocates applying the pathway case study technique which aims to refine theory itself, not to adjust a hypothesis. Stories found in researched cases, become a fundamental part of a theory and help increase its accuracy (p.211). Embracing this retrospective pathway case study approach, using multiple interview contacts and multiple different sources, enabled ‘turning cases inside out’.

While cases are (a combination of) innovation intermediary organisations (instances) that connect and facilitate governments, contractors, engineering firms, knowledge institutions, and NGO’s around BWN, experts play a more generic role. Sub-sector Dutch Delta Solutions accommodates many. To answer this research’s ‘how and why question’, the following types of experts were specified and selected for consultation (Flick (2018)). 1) Governmental project initiator awarding multiple BWN projects (Rijkswaterstaat), 2) Association representing contractors executing BWN project (Vereniging van Waterbouwers) and 3) Specialist regarding international dredging and BWN business-perspective (RSM Erasmus university). For privacy reasons no names or details of interviewees are provided (in any appendix of) this thesis.

### **4.3 Operationalization**

This empirical case study research was operationalised by utilizing the “*swiss army-knife applicability*” (Obstfeld, 2017, p.194) of the BKAP model, in combination with ways to measure impact provided in additionality literature (Davenport, Grimes & Davies 1998; Falk 2007; Clarysse, Wright & Mustar 2009; Hulsink & Scholten 2017). The BKAP model was used

to specify ‘value’. The two independent variables, being brokerage and knowledge - and one dependent variable, being projects (getting things done) - were used to develop an in debt understanding of ‘how and why’. To magnify this in debt understanding, BKAP was enriched with the variables output additionality and behavioural additionality explicated in additionality literature. Although relevant, input additionality was not incorporated as a variable, for this would not serve the accuracy of measurement. Recapitulating, this means that items (or indicators) in BKAP were mirrored against, enriched with and completed by items belonging to output additionality and behavioural additionality. Each item in the resulting model was contemplated on in three layers. Layer 1) internal value ‘within’ the innovation intermediary organisation and its ability to grow its internal value by inwards focus. Layer 2) (perceived) external added value of the innovation intermediary organisation in the innovation ecosystem served. And, Layer 3) communication about the added value of the innovation intermediary organisation for the innovation ecosystem served.

Combining BKAP and additionality served various purposes. 1) to specify and unravel the meaning of internal value within innovation intermediary organisations 2) to specify and unravel the meaning of their (perceived) external value in innovation ecosystems. 3) to understand the interrelation between internal value within innovation intermediary organisations -and- their (perceived) external value in an innovation ecosystem. 4) to understand ‘communication about’ added value. 5) to understand the organisational set-up of innovation intermediary organisations (and cases) and to classify typical roles, functions or job profiles accordingly. 6) to guide and organize the interview process. 7) to organized and file-recorded case data. And, 8) to code and analyse the data. Collecting useable field data required ‘understandable practical translation’. Hereto, the theoretical concepts were converted in practical constructs after which practical constructs were translated into research items. This breakdown structure ultimately provided thorough insights.

Theoretical concept	Practical construct	Items
<b>BROKERAGE &amp; KNOWLEDGE – Output additionality</b>		
Brokerage	Brokerage network structure	<ul style="list-style-type: none"> <li>• Innovation ecosystems’ network dimensions.</li> <li>• Competition and reciprocal contact.</li> </ul>
Brokerage	Brokerage process	<ul style="list-style-type: none"> <li>• Visibility, brand awareness, accessibility, quality of interaction, past performance and reputation.</li> <li>• Interaction intensity level and future potential.</li> <li>• Density growth of networked connections within innovation ecosystem.</li> </ul>
Knowledge	Individual knowledge	<ul style="list-style-type: none"> <li>• Involvement in new knowledge created by self and others.</li> <li>• Availability of knowledge and knowledge management &amp; sharing (systems).</li> <li>• Knowledge effect (kennisdoorwerking); knowledge growth within innovation ecosystem.</li> </ul>
Knowledge	Knowledge Articulation	<ul style="list-style-type: none"> <li>• Uncovering future knowledge (types) needs.</li> <li>• Involvement in strategy &amp; policy regarding future knowledge (types) needs.</li> </ul>



Theoretical concept	Practical construct	Items
<b>GETTING THINGS DONE – Output additionality</b>		
Projects	Creative innovation projects in a project-oriented world.	<ul style="list-style-type: none"> <li>Enabling successful initiation and management of creative innovation initiatives and organizations (or movements).</li> <li>Being an active and explicit partner in innovative projects.</li> </ul>
Projects	Routine based innovation	<ul style="list-style-type: none"> <li>Being an active and explicit partner in routine projects and improvements.</li> </ul>
<b>BEHAVIOURAL CHANGE (by members innovation ecosystem) – Behavioural additionality</b>		
Behaviour	Individual behaviour in day-to-day practice	<ul style="list-style-type: none"> <li>Ability to collaborate inter-organisationally.</li> <li>Strategic repositioning within innovation ecosystem.</li> </ul>
Behaviour	Inter-organisational collaboration in day-to-day practice	<ul style="list-style-type: none"> <li>Actual inter-organisational collaboration.</li> <li>Reaction to new opportunity and failure.</li> </ul>

Table 03 – Operationalization

#### 4.4 Data collection from three (3) cases

To collect data from innovation intermediary organisations (instances for the three (3) cases), semi-structured interviews were conducted. *“Semi-structured interviews can be used to study both ‘what’ and ‘how’ questions. The major advantage is that materials are somewhat systematic and comprehensive, while the tone of the interview is fairly conversational and informal”* (Eriksson & Kovalainen, 2014, p.94). To limit bias, attention was paid to *“refrain from projecting own opinions or feelings into the situation”* (Easterby-Smit et al, 2015, p.141).

Translating the conceptual model into ‘typical roles/officials to search for within selected innovation intermediary organisation instances’, resulted in table below. Given the pursue of ‘sustainable continuation of innovation intermediaries existence’ by the management of innovation intermediary organisations, those responsible for funding and sales were also incorporated as potential interviewees. Based on table below officials/employees - for each innovation intermediary organisation (instance) - have been selected.

BKAP-model element	Typical officials in organisations
<b>Brokerage</b> <i>Including funding and sales</i>	Chief Executive Officer, Sales Director, Sales Manager, Relations manager
<b>Knowledge (Articulation) and Knowledge Management</b>	Chief Information Officer, Chief Operations Officer, Knowledge manager
<b>Projects</b> <i>getting things done</i>	Chief Operations Officer, Operations Manager, Programme Manager, Project Director, Project Manager

Table 04 - Typical roles/officials in innovation intermediary organisations related to BKAP-model by Obstfeld (2017)

Because innovation intermediary organisations fulfil a facilitating linking-pin-function (Tertius iungens brokerage) between ‘those parties that develop an innovation’ and ‘those parties that utilize the developed innovation’, both type of clients were consulted in the research as well. Selection of clients was done during the first interviews conducted with employees/officials representing an innovation intermediary organisation. Semi-structured interviews were organised in accordance with the theoretical constructs of the BKAP model and the derived specification of required data. Obviously the type of roles/officials of the interviewee, determined the centre of gravity of conducted semi-structured interviews. Questions for

interviewees were derived from **appendix II**. A thorough protocol for conducting semi-structured interviews was used. In addition to the sources mentioned above the following sources were used; Skill sheets D1 Principles of constructive listening, D2 Preparing interviews and D3 Managing interviews (Van Tulder, 2014, p.187-195). The semi-standardized interview (Flick, 2018, p.226-232). Gathering data (Stuart et al, 2002, p.427) and conducting interviews (Voss et al, 2002, p.207).

#### **4.5 Data collection from three (3) Building With Nature experts**

After selecting BWN experts, expert interviews were conducted. *“Expert interviews are used to complement other methods – beforehand for developing the main instrument or for orientation in the field or parallel to rounding up information from other interviews”* (Flick 2018, p.238). Flick (2018) refers to expert interviews as *“a specific form of applying semi structured interviews”* (p.236). *“In contrast to biographical interviews, here the interviewees are of less interest as a (whole) person than their capacities as experts in a certain field of activity. They are integrated into the study not as a single case but as representing a group (of experts)”* (Flick, 2018, p.236). Hence the above, execution of the expert interviews were **‘more’ semi-structured**. *“If expert interviews are used, mostly staff members of an organization with a specific function and a specific (professional) experience and knowledge are target groups”* (Flick, 2018, p.236-237). Accordingly three (3) BWN-experts were requested for their cooperation, experiences and opinion. Expert interviews were similarly structured in line with the BKAP model. *“The expert’s function in their field often leads to a certain time pressure if interviews are planned. Therefore, expert interviews are normally based on an interview schedule”* (Flick, 2018, p.237). (Tone of voice in) interview questions were prepared accordingly. Obviously the type of expert interviewed, determined the conversations’ centre of gravity. Questions were too derived from **appendix II**. Data collection and processing of BWN expert interviews was done roughly similar to steps taken in the semi-structured interviews for research cases.

#### **4.6 Data Analysis**

A rich variety of data sources was obtained and collected through previous research steps. To enable ‘analysing the data’ in next steps of the research, sorting, organisation and structuring it was required. Wagering collected data in a filing structure was done based on a combination of the defined cases and the theoretical concepts of the conceptual model. To be able to answer the ‘how and why question this research aims to answer, *“case research experts refer to a need for lateral and conceptual thinking to master the case-based research methodology”* (Stuart et al, 2002, p.428). *“Techniques designed to facilitate pattern recognition and examination against propositions”* (Stuart et al, 2002, p.427) need to be utilized. To accomplish this, Voss et al (2002) highlight the importance of reducing data into categories. *“The existence of good documentation of observations and multiple sources of evidence allows a chain of evidence to be established”* (p. 212). This activity is referred to as coding. Incidents of phenomena in the data were coded and organized into categories. Guidelines used were *“The coding manual for*

*Qualitative researchers*” (Saldana, 2009). Although advanced software tools ‘to streamline and perform the required analyses in the coding process’ exist, the wide range of possibilities of Microsoft Excel was utilized. The rich variety of coded data enabled analysing “*the pattern of data within cases*” (Voss et al, 2002, p.213). After the within case analysis, the “*systematic cross-case patterns*” (Voss et al, 2002, p.214) was looked for and uncovered as well. To do this successfully “*researchers need to have the natural ability to step back from an array of observations and see complex, difficult patterns when there may be ambiguous qualitative information mixed in*” (Stuart et al, 2002, p.428). Projecting the coded data in a matrix - that interlinks the research items, the three research cases and the opinion of BWN experts supported this process (Miles & Huberman, 1994). This matrix enabled and facilitated the researchers analysis while answering the research question. For privacy reasons the utilized matrix is not provided (as an appendix of) this thesis.

#### **4.7 Validation of research findings**

This research developed new theory while building on existing knowledge. To cope with “*terminological redundancy and sometimes confusion*” (Klerkx & Leeuwis, 2009, p.851) in relation to construct validity, specification of concepts, constructs and items was done precisely (see appendix II). External validity “*refers to the degree to which findings can be generalized*” to other situations or settings (Bryman & Bell, 2011, p.395). To increase external validity, three (3) cases were build, each existing of a diverse number of instances which - in turn - consist of a multitude of different sources per instance. Interviewees were invited to elaborate beyond their own silo’s. On top of that Building With Nature expert, overseeing all three cases provided case insights generally and cultural and behavioural insights specifically. To add even more external validity, the richness of the gathered instance-data allowed detailed cross-referencing. Respondent validation was done via very specific additional data that interviewees provided during or after interviews. This was used to check if the information provided in the recorded interviews was correctly understood. Multiple contact moments with the interviewees during the course of this eight month running research added to respondent validation as well.

#### **4.8 Reliability of the research process**

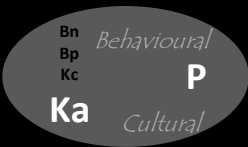
Reliability refers to “*the degree to which a study can be replicated*” (Bryman & Bell, 2011, p.395). In a qualitative case study reliability is challenging. “*Stories found in researched cases, become a fundamental part of a theory*” (Jaspers, 2007, p.211). This also implies dependency on the researchers interpretations though. The same is true for “*pattern recognition*” (Stuart et al, 2002, p.427) and the “*need for lateral and conceptual thinking*” (Stuart et al, 2002, p.428). The precise operationalisation (see appendix II) that originates from a traceable literature study, the very securely transcribed interviews and availability of supporting audio recordings, as well as the availability of provided ‘organisation specifically supporting documentation and information’ increases the replicability of the underlying research. This is also true for Dul & Hak’s (2008) meticulously followed nine-step-research-sequence. For privacy reasons and out of ethical considerations data provided by interviewees is only available on request.

## 5. Results

This chapter presents findings and a within-case analyses for each of the three (3) funding-type-based-cases as well as for the consulted building with nature experts. After introducing the cases in paragraph 5.1, knowledge articulation in creative innovation projects by ‘government driven innovation intermediary organisations’ will be described in paragraph 5.2. Paragraph 5.3 consequently explicates how ‘market driven innovation intermediary organisations’ utilise the power of creative innovation projects while creating new knowledge. Paragraph 5.4. continues by providing insight in the way ‘specialised commercial innovation intermediary organisations’ facilitate involved parties in either knowledge articulation or knowledge creation from within a brokerage niche market. This chapter closes by presenting the insights of consulted building with nature experts on the sectoral cultural and behavioural aspects regarding the involvement of innovation intermediary organisations. In terms of structure, results are presented in line with the operationalization set-up (**appendix II**). Chapter 6 will combine these within-case result and accordingly present the cross-case analyses.

### 5.1 Case description

Table below introduces the three (3) research cases, the instances (innovation intermediary organisations) grouped under each case and the interviewees for each innovation intermediary organisations. The table also displays the organisations employing three (3) interviewed building with nature experts. For privacy reasons, interviewee names are not provided.

<b>Public-Privately funded</b>			
<i>Knowledge articulation in creative innovation projects by government driven innovation intermediary organisations</i>			
<b>Foundation: Topconsortium voor Kennis en Innovatie (TKI) Deltatechnologie</b>			
TKI Delta technologie is in charge of knowledge and innovation programs in the field of water quantity, water quality of surface waters and the protection against the raising water. Due to these developments in Delta technology, it is still possible to live in the Dutch Delta and in deltas elsewhere in the world.	<b>TKI-RP-01</b>	Representative	Secretary and manager general affairs
	<b>TKI-KP-02</b>	Client - Knowledge provider	Head river engineering & inland shipping department
<b>Governmental Flood Protection Program: Hoog Water BeschermingsProgramma (HWBP)</b>			
60 % of the Netherlands can be affected by flooding. This is an area where 9 million people live and work. Through the Flood Protection Programme, Rijkswaterstaat (the Directorate General for Public Works and Water Management) and the regional water authorities (waterschappen) are reinforcing the large primary dikes to protect the Netherlands against flooding. At a speed of 50km/year, this program includes the reinforcement of over 1000 km of dikes.	<b>HWBP-RP-03</b>	Representative	Sr. Advisor knowledge and innovation

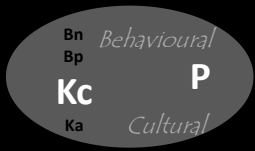
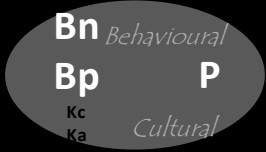
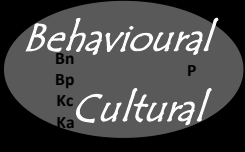
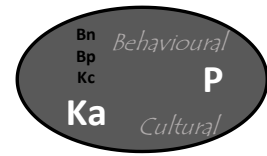
<b>Foundation: de Bouwcampus _ Worklab of 'de bouwagenda' _ Dutch Coastline Challenge</b>			
De Bouwcampus is committed to accelerating innovation in the construction sector in general. Focus is on innovation at product, process and system level and those contributing to solutions that are scalable. Among other things co-creation labs are managed. Dutch Coastline Challenge is one of which applications often involve the BWN concept.	<b>DC-RP-04</b>	Representative	Project manager
<b>Privately-Publicly funded</b>			
<i>Creating new knowledge in creative innovation projects by market driven innovation intermediary organisations</i>			
<b>Ecoshape foundation</b>			
Ecoshape is implementing a Building With Nature innovation program. Within Ecoshape, contractors, engineering firms, knowledge institutions, governments and NGOs work together on knowledge development and knowledge sharing related to Building With Nature.	<b>ES-RP-05</b>	Representative	Program manager
	<b>ES-KP-06</b>	Client - Knowledge provider	Senior scientist
	<b>ES-KA-07</b>	Client - Knowledge applier	Deputy director
	<b>ES-KA-08</b>	Client - Knowledge applier	Project manager delta solutions
<b>Commercial</b>			
<i>Facilitating involved parties in knowledge articulation and knowledge creation from within a brokerage niche market by specialised commercial innovation intermediary organisations</i>			
<b>Commercial innovation intermediary organisations</b>			
Company 01 - 30 people	<b>CP-RP-09</b>	Representative	Managing Partner
Company 02 - self-employed - 2 people	<b>CP-RP-10</b>	Representative	Owner
Company 03 - self-employed - 2 people	<b>CP-RP-11</b>	Representative	Owner
Company 04 - self-employed - sole trader	<b>CP-RP-12</b>	Representative	Owner
<b>Building With Nature specialist</b>			
<i>Insights in the behavioural and sectoral cultural aspects regarding the involvement of innovation intermediary organisations</i>			
<b>Rijkswaterstaat (RWS)</b>			
For sub-sector Dutch Delta Solutions RWS is the biggest project initiators and governmental clients.	<b>RWS-SP-13</b>	Specialist	Project Leader
<b>Vereniging van Waterbouwers (VVWB)</b>			
VVWB is the employers and entrepreneurs' organization for contractors & service providers in Delta solutions. Ranging from advocacy to the sharing of knowledge.	<b>VWB-SP-14</b>	Specialist	Director
<b>RSM_Erasmus University</b>			
One of Europe's top 10 business schools	<b>RSM-SP-15</b>	Specialist	Associate Professor

Table 05 - Cases, Experts and Interviewees

## 5.2 Public-Private cases - Knowledge articulation

With regards to Public Private cases, three (3) different instances and four (4) interviewees were consulted. A main finding interwoven in reporting the further results of this case, is that the focus of these government driven innovation intermediary organisations, in comparison with the other constructs in the BKAP-model, lies with knowledge articulation in creative innovation projects. The output of instances researched is to systematically define required new knowledge.



### Brokerage – output additionality

Within governments ‘thinking in structure and system’ is ‘the way of thinking’. These givens are very clear for interviewees and this is the starting point from which they think about building bridges to other missions, governmental challenges and departments. Although the core and focus indicated by interviewees is to commit to the Dutch delta, the internationalisation of Dutch delta technology knowledge is almost genetically encrypted in ways of thinking to. A typical example is the fact that one of the selection requirements for a so called ‘test garden’ funded via TKI Delta technology is its ‘shopping window suitability’, determined based on theme and the accessibility of the project location. Another word used to indicate this, was ‘showcase function’. Because structures and systems are in place, network dimensions are relatively clear and stable for instances representing the Public-Private case. Besides that the sector is relatively small, so personal networks are valuable and adequate in that sense. Government officials that work in the innovation intermediary organisations also have big personal people-networks, which is often the reason why they were selected to represent the government. Interviewee DC-RP-04 even referred to ‘the network’ as the biggest current added value of the Dutch Coastline Challenge to the innovation ecosystem. *“I believe that is ‘the network’. Yes! That you have the opportunity to interconnect people. Yes it is!”* (p.2). While mapping the ecosystems network dimensions related to new programs or projects, three of four interviewees indicated they utilise their personal networks and not work systemically. The interviewees representing the Dutch Flood Protection program, indicated to have made an actor analyses though. *“We also looked at power. What kind of power do these actors have? Do they have decisive power? So, what role do they play in the network?”* (HWBP-RP-03, p.7). When the network gets new and really project specific, most government driven innovation intermediary organisations however reach out to the innovation intermediary organisation grouped in the commercial case of this research, the brokers. The brokers who were consulted in this study for ‘case commercial’ were actually also allocated based on the directions of the interviewees representing the public-private case.

Within the public-private case no indications of competition amongst innovation intermediary organisations or other organisational types was found. The contrary is true. Due to the governmental origin they are interconnected, see the added value of strengthening these relations and want to create new ones. Cross-sectorally connections exist. They are however originating from personal interest or as a heritage of shared previous projects, rather than being a conscious strategy.

Within the Dutch Flood Protection program visibility, brand awareness, accessibility and quality of interaction are important. *“We occupy six people for communication in our department”* (HWBP-RP-03, p.14). Obviously the main focus of this program is to service other water authorities regarding the improvement of flood defences. The team knowledge and innovation, who is particularly occupied with the knowledge articulation process, rides the wave of visibility and reputation of the complete program. Within the Dutch Coastline Challenge this maturity state is not yet reached, but indicated to be important. *“What we mainly did in recent years is look at: ‘What it is we specifically want to accomplish with the Dutch Coastline Challenge?’ and ‘What is the way in which to achieve that?’. And, ‘that fact’ is the reason why we do not communicate that much. We are really still searching! Last year, we have also been searching, for appropriate communication”* (DC-RP-04, p3). Interviewees connected to the TKI Delta technology are more interested in the end results and not really occupy themselves with or concern themselves about brand awareness. *“For me it's not that important or fascinating how it is called exactly... I want to do things, ultimately, with each other. See if we can really achieve something together, that we will really do something!”* (TKI-KP-02, p.5). *“if you say to me: ‘but people don't know the TKI Delta technology and the top sectors’... I don't find that interesting really. I just look at: ‘what is it we are going to do together?’”* (TKI-KP-01, p.6). The importance of the interaction with people in the network is underlined for success by all the interviewees. *“Frankly speaking, TKI Delta technology does not have a lot of money. But ‘if something is created from within the network’, a joint project or a test garden, then ‘a kind of fly-wheel-effect is created’, which the TKI can strengthen”* (TKI-KP-01, p.6). A bigger importance of the single actors network, compared to that of the organisations network, is highlighted and confirmed by all interviewees. HWBP-RP-03 confirms *“Yes! Everything is people!”* (p.14). Related to innovations he specifies this by *“Every day people come to me with ideas on innovations. I always listen to them, out of interest. Then I say: ‘okay, fine’, I consequently link those people to my colleagues of the knowledge and innovation team”* (p.9). In general achieving density growth of networked connections within innovation ecosystem is not a main goal of government driven innovation intermediary organisations, it is seen as a side effect of their activities which is embraced.

### **Knowledge – output additionality**

The focus of government driven innovation intermediary organisations clearly lies with knowledge articulation. Either in terms of policy creation or via creative innovation projects. When asked for the availability of internal mechanisms for uncovering ‘(future) needs regarding specific knowledge (types) within innovation ecosystem’ interesting findings followed! *“We always start with the party who have both ‘the money’ and ‘the underlying challenge that needs solving’”* (TKI-KP-01, p.5). For the TKI Delta technology this is a very important viewpoint, *“you have to turn it around! You need to look at which challenges are at hand”*. He finalises by stating *“We want to have it ‘challenge-oriented’”* (TKI-KP-01, p.5). Sequentially, TKI Delta technology is focussed on the division line between knowledge articulation and knowledge creation, which they materialise by means of so called test gardens. The positioning of such test gardens strongly finds its origin in ‘a system approach’. Obviously the Dutch flood protection

program exist due to clear challenges. The ‘program plan’ incorporates a clearly defined Knowledge and Innovation Agenda (KIA) and communicates the programs alliance principles for inter-organisational collaborations. Anticipation on continuous extracurricular, social and technological development is done by periodically calibrating innovation focus. *“An external independent group advises us about ‘whether or not themes are still relevant’. We do that to be flexible and future-robust, because we will continue to 2050 no matter what. Of course you also have to ‘gradually adjust’ because of that. For now we have said that we want to adjust our themes once every three years”* (HWBP-RP-03, p.2). Within the Dutch flood protection program innovations are furthermore organised in types; technical, measuring & monitoring, product and process innovations. Resulting from the last type of innovation, the technology readiness system is embraced while guiding ongoing innovations through maturity stages. Guided by the themes and determined focus areas, incoming requests for funding specific innovations are assessed for applicability and approved or declined accordingly. From all instances consulted the Dutch Coastline Challenge is by far most focussed on the knowledge articulation process. This is its core reason for existence. The way of working advocated is ‘the designing research’ approach. *“Sharpening the necessary knowledge is what you do beautifully with ‘the designing research’ approach. ‘Apply focus in what you want to know’ and ‘discover what you do not yet know’.”* (DC-RP-04, p.10). *“So, depending on what comes forth out of the ‘the designing research’ process, you get new knowledge questions!”* (DC-RP-04, p.6). *“Thé big benefit of this kind of process is also, that it is a process which is well understood in ‘the world of spatial planning’”* (DC-RP-04, p.7). When looking at the knowledge articulation approach of the three (3) investigated instances in mutual context, the sequential character of their activities surfaces. The Dutch Coastline Challenge focussing on what we need in the Netherlands moving forward to 2030/2050. In its running program up till 2050, the Dutch flood protection program is making sure the Dutch delta is protected against the rising water and facilitates innovation in this clear targeted context. In the meantime TKI Delta technology is making and creating suitable linkages between different challenges of different character and networked actors in its (physical) test gardens.

Government driven innovation intermediary organisations are without exception asking others for new knowledge, not so much creating it themselves. Although involved in pilot projects and test gardens, their role is mainly to clarify the challenge and to monitor if questions are in fact answered. Knowledge institutions and the market are, in other words, invited and guided to create ‘the right’ new knowledge. Due to the big personal networks of government officials that work for the instances researched, access to appropriate (weak tied) knowledge and information relevant to the innovation process is extensive. Formal knowledge sharing systems and platforms are in place, but not referred to as actively used by the government driven innovation intermediary organisations consulted. None of the interviewees indicated they missed such platforms either. Generally, growth and application of new knowledge within the ecosystem was referred to as important or even a main goal by government driven innovation intermediary organisations. How to achieve this, was made most clear though, by the knowledge and innovation team of the Dutch flood protection program. After performing ‘project transcending



explorations' newly created knowledge in these exercises was passed on to the water authorities in a process called 'knowledge effect' (kennisdoorwerking in Dutch). Although, this is a process still highly in development, *"what we are trying to distinguish within the knowledge and innovation program is that the effect of knowledge (kennisdoorwerking) is picked up! Because we, and most certainly the engineers, are very good at writing reports. But then what?"*. She continues to explain, *"Currently I am working on bringing 'the concept knowledge strategy' to the flood-protection-program projects as well as putting it on the agenda of the program directors. Essentially, 'when we are busy innovating', than projects should have a knowledge strategy. In which they make crystal clear: 'what knowledge is being developed?' And, 'where does that need to land?'. So, that you have already involved the required people and parties at-the-beginning of the process. And that, in the meanwhile, you continuously have a very clear picture of your stakeholders or your actors with whom you want to have certain knowledge landed afterwards precisely"* (HWBP-RP-03, p.5). Recapitulating, government driven innovation intermediary organisations are thinking about what knowledge is required as well as how to distribute and reuse it after its creation by knowledge institutions and the market.

### **Projects / Getting things done – output additionality**

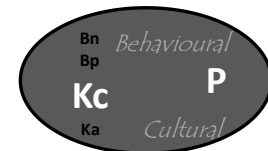
For all interviewees consulted it is explicitly clear that they are not involved in routine based innovations. When approached in that context they operate as a broker and forward the people who contact them to 'a more appropriate desk' available within their (personal) networks.

Creative innovation projects in a project-oriented world is the way in which government driven innovation intermediary organisations are projecting ideas onto reality. These reality checks are done through somewhat abstract design workshops - part of the designing research approach - attended or initiated by the Dutch Coastline Challenge, via a 'pre-programmed assessment process' controlled by the knowledge and innovation team of the Dutch flood protection program and in very concrete test gardens by TKI Delta technology. The geographical and practical flavour added to ideas within themes and related to governmental challenges is, as indicated by all interviewees, determining a common ground for innovation success. Involvement of a variety of partners is important. The existence of a shared, crystal clear and mutually understood common goal however, has been indicated as the beating heart and lifeline of such shared projects. What do you want to accomplish with this temporary inter-organisational collaboration? In case of government driven innovation intermediary organisations, without exception, this is to define newly required knowledge and to start up the process of creating it. In a very catchy way, interviewee TKI-KP-01 shared a meaningful enumeration that illustrates the way of thinking and the importance of creative innovation projects for government driven innovation intermediary organisations. Program entry-requirements for suitability of (physical) test gardens are; no more than five at a time to keep things manageable; deliverable within a few years; combining and linking several missions, transitions and the big assignments formulated by the Dutch government, preferably formulated from within different governmental bodies and departments; to ensure undoubtable interest government needs to be (co-)financer; innovative in the home market with demonstrable

potential for internationalization; an international shopping window function and because of that properly in reach for visiting foreign delegations; scalable; involvement of innovative SME; a combination of geographical focus (river mouths, navigability Waal, nourishments Northsea shore, the Wadden, etc) and thematical focus (BWN, digitalisation, data analyses, robotization, energy, carbon dioxide in earth movement, less concrete & more natural materials, etc); and, finally, clear in the approach, mitigation or adaptation? Progress made within these five test gardens will be reported periodically to the minister and director general of the ministry of infrastructure and water management. The interviews and supporting data provided by interviewees, clearly show that - within government driven innovation intermediary organisations - directions for projecting ideas onto reality are in place. This eventually results in clear questions to answer by knowledge institutes and market parties.

### 5.3 Private-Public case - Knowledge creation

For the Private-Public case the opportunity was seized to study innovation intermediary organisation Ecoshape as the research instance. A representative of Ecoshape, ‘those parties that develop an innovation’ and ‘those parties that utilize the developed innovation’ were interviewed.



Interviewee ES-RP-05 aptly typified Ecoshape as a “*privately driven, public-private collaboration aimed at pré-competative knowledge development*” (p.6). Findings in this paragraph are backed up by as much as four separate (4) interviews. Where instances in the Public-Private case focus on ‘defining the question’, Ecoshape - as a market driven innovation intermediary organisations - focusses on utilising creative innovation projects for the creation of new knowledge. Same as in the previous paragraph this overarching finding is interwoven in the reporting of case results. After the questions have been defined, fundings and subsidies have been assigned, Ecoshape’s output is new knowledge regarding Building With Nature.

#### Brokerage – output additionality

Before zooming in on Ecoshape’s creation of knowledge, representative ES-RP-05, ‘those parties that develop an innovation’ (ES-KP-06), ‘those parties that utilize the developed innovation’ (ES-KA-07, ES-KA-08) and Building with Nature Specialist RWS-SP-13, who has been involved with Ecoshape on mutual occasions, all explicated the importance of the brokerage network structure Ecoshape provides, as well as how they position themselves within this network. All shine light on Ecoshapes position and the unique way this consortium adds value for them. Although international projects are done by Ecoshape, focus is predominantly national. Ecoshapes added value on the international playing field, by showing the world the good stuff at home, has been confirmed by all interviewees, not only those involved in this case. The way in which interviewees related to this Privat-Public case described the Innovation ecosystems’ network dimensions furthermore clearly demonstrated their shared understanding and definition of sectoral boundaries. When ES-RP-05 was asked about structured internal mechanisms to map innovation ecosystems’ network dimensions he states, “*the philosophy is ‘to keep doing what we are doing’, thereby it spreads like an oil slick. But it is not as if we are going on a kind of strategic conquest march to conquer new stakeholders*” (p.4). For customer

ES-KA-08 this does not negatively influence the added value experienced though. The contrary is true because *“you try to get some certainty for yourself. Where should I go with my questions? Now I can just go straight to Ecoshape. They will tell me ‘if I were you, I would contact this organization or that organization’. Or they say, ‘I will take a look around for you’”* (p.4). Interviewees ES-KP-06, ES-KA-07 and RWS-SP-13 confirm this experience of added value related to ‘availability of correct data about innovation ecosystems’ network dimensions’ in their own wordings. ES-RP-05 explains Ecoshape does not experience sectoral competition with other innovation intermediary organisations or other types of organisations. He also clearly states to keep away from the competition phase of the building process because *“we would be in direct competition with our own consortium partners otherwise”* (p.6). This quote also visually indicates how the pre-competitive Ecoshape consortium consists of different golden-triangle-organisations which are ‘normally’ active in the competitive phase. Despite Ecoshape’s international fame, cross-sectoral contact with other innovation intermediary organisations is not actively sought. Dutch Ecoshape, is strongly focused on their own delta technology sector.

Visibility and Brand awareness was indicated by all interviewees as one of Ecoshapes distinctive quality’s. *“I find the way in which they communicate very concise and very powerful, I like that. Visually, it is always very good also. They also have a communication advisor like a rock. She is really very good. That also implies, that makes it very clear, what an enormously valuable asset your communication branch is for your foundation. The fact that a well-known worldwide brand exists means and confirms to me that it is simply very well organized. I also think that if the communication branch were not to be properly arranged, it would die in its own beauty”* (RWS-SP-13, p.4). ES-KA-07 referred to the attention Ecoshape pays to brand value as well. When asked how he noticed, he replied *“because in relation to the mud engine project we made mutual agreements related to external communication. Meaning, agreements in between the partners. Personally I did not encounter the communication professional, but she has undoubtedly provided her directions in this”* (p.5). When asked if ES-KA-08 had experienced ‘the idea he got from Ecoshapes external communication expressions’ was in line with his actual experience with the consortium, he said *“you get into contact with them. You take a look at their website and encounter all the other projects they do. That’s when you think, this fits in nicely together”* (p.6). When asked about some examples of external reactions Ecoshape had received in the context of external communication strategy ES-RP-05 shares *“positive energy of new people that have been inspired”* and *“things like ‘the positive Ecoshape brand’”* (p.4). When it comes to ‘building a brand for yourself as an innovation intermediary organisation’ Ecoshape has been put forward as an example by multiple interviewees.

Ecoshape has earned itself a very good reputation. Regarding feelings of trust, impartiality and credibility the next quote of customer ES-KA-08 is so beautifully worded that omitting sharing it would be a waste. *“For me it is a group of people with knowledge and networks, not really a commercial party. They don’t come across as a commercial party, but really like a constructive party that thinks along with you. When I am talking to a dredger you know, I get a little suspicious, because he just wants to dredge cubic meters”*. He continues *“obviously the*

research institutes want to do some research to, but if you work with an entire group of organisations under Ecoshapes' flag, I hope they keep each other in balance. That they prevent each other from just fishing for a little job again" (p.6). When asked about Ecoshapes reputation ES-KP-06 replies "a movement has started! A building with nature movement" (p.9). Ecoshapes network is bulky and unproportioned dependency of single actors in it was not observed to be a problem. RWS-SP-13 states "I believe that the Ecoshape brand is bigger than individual people" (p.3). When asked about dependency on single actors in the network, interviewees once more link this question to the well organised communication.

When asked about the success factor of the internal business process for brokerage, ES-RP-05 shares 'an innovation intermediary organisations dilemma' faced by Ecoshape. He describes to be in between two force fields and refers to this situation as "the loneliness of a program manager" (p.9). He explains "in my role as program manager I interact with external partners about how we are going to approach a new project. Prior to that, I obviously shared with my internal-consortium-partners that I have detected a project worth developing. Ecoshape always discusses which project we will be doing and how we are going to fly with it, with the external partners first. 'And then you turn around', because Ecoshape in itself does no execution. The internal-consortium-partners have to execute it after agreements with external partners are made. So, then you turn around and they say 'couldn't you have arranged that in a better way?'. Naturally that is always standard-question-number-one. As a program manager you are really in between both parties during these turn-around-moments" (p.9). Ecoshapes management team has found successful ways to deal with these conflicting fields of interest, which is clearly an internal value. When Ecoshape number three will not fly however, this valuable and specific process knowledge will blend into the competition phase again, without being utilised by other innovation intermediary organisations. In this regards ES-RP-05 shares that capturing these ways of working, besides the content knowledge that is created on a daily bases, was discussed internally sometimes. Sharing these internal ways of working with other innovation intermediary organisations is not on top of mind or a priority however.

Regarding density growth of networked connections within innovation ecosystem ES-KP-06 states "in the meantime you have obviously become part of the network. There are many examples of persons who have become part of it from the outside. Yes, afterwards you just keep going with each other" (p.9). ES-KA-07 explains that "as a nature organization, I have an interest 'in a network that knows what is important to me' actually. And, 'when it is known to them how they can take these interests into account'" (p.2). So it's not only the growth of networked connections that is accomplished, but also improving the knowledge level within that network at the same time. As a client ES-KA-08 states he uses Ecoshape as a networked hub to get his contacts from. He states "for me the research world is a bit unclear. Where and to whom should I reach out? Now I have one door that I can knock on. They help me to get started and they say 'I'm going to call some people for you'" (p.7).

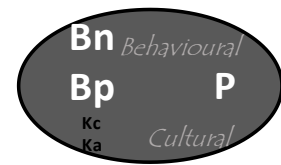
### **Knowledge & Projects / Getting things done – output additionality**

With a focus on building with nature, Ecoshape is well informed about the governmental missions, ambitions and articulated needs for new knowledge. Besides that several consortium partners are governments, meaning this information is within reach easily. Because research institutes make part of the Ecoshape consortium as well their involvement in the research planning process is accounted for too. Besides governmental guidance and direction given via subsidy programs, Ecoshape has internal mechanisms in place for uncovering ‘(future) needs regarding specific knowledge (types) within the innovation ecosystem’ as well. ES-RP-05 states *“Agenda-setting for building with nature’ is one of the roles of Ecoshape! Within various forums, we regularly consult with our partners in which we determine topics that merit further attention”* (p.9). After that he gives an example of how a need for more knowledge about fine sediment (sludge) required more attention in comparison to sand. Because, although a valuable example, The Sand Engine is not all Ecoshape has to offer. After determining a strategic search for ‘fine sediment related knowledge questions’, the Waddenzee turned out to hold potential pilot projects. The sludge engine, the reference project used in underlying study, turned out to be one of such pilots.

In its current state of maturity, Ecoshape is not actively searching for new knowledge created by others. If Ecoshape is not aware of the existence of specific knowledge in the field of building with nature, most likely it is non-existent. This was confirmed by several interviewees. Ecoshapes turns down any involvement with projects in the competitive context for this is what consortium partners take care of. Routine bases innovations are critically kept out of scope. *“Especially the internal innovations within companies, those we should not touch. Not only for the companies participating within the Ecoshape consortium, but also not for the companies who don’t! That is truly another kind of business”* (ES-RP-05, p.7). Creative innovation projects in a project-oriented world are ‘the physical geographical locations’ where Ecoshape concentrates, groups, arranges and manages the involvement of all ‘parties required to make the project a success’, funnelling all this energy into ‘freshly developed knowledge around the building with nature concept’. In the context of the project question at hand, Ecoshape truly orchestrates the inter-organisational collaboration which is benefited by its temporary nature. Having or getting access to appropriate (weak tied) knowledge and information relevant to innovation process has been confirmed to be a big added value provided by the Ecoshape consortium. The same is true for knowledge management & sharing (systems). Both externally, via the wiki’s on Ecoshapes website, and internally. Evaluation and reporting about lessons learned is a mandatory requirement in Ecoshapes’ project set up. Ecoshape is continuously approached regarding available or accessible knowledge and can be typified as a truly flourishing innovation intermediary organisation. The external added value of growth (and application) of individual knowledge within innovation ecosystem was described by client ES-KA-07 as a valuable spin-off. *“If other parties internalize this kind of knowledge, then that is also interesting for me! If ultimately there are contractors who know enough about natural processes to make good use of them - where ‘a good way’ for me is ‘a way which is also good for nature’ - then that is a profit for me”* (p.2).

## 5.4 Commercial case - Brokerage

This paragraph provides insight in the way specialised innovation intermediary organisations facilitate the inter-organisational collaboration between parties involved in either knowledge articulation (Public-Private case) or knowledge creation (Private-Public case). The four (4) innovation intermediary organisations that willingly cooperated as instances for this commercial case, do so from within a brokerage niche market and mainly operate on ‘creative innovation projects basis’. With reference to the BKAP-model, these brokers focus on the practical constructs ‘brokerage network’ and ‘brokerage process’. Besides several, sometimes surprising skills, knowledge on sectoral culture and behavioural aspects will be explicated as ‘a brokers qualifier’ in this paragraph. Brokerage turns out to be nothing less than ‘a way of life’ and ‘true craftsmanship build up through years of experience’. These brokers output is; smooth passage sequentially, correct focus thematically and local integration geographically.



### Brokerage – output additionality

Innovation intermediary organisations active within the brokerage niche market of the Dutch delta technology are very well aware of ‘shared understanding and definition of sectoral boundaries’. Not only because they are involved in multiple creative innovation projects with a relatively fast turnover, this kind of knowledge is what their clients expect them to provide. All instances have a focus on the Netherlands, not internationally, and two of them are even region specific. CP-RP-10 focusses on the Waddenzee and CP-RP-12 focuses on Dutch coasts and deltas. *“Focus helps! In my thoughts and also in my network. That is a choice that I have made very consciously”* (CP-RP-12, p.2). These brokers get involved, not only for their extensively available data about the regional innovation ecosystems’ network dimensions, but also for availability of specific knowledge about cultural habits, regional history and subtleties in language. This will be further explicated later in this paragraph, while discussing required broker skills. Having internal mechanisms in place for mapping innovation ecosystems’ network dimensions is an integrated part of the brokerage process and brokers core business.

Because this is a niche markets, instances investigated confirm being each other’s competitors. Interviewees also confirm that potential business is sometimes carried out by the competition. But times are prosperous at current. *“Let me put it this way, the market is just good at the moment. There is a lot of demand. A few years ago, then everything was stuck! Then it was really like: ‘gosh, can you still do something?’ Thén you could feel that competition”*. He continues to explain *“so other parties, yes they are there. They also do all kind of things but currently it doesn’t get in my way”* (CP-RP-12, p.9). When digging into it a little deeper, CP-RP-09 stated *“Let me put it this way: ‘yes, it is nevertheless a market of consultants, who are also asked to get involved. They more or less are fishing in the same pond’. Those are the big bureaus, the ones that do our type of work ‘on the side’ a little. In addition to their other engineering services”* (p.7-8). Further sectoral competition with other organisation types was not found. All interviewed brokers confirm disliking participation in tendering. Partly because this is when the afore mentioned big engineering firms join. But an equally important reason is

because explaining their own added value is experienced to be very difficult. CP-RP-12 explains *“the risk of this craftsmanship, is – I also noticed that when I was working for Arcadis - ‘what is it exactly that you do?’ . So, if you have to write that on a piece of paper for a tender, then you will be thrown back into vague wordings. Than you receive feedback like: ‘you are so vague’.”* (p.7). All four brokers confirm that most of their clients award them long-term jobs and privately. It becomes even more interesting when CP-RP-12 states *“It is all consequential, that’s what you observe. Currently I am seeing all kinds of projects that I have worked on before becoming more concrete now. Something like this takes about 10 years. So what I want to indicate by that, is that there is always some sort of phasing arising and that it takes time, you need lead time”* (p.8). Obviously curious about the mutual positioning on this timeline, interviewees of each of the four (4) instances claimed their own time-laps in the sequential lead time of the pre-competitive construction phase. So, not only are these brokers specialised geographically, they also have strong preference for the maturity of underlying initiatives or projects. As a consequence this also prescribes involvement in either knowledge articulation or knowledge creation. Where both CP-RP-09 and CP-RP-12 feel of most added value in the brokerage process around the knowledge articulation phase, CP-RP-10 flourishes while knowledge is being created. Because of his strong preference and connection with SME, CP-RP-11 operates on the edge of knowledge creation and practical application. Although not confirmed by the interviewees, this also might be another reason for current minimal reciprocal contact. Cross-sectoral contact between innovation intermediary organisations is explained to be of inspiration but not really actively sought. CP-RP-12 says *“yes, I do get inspired. But I have learned that I get 80% of my inspiration from within my network”* (p.10). All brokers however acknowledge the added value of such fresh blood. CP-RP-09 summarises the matter as *“well, you know, building that kind of cross-links, it works! Every time we make such cross connections and bring in fresh-viewers, that’s when something happens”* (p.9).

Although important, visibility, brand awareness, familiarity with the innovation intermediary organisations existence within innovation ecosystem and similar item specifications are confirmed to be important. They are however totally snowed down by the importance of the content of the brokerage process and the required personal skills of the broker enabling success in that process. When asked for communication strategies answers like; we hardly ever act on that, in that respect we do not get the most out of it or we can put that in a smarter packaging were given. *“That we have three types of roles and that we can help them substantively. Those kind of things I do tell them. I tell them that we are good process coordinators and that we can also provide leadership in difficult processes. I also tell them that we connect worlds”* (CP-RP-09, p.5). Accessibility seems to work well enough, because all brokers are very well interlinked in their networks. Attempts to ask about past performance, reputation, the importance of feeling connected, feelings of trust, impartiality and credibility again got directed towards the tremendous importance of the brokerage process techniques and the accompanied required personal skills of the broker involved in it. *“Our added value? They judge that by the results that we achieve”* (CP-RP-09, p.6).

Although somewhat reluctant in sharing blacksmiths secret, the brokerage process is referred to by all interviewees - including those of other cases - as one of true craftsmanship. Boiling dry the information shared by the interviewees, three (3) main approaches - or flavours - were shared. Depending on the task at hand, they are combined in specific composition by skilful brokers. These approaches are the public administration approach, the socializing approach and the design approach.

Regarding the public administration approach, process management according to De Bruijn et al (2016) was referred to by CP-RP-09. The Mutual Ganes Approach (Twynstra Gudde) and the Strategic Surrounding Management that ensued, was brought up by CP-RP-12 who worked there previously. VWB-SP-14 also strongly advised to buy Wesselink (2017) for further details on Strategic Surrounding Management. HWBP-RP-03 referred to Meijerink & Huitema (2010) for theory on policy entrepreneurs and Van Meerkerk & Edelenbos (2017) for theory on boundary spanners. CP-RP-10 did not allow the researcher to leave without promising to buy Klinkers (2002) book, policy starts with society regarding a search for the human dimension and the essence of interactive policy creation. CP-RP-09 typified the public administration approach as follows. *“This is based on a world view that starts with the idea that all people go for their own interest, and that people are all rationally calculated about it to. The process manager, who identifies the entire force field in detail, looks at where everyone's interests and stakes are and talks to everyone. He is an oil man. He creates and comes up with a smart arrangement between all parties. Like a wizard who says, ‘look, this is how you will be able to find one another’. Those parties involved consequently say: ‘oh, yes!! this way my interests and stakes are served’ ”* (p.2-3). Thinking about the literature study done for this research, it is not very difficult to see the similarities with system theory and the national system of innovation.

More in line with (social) network theory, communities of practices by Wenger were referred to by CP-RP-09 which says *“in essence the human is a social creature that wants to connect and learn. It wants to fit in somewhere and is looking for reward”* (p.3). CP-RP-09 claims much challenges are faced by his organisation via the socializing approach and provides an almost poetic description of how it should be done. *“Then you see the process is stuck! What they actually need is just a learning network, to take steps together. That’s the moment you actually say: ‘guys lets create a common play-ground that stands in between the parties’. We allocate a common tree, that is not yet occupied, and we put our little chairs around it. Then we go there, together, representing all those individual stakeholders, but in an equal setting, also not involving everyone's interests for a minute. Around this tree the starting point it that we are all carriers and holders of important knowledge! Even more so, we are all curious about that knowledge. Well, by doing so, you just accomplished two things. A: you surfaced more relevant knowledge related to the innovation at hand. But B: you have created mutual terms, an understanding. Believe me, you won’t accomplish that in the line of: ‘I understand your interest, you understand mine, now; let’s make a deal’ ”* (p.3). In the literature study this ‘not being compatible’ of approaches or their ‘not being common in size’ was called incommensurability.



The design approach is in fact similar to ‘the designing research’ approach introduced in the private-public case by DC-RP-04. *“This method is based on the design dialogue. For this you will use the process of designing as a method for dialogue at the same time. To facilitate this process we also have landscape architects on our payroll. Sometimes it is spatial design, with maps and the like. But it is also about concepting, meaning that you display certain concepts in symbols. In the design approach you do an essential appeal to people's creativity. Similarly to the socializing approach you also define your stakeholders as being knowledge holders which changes the mood. ‘We go on the parallel track for a little while’, as I always refer to it. That requires trust and rules to play this game apply. Then you get into the creative work forms as defined by COCD (Centrum voor de Ontwikkeling van het Creatief Denken) for example. The world of the design approach therefore assumes that we also release ‘the unconscious’ in people. The implicit knowledge, as indicated in the innovation cycle of Nonaka and Takeuchi”* (CP-RP-09, p.3).

To be an outstanding broker, in debt knowledge of the sectoral system, substantive knowledge about the content of activities in the Delta technology sector, multiple years of working experience (a certain seniority) and mastering the three (3) main brokerage approaches is required. This requires both a lot of pre-investment, a lot of staying informed and on top of things and a specific attitude towards the profession. CP-RP-11 refers to being a broker as *“I'm actually constantly working on it. It is just a way-of-life”* (p.11). Interviewees shared their opinion about diverse personal characteristics required to be a successful broker in the Dutch delta technology sector. The enumeration below is a modest attempt to summarize these in three categories; pre-conditional, individual and inter-human. The personal characteristic that can be clipped under pre-conditional is; ensure you are truly impartial and free of interest from a content point of view and constantly challenge yourself if this is really still the case. Personal characteristics that belong to the individual category are; focus on favourite topic, region and time-laps of the pre-competitive building phase; maintain personal hygiene of the mind, which means being true to and knowledgeable about yourself in terms of personality, character and needs to be able to function properly, as well as knowing your own maintenance schedules; knowing how to breath peace of mind and calmness; having the courage to follow intuitions and promptings provided to you by the unconscious mind, especially in situations with unclear outcomes. And, Feeling confident and at ease in those uncomfortable situations when all that surrounds you gets blurry and tense. Truly believe that solving will appear in these situations. Personal characteristics belonging to the inter-human category are; a genuine interest in others; providing others the opportunity to truly get to know you as a person (preventing social barriers to arise); being able to read people on the one hand but not being prejudiced on the other while in interaction with other people; being able to forge interpersonal connections and win trust; truly listening to what other people say, even if you think you know what they are going to tell you and strongly force yourself to do so if need be (hearing the unheard voice); being able to deal with people that would naturally ‘be in your space’ equally to ‘people you naturally favour’. And, being able to handle manipulations thrown at you under group pressure.

### **Knowledge – output additionality**

Based on their preference for the maturity of an underlying initiative the involvement of a broker in either knowledge articulation or knowledge creation is consequential. Either way the outcome of the process is not what interests the broker, they focus on the fact that a commonly shared outcome appears, not so much on the contents of it. That is why specific internal mechanisms to determine strategy & policy regarding ‘creation of new knowledge within innovation ecosystem’ were not found. Similarly to most other items researched, the brokerage process and required skills were brought forward as ‘the answer’. Co-creation with research institutes or universities takes place in the context of a project, not so much regarding research planning in general. Sometimes though, ‘the project’ is ‘to define the question’. *“Well, then knowledge workers are brought together and then we supervise "that" process. Then an outcome beneficial to that knowledge process is delivered. Or we are asked to organize a conference for example. At such a conference there will be all kinds of groups in workshops. At that time they articulate!”* (CP-RP-09, p.10). Interviewees approach knowledge articulation more like part of what is collected from within the network, whilst moving the complete process forward.

Besides being a constant sponge for new information, brokers only search for new knowledge, or create it if need be, in relation to grease the inter-organisational collaboration process they were hired to facilitate. When asked about systemizing the brokerage knowledge for potential sharing it with others, reactions were reluctant. Not only because of potential new competition. CP-RP-10 also shared previous experiences of trying to capture such brokerage knowledge that were unsuccessful. Similar to the experiences while writing tenders, recipients of such attempts experienced them to be vague or unclear. Brokers interviewed do not utilise internal knowledge management & sharing (systems). They heavily rely on their network and social skills. Simultaneously this is what provides them access to appropriate (weak tied) knowledge and information relevant to the innovation process / project at hand. Brokers are very project oriented in their ways. No signs of interest or activity towards growth (and application) of individual knowledge of others within innovation ecosystems was observed.

### **Projects / Getting things done – output additionality**

All interviewees consulted are not involved in routine based innovations. Brokerage support put in the market via tenders is generally done by bigger engineering agencies that work according to a management system approach. Creative innovation projects are the embodiment of the required roadmap for working towards shared goals in the pre-competitive phase of the project oriented Delta technology sector. *“Our job consists of finding the common ground within the object; ‘what do we want to mutually accomplish?’”* (CP-RP-09, p.1). He further elaborates by sketching out an imaginary scene with a client *‘But what is actually required here? You seem to be in a fight at current, but what do you need? That is how we do it, always focussed in the accomplishment of a goal!’* (CP-RP-09, p.1). In the same line of thinking CP-RP-11 says *“My activities focuses on bringing ‘different organizations’ together, ‘different parties’, with a clear goal. To achieve something. For me that is on top always, an alliance is*

*a means to an end, to achieve something*” (p.4). With regards to ‘variety of organisational types participating’ their viewpoint is ‘to involve who-ever positively influences the process’. As a final remark it was interesting that all interviewees explicated that they do not want to be involved in what they called ‘solving hassle’, because the energy is completely different in such situations, but that they are on the lookout for creating new positive and constructive inter-organisational collaborations; let the big firms solve the hassle.

## 5.5 Building With Nature experts - Sectoral culture

Based on the insights of the building with nature experts and the interviewees related to all previous cases, sectoral cultural and behavioural aspects, regarding the involvement of innovation intermediary organisations in inter-organisational collaborations, are presented below.



### Organisations individually – behavioural additionality

All interviewees are aware of the importance of sectoral culture, customs, stakes and force-fields. Without exception interviewees shared similar insights and opinions on the sectoral culture. As an example, the Dutch delta technology sector was referred to by RWS-SP-13 as *“We are still a rather innocent sector! It is largely government work and the work is done for the public good”* (p.6). VWB-SP-14 states *“Look, the delta technology sector, the wet sector, is yet again slightly more ambitious and more focused on collaboration when compared to the dry sector”* (p.6). As more of an outsider RSM-SP-15 shares *“in this industry, what I have observed, is that informal networks play a big role. When you go to an event, everyone almost knows everyone”* (p.5). Organisations are familiar with and well embedded in this sector

Some innovation intermediary organisation provide very self-conscious organisational profiles. Their ability to explicate own identity and positioning in sector is big. The flood water protection program is mission driven and is in charge of reinforcing the large primary dikes to protect the Netherlands against flooding. Not a word of French in there! Another very explicit statement regarding the organisational profile is given by ES-RP-05 for Ecoshape. He states Ecoshape is a *“Privately driven, public-private partnership focussed on pre-competitive knowledge development”* (p.6). Other innovation intermediary organisations turn out to be less convinced when asked to explicate their own identity and to typify themselves. *“What we mainly did in recent years is look at: ‘What it is we specifically want to accomplish with the Dutch Coastline Challenge?’ and ‘What is the way in which to achieve that?’ We are really still searching!”* (DC-RP-04, p.3). The above quotes are selected because they bring across a message applicable to all innovation intermediary organisation types consulted. Most are self-aware. Although very interesting, whether or not organisations can explicate the identity and positioning about ‘the other organisations they collaborate with’ in sector was not researched. In the context of the lack of reciprocal contact, the general mutual confusion related to inter-organisational collaboration and the unclear division of the playing field for innovation intermediary organisations, it’s fair to doubt this however.

Regarding the mind-set, attitude and willingness towards inter-organisational collaboration VWB-SP-14 gives a description of how he approaches the network. This approach represents many of the actors consulted. *“I think it is important to continuously peel off your own network. That you also look for new collaboration partners that can be of added value”* (p.7). Organisations active in the Dutch Delta technology want to change and enlarge the network for the benefit of inter-organisational collaboration, most act more or less alone in this regard however. Involvement of an innovation intermediary organisations to ‘just expand the network’ is not a typical way of thinking. In this regard, the sector is also very project oriented.

Regarding strategic repositioning within innovation ecosystem or sector, from a theoretical viewpoint RSM-SP-15 provides one of the reasons why innovation intermediary organisations are needed in the first place. *“an organization has only a limited number of people. They have smart people, but not all smart people work for them. If they can combine, and collaborate with other parties, you simply multiply the creative pool”* (p.2). A very catchy example of how repositioning in the innovation ecosystem is prepared was given by VWB-SP-14, who states *“if you take the position of branch organization 3.0, you could fulfil five tasks. 1) Bind outside the sector. 2) Address sector-driven issues. 3) Inter-organizational collaboration. 4) Facilitate and help shape major innovation processes, or you can 5) arrange financing as an intermediary”*(p.10). An important fact in this regard is that these five points were literally drawn on the white board behind the interviewee’s desk as the interview took place. When asked why, it was because he was giving a presentation about it soon. For Ecoshape ES-RP-05 shares *“We always say that the roles of Ecoshape are the following: we ensure pre-competitive collaboration, knowledge development, and besides that we have a whole range of other responsibilities that belong to our role as Ecoshape. That stands very strong. At the start of the second program, we defined that together well. And that stands. Those are also the rules that we adhere to!”* (p6). Further along in the conversation ES-RP-05 asks himself *“what is the framework that you actually have while going to external partners?”* (p.10). He explains that as an innovation intermediary organisation *“you need a mandate to do things! And on the other hand, influence should also not become too big... That balance, and how do you arrange for that? If we were to set up a whole new program in the future, then we should think about this very carefully in the beginning, at the front!”* (p.10). This clearly shows how Ecoshape considers their strategic (re)positioning within innovation ecosystem / sector. For the flood protection program a program plan is created and periodically updated. This explicitly states their position in relation to all other parties. Strategic repositioning within innovation ecosystem by innovation intermediary organisations themselves as well as by other parties serviced by them was observed within this research.

### **Inter-organisational collaboration – behavioural additionality**

Regarding governmental recognition of innovation intermediary organisations, RWS-SP-13 explicates how he sees the role of Ecoshape and how he interprets their added value is. *“They have the fundamental scientists on board. They have the somewhat more applied scientists on board. They have government parties that have certain questions and therefore create certain*

*certainty. They have dredgers who want to apply their machinery and knowledge and consultancy agencies that sit in front of them sequentially, who can translate the almost applicable knowledge into the application. They cover that entire pallet and I think that is the power of Ecoshape. What they call the golden triangle in the Netherlands is captured within Ecoshape. That is truly an outstanding achievement!*" (p.9). The description above indicates the governments perception of well-functioning innovation intermediary organisations observed in other occasions during this study as well.

The fact that inter-organisational collaboration is culturally accepted as a requirement for progress was stated clearly by VWB-SP-14, *"what you see is a development that knowledge, fluid, is present throughout that complete chain. It is no longer only located with clients or engineering firms or educational institutions. If you want to utilise that knowledge, you will have to get into other forms of collaboration"* (p.4). From a theoretic point of view, RSM-SP-15 explains the benefits in other wordings *"So as a result of this collaborations, we term this as co-opetition. This is defined as a cooperation between competitors related to innovation. Co-opetition is highly beneficial because they bring those European partners together again as common competitors. They pool resources. In addition to that, it creates cross-pollination so that they can come up with solutions. We already see that trend is happening fortunately. So this close model is being dented by those consortia or intermediary organizations. This is extremely good news because only that way they can prepare and get ready for these trends."* (p.2). Innovation intermediary organisation being 'the way' to solve this sectors inter-organisational collaboration challenges is not common ground however. According to CP-RP-09. *"Then they say 'no', 'that is all overhead'. It is all about execution, dirt has to be moved! All this talking won't get us anywhere"*. He continues to state *"an enormous bias exists, a kind of Calvinistic timidity. They say, 'if we rig that up too luxuriously, it will lead to a waste of money. Which we will be held accountable for."* His explanation for all this is *"the thing is: there is a very strange dilemma. There where it is needed most, parties are the least willing to accept it"*. He finalises by sharing an often heard phrase when in communications with parties related to the above. They say *"you should be careful for over-doing it all"* (p.6). The need for inter-organisational collaboration is culturally excepted. Whether or not innovation intermediary organisations are the best way to accomplish that stays undetermined however.

In the context of attitude and consequential action towards mutual learning from and improving by failure, in context of inter-organisational collaboration, RWS-SP-13 introduces the term 'pilot paradox'. He explains *"with pilot projects, it is very important that you have at least the widest possible monitoring and the longest possible subsequent monitoring. And, a good analysis. Exactly the aspect of that monitoring, followed by an analysis is what makes the matter strong. If you don't do that, then you don't have to do the pilot either"* (p.10). After which he specifies *"in case of a pilot all noses are heading in the right direction and everyone is enthusiastic. We are going to do a pilot to show that it all works! And then, often they forget the monitoring, or they mess around with it a bit. It is a certain spirit that is in it. Then you have it done, people are going to cut a ribbon and have an attitude of 'look at us being terribly*

*innovative', also good for the relationship with other countries. But putting-it-into-mainstream practice requires the monitoring and analysis I was just talking about"* (p.10). In this context TKI-KP-02 shares "*I think we may be learning too little, of all the various kinds of inter-organisational collaborations that are existent within our top sector"* (p.7). Others confirm that mutual learning from shared initiatives can and should be improved as well.

## **6. Cross case analysis**

This chapter describes a journey. A journey comparable to that of the development of thousands of tree seeds into only a handful of healthy mature and full grown trees. This funnelling route starts with the ideas, with the promptings in people's minds, with uncovered need for transition, with wishes and with the detection of inevitable upcoming change which precedes influencing the Dutch delta technology sector. Still blurred or a bit fussy is how the results of such creations of the mind enter the process of knowledge articulation that 'government driven innovation intermediary organisations' support. Same as with tree seeds, some ideas just don't fit the environment, are in lack of water or nutrients or had some errors to begin with. Sectoral knowledge, flavour and behaviour is added resulting in clarified questions. 'Market driven innovation intermediary organisations' utilise creative innovation projects to facilitate the process of finding answers. They pilot new trials aimed at creating new knowledge. After proof of pudding via creative projects, knowledge and renewal becomes mainstream via institutionalisation. This is the place where mature trees grow. Specialised innovation intermediary organisations facilitate and support the parties involved in either knowledge articulation or knowledge creation from within a brokerage niche market. Adding brokerage network, knowledge, experience with inter-organisational collaboration and a strong insight in sectoral culture and social/behavioural aspects that can make or break a smooth and lubricated cooperation process. Obviously, when the above is viewed sequentially, consecution and time are important. Viewing this journey thematically is sensible to, because judging and successfully germinating most of these creations of the mind requires in debt prior and system knowledge. The number of dialects spoken in the Netherlands, combined with the importance of the subtleties of language, is a meaningful indication of the importance of viewing things geographically as well. Culture and behaviour are too strongly linked to geographical area. In this line of thinking, to get a feel for the landscape through which this journey leads, this chapter starts with a description of the characteristics of sectoral culture and behaviour. From a birds eye view this journey will be summarized by providing a sectoral innovation route map.

### **6.1 Sectoral culture sub-sector Delta technology – behavioural additionality**

The Dutch delta technology sector can be typified as highly systemized and closed. Organisations are working out of silo's for which prescribing corresponding roles and responsibilities starts within the sectoral education system already. People are educated for one of three corners of the golden triangle. Inter-organisational communication is predominantly arranged for via the medium 'contract' and in this water world generally not much is left to

coincidence. Besides knowing about ‘the unwritten rules on the way things go’ and about ‘how things used to be’, at the same time ‘a lot of (new) system knowledge’ is required to be successful. Historically an almost Calvinistic hesitation towards investing in the development of ‘inter-organisational collaboration process knowledge’ exists. Maybe not surprisingly, this restraint seems to be most applicable to those situations potentially benefited by it most. Some suggest that historical sectoral fraud situations damaged trust and still linger below the surface. Nevertheless the different sectoral actors have become very well aware of and are searching for the potential added value of inter-organisational collaboration. Deployment of innovation intermediary organisations is one of multiple ways utilized to influence and stimulate this. The existence and activities of sectoral innovation intermediary organisations plays an important role in this changing mind-set for they provide positive personal experiences.

## **6.2 Brokerage network structure – output additionality**

All sectoral parties involved clearly understand the definition of sectoral boundaries. Again, these are highly systemized. Interestingly however, when involved in inter-organisational collaboration, the division of focus and responsibility within the sector seems to become fussy. This is true for the process of knowledge articulation supported by government driven innovation intermediary organisations, the creation of new knowledge by market driven innovation intermediary organisations and for specialised innovation intermediary organisations that facilitate and support the parties involved in either knowledge articulation or knowledge creation from within a brokerage niche market. Within the process of funnelling ‘creations of the mind’ towards ‘mainstream projects’ multiple undefines phases, topics and topographical areas exist. Thereby three viewpoints surface; the sequential view, the thematic view and the geographical view which all deserve further specification by the sector. The Dutch Delta technology sector is very aware of their responsibility and potential regarding internationalisation. Far before being one of nine top sectors delta technology has been Dutch glory. Innovation ecosystems in a project oriented world are common practices in this sector to. Although some people work from intuition, very sophisticated methodologies are in use to map and manage them. Strategic Surrounding Management and the Mutual Gains Approach are examples. Clear evidence of systems to store data about innovation ecosystems’ network dimensions were not found, most things in this sector are project oriented. Innovation intermediary organisations conceive themselves as competitors only when involved in the brokerage process, given their commercial approach this makes perfect sense. When involved in knowledge articulation and knowledge creation the sentiment is more like being complementary to one another. Fussiness regarding division of focus and responsibility influences these mutual relationships to however. Cross-sectoral contact between innovation intermediary organisations have been acknowledged to be happening and beneficial, but at current not deployed as a conscious strategy.

### **6.3 Knowledge articulation – output additionality**

The process of knowledge articulation supported by government driven innovation intermediary organisations is done thinking from missions, governmental challenges and departments as a start point. To accomplish those future goals new knowledge is required. Clarifying what kind of new knowledge is required is the essence of the knowledge articulation process. Government driven innovation intermediary organisations have different focus. Sequentially, varying from ‘philosophizing about what is needed in 2050’, ‘asking for specific innovations to accomplish a mission’ to ‘actively surfacing required knowledge by setting up ‘(physical) test gardens’ in which linkages between challenges and available networked actors are created’. Thematically, varying from ‘a future proof coastline’, ‘literally keeping the land dry’ or ‘the Dutch delta in generic sense’. Geographically, these organisations focus to. A good way of working, mentioned by one of the interviewees, to combine all three views is ‘the designing research’ approach. Strategic approaches to the knowledge articulation process vary as well but generally, they work similarly to the Knowledge and Innovation Agenda (KIA) approach prescribed by the Dutch government. Besides ‘thinking about what new knowledge is required’, government driven innovation intermediary organisations create strategy for ‘the distribution and reuse of new knowledge’ after its creation by knowledge institutions and the market as well. To facilitate both project oriented and routine based innovation, government driven innovation intermediary organisations are involved in the development of a new contract type referred to as ‘the innovation partnership’. This development explicates the need to inter-organisationally communicate more freely during the building process’s’ competition phase.

### **6.4 Individual knowledge – output additionality**

Articulated questions and needs for new knowledge, by government driven innovation intermediary organisations, are used as input, by market driven innovation intermediary organisations, while finding answers aimed at creating new knowledge. To facilitate this process, creative innovation projects pilot are utilised. Within such a project environment that is created around a clear question/challenge, both structural and applied research are performed. Closing the gap and the coming together of theory and practice, is the most commonly reported benefit. Sequentially the focus of these market driven innovation intermediary organisations is clear. After proof of pudding via creative projects, knowledge becomes mainstream via institutionalisation. Thematically the focus of Ecoshape, the researched case, is very clear as well. It involves the Building with Nature concept. The geographical project is the location where different siloed worlds culturally meet, because - for the duration of the knowledge development project - the golden triangle and anyone else who can add value to achieving the project goal works together ‘as a team’. Because the challenges and goals fit governmental missions, challenges and departments, participation of governmental bodies and availability of funding via subsidy becomes opportune. Developing knowledge is in fact on top of mind and the knowledge is share both via online portals, events and professional communication strategies. Although initially a market driven approach the government has become charmed of this way of working and embraces it.



## **6.5 Brokerage process – output additionality**

Specialised innovation intermediary organisations facilitate and support the parties involved in either knowledge articulation or knowledge creation from within a brokerage niche market. Sequentially, brokers claim their own time-laps in the sequential lead time of the pre-competitive construction phase. They have strong preference for the maturity of an underlying initiative. As a consequence this also prescribes their involvement in either knowledge articulation or knowledge creation. Besides that, some brokers are specialised geographically, focussing on a specific area. When looked at from a thematical viewpoint, brokers are less topic focussed. To be an outstanding broker, in debt knowledge of the sectoral system, substantive knowledge about the content of activities in the Delta technology sector, strong insight in sectoral culture and social and behavioural aspects, mastering three (3) existing main brokerage approaches and specific personal skills of the broker are required. The brokerage process is referred to as one of true craftsmanship and, depending on the task at hand the broker combines the three (3) main approaches or flavours in specific composition. Approaches are the public administration approach, the socializing approach and the design approach. Main categories in which required personal characteristics to be a successful broker in the Dutch delta technology sector can be subdivided are pre-conditional, individual and inter-human. Brokers do not work without clearly defined mutual goals or the ambition to create one.

## **6.6 Creative innovation projects - output additionality**

Innovation intermediary organisations researched do not occupy themselves with routine based innovation in the competition phase of the building process. Meanwhile, creative innovation projects are the embodiment of the route map for working towards the achievement of shared goals in the pre-competitive phase of the project oriented Delta technology sector. This is true for knowledge articulation (designing research within a project, requests for specific innovative solutions regarding future proof flood defences and test gardens), for knowledge creation (knowledge institutes and market creating knowledge while teaming up to tackle socially relevant challenges within a project framework). All these test set-ups are meant to filter out what has been learned and to elevate these lessons to institutionalised ways of working. Brokers, also only working towards clear and shared project goals, facilitate this process to the best of their ability. People in the sector remain finding it difficult to filter out the lessons learned and to share them inter-organisationally. In this respect promising lessons have been learned over time however.

## **6.7 Sectoral innovation route map - A birds eye view**

From a birds eye view **appendix III** summarizes this chapters funnelling innovation route. It visualises a sectoral innovation route map, guiding ‘creations of the mind’ towards ‘mainstream projects’.

## 7. Conclusion and Implications

This chapter brings main findings, answers the research question, sets forth theoretical and managerial implications, gives insight in limitations and provides final recommendations.

### 7.1 Research summary

The question answered in this research is; *To what extent can ‘capturing, maintaining and communicating the internal value of innovation intermediary organisations’ contribute to ‘improvement of their perceived added value within connected innovation ecosystems’?* To find answers, preliminary proposition below was utilized. Combined with additional literature, further operationalization germinated from Obstfeld’s (2017) BKAP model.

Independent variable	Dependent variable
<i>Value capture within innovation intermediary organisations.</i>	+ <i>Sustainable continuation of innovation intermediary organisations existence, enabling continuation of (perceived) positive impact on innovation outcomes of innovation ecosystem.</i>

Working within a highly systemized sector, semi-structured interviews within three funding-type-based-cases turned out to have specific focus areas. Public-Private ‘articulates the need for new knowledge’, Private-Public is mainly occupied with ‘the creation of this knowledge’ and Commercial is ‘specialized in brokerage within the niche market around knowledge’. Expert interviews provide more insight in matching sectoral culture and behaviour. Analysing transcribed and coded data via a Miles & Huberman (1994) matrix resulted in conclusions.

Enabling full comprehension of the final conclusions, a number of contextual findings must precede. That’s why findings start with characterizing the highly systemised and organized sector in which inter-organisational collaboration was studied. Accordingly, three identified viewpoints of such inter-organisational collaboration are revealed. Thereafter, findings regarding the inter-organisational ability and willingness to learn and improve in the context of such collaborations is surfaced. Contextual findings are completed by explicating the fact that the deployment of innovation intermediary organisations is in fact ‘one of multiple ways’ to influence inter-organisational collaboration. Specific findings kick off with the fact that and the positive way in which innovation intermediary organisations ‘influence the researched innovation ecosystems’. Subsequently, actual encountered ‘internal focus’ by innovation intermediary organisations is elucidated. Specific findings are finalised by explicating the importance of and the required approach of ‘communication about’ the added value of innovation intermediary organisation in the innovation ecosystem served.

#### Contextual findings

Delta technology is a very traditional, very organised and project oriented sector. To have any chance of success, this must be internalized and taken seriously. The dominant paradigm towards inter-organisational collaboration within this sector is, without a doubt, grounded in

system theory. Top sectors, and underlying breakdown structures, are classic sectoral exploitations of the National System of Innovation. ‘Who pays determines’ applies as a rule of thumb and within Delta technology - a sub-sector mostly focused on itself - governments receive the final invoice. Predetermined division into groups exist historically, with predefined scopes, focused on content and driven by knowledge. ‘Lots of’ predetermined groups, referred to by some as silo’s. Inter-organisational communication is predominantly done via the medium ‘contract’ and generally little is left to coincidence. Besides knowing about ‘unwritten rules on the way things go’ and about ‘how things used to be’, at the same time ‘a lot of (new) system knowledge’ is required. The above portrays some of the challenges of inter-organisational collaboration. The need to find each other ‘around existing structures’ is clearly indicated by all involved parties however. All sectoral players are well aware of and searching for the added value of inter-organisational collaboration. “How?” poses challenges however and creates reluctance. Initiatives that give substance to this renewed acquaintance within and between ‘the imposed organisational boxes’ utilise, without acceptance, the opportunities that (social) network theory provides. In the end this helps to descend to the aspired inter-personal and to break free from the imposed inter-organizational. Its importance was confirmed by all interviewees.

Not only are the players and their scopes predefined, this is also very true for the sequencing of building phases, relevant themes and the geography of project locations. Within the Dutch delta technology sector, regarding interorganisational collaboration, these three viewpoints were identified. The building process is subdivided in widely known pre-defined sequential building phases. Guided by governmental missions, challenges and goals, innovation and the accompanying knowledge reaches main stream and routine ways of working via these pre-defined sectoral baby steps. In line with the BKAP-model these phases simultaneously are knowledge articulation, knowledge development and main stream (project) business. Consequentially innovative ideas reach the reality of day-to-day life via a clear and predefined route. Situated in this march route, this research obviously has focussed on the pre-competition building phase. Still strongly organized, but, compared to subsequent steps, allowing easier and less restricted inter-organisation communication and collaboration. ‘Innovative ideas types’ are the origin of the other two viewpoints on inter-organisation collaboration. Ideas can be thematic, about sustainability for example, or energy, or building with nature. People consequently organise themselves in groups around these themes. As the National System of Innovation teaches us, people can also organize themselves around geographical areas. The Waddenzee, Dutch river systems or North sea shore for example. The theme and geographical region of any type of innovative idea more or less predicts who’s going to be guiding it through the pre-defined sequential building phase steps. Knowing who you are dealing with is a very important prerequisite for success in this sector. Therefore ‘being extended and explicit about stakeholder management’ is sectoral common practice. The geographical viewpoint enables a very sector specific way of inter-organisational collaboration called ‘designing research’. Innovation ideas regarding any kind of topic are linked to geographical location in this process, making the potential of ideas very specific and visible. Delta technology professionals feel comfortable operating this way, because it resembles the ways of spatial planning.

The Delta technology sector is a project-oriented-world in which the pilot project is a widely spread and utilized concept. Most inter-organisational collaborations, both in pre-competition and in competition phase are temporary by nature. Given this fact, intuitively one would expect that evaluating and learning about the inter-organisational collaboration process is promising. Findings however show the contrary. Lessons learned often do not find their way to subsequent projects and often do not become common good. Especially the lessons related to the inter-organisational collaboration process. Within the sector this phenomenon is referred to as ‘the pilot paradox’. Signals of becoming pilot-tired have been received. Indications of change in mind-set in favour of piloting have been observed as well. Still, the general sentiment is however to hold back on investment in knowledge sharing and in collaboration process. Sectoral governments, knowledge institutes and market parties are very willingly investing in the development of content-knowledge and are more reluctant to invest in knowledge management or sharing initiatives. There seems to be an even bigger, almost Calvinistic, hesitation towards investing in ‘inter-organisational collaboration process knowledge’. Ironically, findings show that this restraint seems to be most applicable to those situations potentially benefited by it most. Some suggest that historical sectoral fraud situations damaged trust and are still lingering below the surface. Playing it safe, from within the box, is perceived as the least risky option. Although movement was observed, systemic movement towards learning about inter-organization collaboration is still in its infancy. In this regard the sector leaves opportunities unused and would benefit from faster collaborative change.

Influencing sectoral inter-organisational collaboration is attempted via different ways. From a governmental perspective, by introducing tax benefits for inter-organisational collaboration constructions and by introducing grant conditions that stimulate inter-organisation collaboration for example. Trade associations do their part in creating awareness and clarity as well. The Dutch Water Authorities (unie van waterschappen), the Dutch branch association of consultancy, management and engineering firms (NLingenieurs) and the employers and entrepreneurs' organization for contractors & service providers in Delta solutions (Vereniging van Waterbouwers) are examples. Valuing inter-organisational collaboration is to high extend an awareness process that is achieved through and fuelled by positive past experience. Seeing is believing, applies here. Spill-over from one project to the next, based on positive experience, has been confirmed. Obviously the deployment of innovation intermediary organisations is one (of multiple) ways utilized to influence and stimulate inter-organisational collaboration.

### **Specific findings**

Findings confirm that innovation intermediary organisations endeavours positively influence inter-organisational collaboration for innovation in ecosystems served. This, in turn, has a positive impact on innovation outcomes. The seeing is believing phenomenon applicable to the benefits of inter-organisational collaborations, is definitely utilised by innovation intermediary organisations as a coagulation mechanism. Utilising an innovation intermediary organisation is a very practical way to facilitate a positive experience. “*The deceptively complex coordinative work associated with bringing parties together*” Obstfeld (2017, p.21) is currently still often

overlooked and unrecognised, but becomes more and more ~~IN~~visible work however. Over time innovation intermediary organisations have been put to use to manage and start up new and to rejuvenate stagnated inter-organisational project collaborations. The sector has tasted its benefits. Towards the future these achieved successes have a positive impact on importance awareness of inter-organisational collaborations. Tense experiences tend to stick with people longer. Although most innovation intermediary organisations are specifically focussed on accomplishing a project oriented goal, providing a positive benchmark is definitely a spill-over effect. Due to the pragmatic approach of the innovation intermediary organisations, because they aim for achieving something, the seeing is believing phenomenon becomes practically translated in watch and learn set ups. Seeds are planted for future inter-organisational collaborations this way. This is true for peoples personal experiences. Major programmatic initiatives like Ecoshape or the Governmental Flood Protection Program however also serve as a source of inspirations for smaller scaled program set ups. Municipality partnerships for example or specific projects that fall outside of the bigger scoped programs. Consortium formation for tenders in the competitive phase are also inspired by this inter-organisational set up. By introducing knowledge, network, ‘experience with facilitating and managing large group processes’ and ‘experience with project based pilots’ innovation intermediary organisations deliver and facilitate success experiences. Experiences with an enlarged success rate of achieving positive results through inter-organisational collaborations, because innovation intermediary organisations know how to do it. This consequently becomes the participants positive bench mark for future inter-organisational collaborations. This is how this new gained skills and knowledge can be broader utilised by participants in more mainstream (or incremental) innovations throughout the sectors innovation ecosystems. The results of this research suggests that without prejudice a growing acceptance and need for innovation intermediary organisations exists in the Dutch sub-sector Delta technology in the coming years. This is possibly linked to today’s mission, transition thinking and shared challenges thinking.

When compared to inside focus, research findings confirm that all consulted innovation intermediary organisation instances have a much stronger outside focus. This outside focus is however fragmented and dispersed as well. Most innovation intermediary organisations zoom in on a specific phase of the sequential pre-defined building phases, on a specific theme or on a specific geographical location. Mutual contact between the different sectoral innovation intermediary organisation for shared improvement or learning reasons is not frequent of character and is not consciously sought. When contact does happen, it is mostly related to an ongoing project. Sectoral competition amongst innovation intermediary organisations is not experienced as such, mainly because a lot of opportunity to facilitate the sector currently exists. This lack of reciprocal contact is not experienced to be a problem, although the future opportunities such contacts hold were not denied.

Innovation intermediary organisations consulted vary in character and identity. Some do not consider themselves to be a true organisation, refer to themselves as movements or have strong identities with legal status and defined ambitions and goals. Most innovation intermediary organisations consulted are focussed on ‘external goals that must be reached’. This can be ‘to define requirements for new knowledge’ in the Public-Private case, ‘to create such knowledge’ in the Private-Public case or ‘to facilitate or fix the inter-organisational collaboration process’ in the Commercial case. It is striking that all interviewees confirm that in debt sectoral, cultural, technical, sequential, thematical or geographical knowledge is required to be able to have any success in endeavours to influence the course of affairs, yet few refer to innovation intermediation done by their innovation intermediary organisations as a true profession or a craft. This is more so in Public-Private and Private-Public cases than in the Commercial case though. When asked for the internal value of innovation intermediary organisations, the most striking resemblance was that all interpretations of this question lead to very different answers.

Howells (2018) finding that focus of innovation intermediary organisations has primarily been on value creation for partners and clients, rather than on their own internal value as well, has been confirmed in this research. Only few occasions of explicit recording of the internal ways of working to reach the defined goals and ambitions were found. Knowledge storage regarding innovation intermediary organisations craftsmanship heavily depends on individuals. Most innovation intermediary organisations implicitly share the way to do things amongst their peers while working on the next project or assignment. The amount and quality of fragmented knowledge and skill available within the Dutch sub-sector Delta technology is impressive however and holds big future potential. Given the expected increase for innovation intermediary organisations involvement, retaining and recording the internal value of innovation intermediary organisations can to big extend and in many ways positively impact the continuation of (perceived) positive impact on innovation outcomes of innovation ecosystems.

The fact that the importance of sharing knowledge inter-organisationally and the willingness to invest in the improvement of the inter-organisational collaboration process can be enlarged, combined with the fact that the value added by innovation intermediary organisations to the innovation outcome of Dutch delta technology ecosystems can be made more specific and explicit, poses communication challenges. Added value innovation intermediary organisations bring, both externally and internally, is simply not clear enough for involved parties. Consequently, communication about the added value of innovation intermediary organisation deserves attention. Established brand value was mentioned by some innovation intermediary organisations to be important for their success. Showing examples and weaving the message into ‘regular project focussed content’ seems to work well. These innovation intermediary organisations have established knowledge on what it is this sectoral target audience likes to hear and read. They have found ways to successfully bring technical content and process as a package deal. Effective ways to communicate the added value of innovation intermediary organisations are available throughout the sub-sector but, similar to other skills and knowledge about innovation intermediary organisations, this craftsmanship is poorly shared.

## 7.2 Theoretical implications

Theoretical implications of this qualitative comparative case study are as follows.

In order to analyse the (added) value of innovation intermediary organisations one has to be clear on the demarcation of ‘value’. How to identify, structure and specify such a capacious theoretical concept? This was a challenge faced throughout this research. Utilising the “*swiss army-knife applicability*” (Obstfeld, 2017, p.194) of the BKAP model, in combination with ways to measure impact provided in additional literature (Davenport, Grimes & Davies 1998; Falk 2007; Clarysse, Wright & Mustar 2009; Hulsink & Scholten 2017) has proven to be a very effective way to do so. The developed operationalization (**appendix II**) can provide inspiration in a different (sectoral) context or can be reused as a whole for future research.

While considering and studying inter-organisational collaboration, this study has explicated the importance of a sectors willingness to improve and learn. Determining whether or not the sector sees the importance of change prior to studying ways to accomplish it seems obvious, this has proven to be an important first step however. Besides that innovation intermediation, by innovation intermediary organisations, is one of multiple ways to influence inter-organisational collaboration. Acknowledging this bigger picture is an important prerequisite for studying inter-organisational collaboration as well.

Based on the operationalisation the capacious theoretical concept value was specified. Within that defined framework, this research has provided insights in the ways in which innovation intermediary organisations create value. Differences in value created related to the applicable step in the pre-defined sequential building phase, theme, geographical area but also very much specific to the corner of the golden triangle (government, knowledge institute, market) the innovation intermediary organisation sprouts from were also observed. These are aspects to internalize when studying innovation intermediary organisations.

In the course of this research “*terminological redundancy and sometimes confusion*” (Klerkx & Leeuwis, 2009, p.851) was ascertained and determined once more. Terminology confusions was even more the case in the Dutch delta technology sector because of this sectors focus on ‘actual natural ecosystems’. When content and process have overlapping wordings things get fussy easily. Besides that, within the Dutch delta technology, terminological redundancy and confusion is true for innovation intermediation as a work process as well as for the naming of innovation intermediary organisations. Reported risks of ‘terminology causing confusion’ is alive and needs to be accounted for when studying innovation intermediary organisations.

This research provides supporting evidence for Howells (2018) claim for a lack of internal focus by innovation intermediary organisations. Besides that this research provides insights in the relation between their (perceived) external value and their internal value. Findings also supports the claimed “*lack of the interaction between value generation for both the clients of intermediaries and intermediaries themselves and how this shapes the trajectory of the market or the sector*” (Howells, 2018, p.80).

This research has provided evidence for the need for pro-active network building and maintenance as well as for the need for inter human communication. Aspects like fear of contractual repercussion, fear of media, fear of being left out and feeling stuck in silo's were found. Although highly systemised and grounded in system theory, the benefits of (social) network theory aspects clearly surfaced as an option while facing encountered sectoral challenges. That's how this study provides examples in possible ways to combine both paradigms via innovation intermediary organisations. Not only theoretically, but also practically.

Regardless the paradigm on inter-organisational collaboration, this study confirms the importance of communicating about the true added value and the effectiveness of the endeavours of innovation intermediary organisations. Obviously this influences the 'perception' of added value. Based on empirical evidence this study provides insight in what this external communication can exist of, how it is established, captured and maintained within the Dutch delta technology sector and how this adds to the 'perceived' value of innovation intermediary organisations within this sector.

### **7.3 Managerial implications**

Within the Dutch delta technology sector a variety of innovation intermediary organisations is active. Several reasons to exist and goals pursued have been observed. Although reciprocal contact exists, much of the (invisible) work is done individually and is duplicated. Consequently only little of the potential that 'contact amongst innovation intermediary organisations' brings is capitalised. These innovation intermediary organisations need to increase mutual awareness regarding each other's existence, ambitions, activities and future plans. They need to clearly determine and know their own game, and, related to the other innovation intermediary organisations active in the same sector, consciously position themselves in the mutual playing field. They need to interconnect, share and calibrate. This calibration challenge needs to be a shared initiative by all parties in the golden triangle. Not by 'one of the corners taking the lead' as is the case with the innovation intermediary organisations instances in this research. An 'alliance between current innovation intermediary organisations' seems to be a very applicable and appropriate form for such a unique inter-organisational collaboration. This very specific and overarching inter-organisational collaboration holds enormous potential. Within the different innovation intermediary organisations consulted in this research, several academically schooled innovation and network specialist, knowledge management and brokerage process specialist are active. Besides that the emergence of a mind blowing in-debt sectoral (to capillary level) and cross-sectoral network can be established in no time. For this, in the context of the complete sector, only few weak ties need to become stronger. Via this approach, referral of stakeholders to 'the right counter/desk' would take flight at once for example. This narrowly veined Dutch delta technology network of 'connected connectors' has an enormous potential for the successful implementation of the top sector policy, for the internationalisation and for 'one ninth of the success of B.V.-The Netherlands' in general.



To define, determine and calibrate ‘a mutually agreed playing field for innovation intermediary organisations’, it is very important to consider the three identified viewpoints for the Delta technology sub-sector in conjunction. These are sequential view, considering the pre-defined sequential steps in the building process. The thematic view, considering relevant topics and the geographical view, considering (project) locations. Comparable to the ‘design research methodology’ results of these views must be superimposed. This will result in the envisioned balanced playing field of innovation intermediary organisations, that complement and reinforce each other. This will reduce duplications in expensive innovation intermediation initiatives as well. Not only that, comparable to portfolio management/analysis done by venture capitalist, uncultivated areas will surface. In a sense this is also a form of knowledge articulation.

When zooming in on the sequential view, timing (Aristotles Kairos) is important. The different (types of) innovation intermediary organizations consulted are most active in and focussed on different moments in pre-competitive building. Besides that, they use different methods and cycles for programming activity. Where in the sequential timeline is which organization located? At what time does which innovation intermediary organization add the most in this sector? Up to what point does the current system allow mediation at all? Answering this type of questions and mirroring the answers in relation to time, will create clarity throughout the entire sector. Comparable to platforms that help start-ups or the way in which Netherlands Enterprise Agency is organised, ‘a chain of helpful innovation intermediary organization counters/desks’ will emerge, each consecutively injecting their knowledge and skills into the evolvement of ‘potential innovative ideas’ into ‘state of the art common practise’. However, any innovation intermediary organisation only adds value when there is indeed an innovation. Similarly, pilot project only makes sense if outcomes are insecure. For competitive activities, incremental improvements and regular projects more traditional - or newly developed ways - of contracting need to be utilized. These are widely available and common in this sector.

Related to the thematic view encountered statements of missions, ambitions, horizon-look-throughs, added value determinations, goals and scheduling’s were comprehensive. Most innovation intermediary organisations are programmatic of character. This means they create an innovation agenda in some form or shape. What goals are determined? Do these goals specify what part of the pre-defined sequential building phases is aimed for? Do they take position? Which themes do these goals give substance to? Does the essence of starting a program or project currently connect with governmental mission, transition lines, core techniques and tasks in a logical manner? Which region do these objectives actually target? Answering previous questions also makes answering the following viability question easier. Is availability of budget expected for reaching this goal? By having positioned the innovation intermediary organizations in relation to each other over time and in terms of theme, adding the geographic view becomes the cherry on the pie. Make sure regional innovation intermediary organisations are known. Move in via those locally inter-networked partners. This way the goals of country, top sectors, innovation intermediary organizations, alliance organizations and eventually people will also become inter-connected more effectively.

“All the world’s a stage, and all the men and women merely players” (William Shakespeare). Once organised within, ‘expand the playing field beyond the sector’ is the next managerial implication. Is the sectoral golden triangle of governments, knowledge institutes en market gold enough? Or should we go for platinum? Specifically for the dredging industry, Van den Ende et al (2018, p.32) suggests to expand into “*the double triangle*”. For dredging this means incorporating shipbuilders and equipment suppliers. For the overarching Dutch delta technology sector expanding the innovation triangle holds opportunity. During the research collaborations initiatives aimed at robotization, clean energy, mega-data-processing were encountered for example. In line with the missions, transition lines and core techniques ‘the basic geometric shape of the triangle for inter-organisational collaboration’ might need re-consideration. In lack of a glass ball, maybe the required future window embodies a trapezium or even a diamond. When looking for expansion cross-sectorally, obviously the predetermined other eight top sectors by the Dutch government are a warm bath to start with. A lot of the knowledge on innovation intermediary organisations originates from the Dutch agricultural sector for example. Links with top sector logistics were mentioned during the interviews and the benefits of ‘importing an IT-professional’ were elaborated on as an example as well. Cross sectoral interlinkage seems ‘rich in potential best practices’ and within reach very easily. One of the cross sectoral missions is the internationalisation. The top sector water even has a core team in place for this. Combining the internationalisation game with innovation intermediation seems to be a winning formula to, for the essence of these missions is corresponding.

During sectoral symposia and knowledge events participants state that more attention should be paid to the social process and to mutual collaboration. And, that it requires more research as well. Accordingly workshops about working together are organised and crowded. Interviewees also recognize the importance but often are more knowledgeable on content than on the actual collaboration process though. Content feels pleasant and more familiar. Although very high-quality examples were found, the importance of ‘focused knowledge regarding the inter-organisational collaboration process’ is very clear. Therefore the Dutch delta technology sub-sector should make the inter-organisational collaboration process equally important as the content. Dare, be brave enough, to learn and to accomplish that. And, reserve budget and spent money on it accordingly. Not from one side of the triangle, but from all sides. In essence this challenge should be approached as any other major challenge historically faced by this sector. Afsluitdijk, Neeltje Jans and Maeslandkering? You just have to do it!

Clarity in identity and consistency in language and terminology are important for innovation intermediary organisations. What name does your innovation intermediary organisation hold and does this name actually cover its load? What is your legal status and what does this say about your credibility and about your ability to raise funds (also outside of the Netherlands)? Because of terminology redundancy and confusion, be consistent in writing and in the spoken word. Obviously the sector would be benefited by alignment on used terminology regarding inter-organisational collaboration. This definitely also applies to individual innovation intermediary organisations. What do you mean exactly when you write or speak?

Once identity, language and terminology are clear internally, explaining what you can offer to other stakeholders in the innovation ecosystem becomes easier. It is in fact very surprising that, while the content is so difficult to grasp and its importance extensive, that not 'much more emphasis' lies on external communication of the added value of innovation intermediary organisation to the innovation ecosystem. It's about people within existing organizations, they have to be known and they have to understand what specific innovation intermediary organisations add and offer. Is this also not 'the way' in which SMEs can be involved more? Because, 'SME' almost equals 'the individual'. Innovation intermediary organisations should put much more strategic and professional effort in communication about 'what it is they have to offer' to the people working for stakeholders active in the innovation ecosystem they serve.

## **7.4 Limitations**

This research focussed on innovation intermediary organisations. In the Dutch Delta technology sector they are only one of more mechanisms and organisation-types aiming to influence an improve inter-organisational collaboration. Inter-organisational collaboration is a strategy to achieve a goal, innovation intermediary organisations are one of many ways to operationalise this strategy. Like innovation intermediary organisations there are other means to an end. Trade organisations such as the Dutch Association of Dredgers / Hydraulic Engineers is proactively scanning for ways to influence the inter-organisational collaborations. And so are the trade organisations of the engineering companies. Working via the culturally accepted and long existing organisations in a traditional sector makes sense. Governments for example are implementing new (and even innovative) legal contract forms, like the innovation partnership or other public-private-partnership contracts aiming at sharing project risk. Knowledge institutions are lobbying for new kinds of funding opportunities enabling more applied research in an effort to connect to the market this way. The area of interest in the Dutch Delta technology sector is inter-organisational collaboration in general. This, rather than focusing on one group of organisations putting effort in improving it. This research could better have been done focussing on inter-organisational collaboration within the sector. This would have introduced innovation intermediary organisations in the sector from the outside in, rather than inside out.

Most interviewees were highly educated and still actively connected to the knowledge institutes. Although knowledge institutions play a significant role in the sector, only one interviewee employed by a knowledge institute was consulted. More knowledge institution representation would have improved the assessment of the situation.

Although they primarily focus on the competitive phase, engineering and consulting firms such as Twynstra en Gudde, Arcadis, Witteveen & Bos, Royal Haskoning DHV and Antea group are increasingly focusing on the pre-competitive domain as well. The government is increasingly requesting for support by innovation intermediary organizations through tenders. In the final phase of the research it became clear that this emerging group of companies was not recognized enough as a "type of innovation intermediary organization" and was unfairly not included.

Within the context of this research mainly ‘believers’ were consulted. Interviewees have elaborated about other groups in the sector that are not by definition pro innovation intermediary organisations. These groups were not consulted for their opinions or viewpoints themselves however. Besides that, interviewees were all highly educated people. This made discussing theory very tempting, which means that respondents have been directed towards a certain viewpoint in some occasions.

## **7.5 Recommendations**

Based on the research findings and a reflection on the research process, recommendations are explicated. They are subdivided in recommendations regarding inter-organisational collaboration within Delta technology’s sub-sectoral culture, specific recommendations regarding creative innovation projects in the project-oriented world of sub-sector Delta technology, recommendations for government driven innovation intermediary organisations focussed on knowledge articulation, recommendations for market driven innovation intermediary organisations focussed on knowledge creation and recommendations for commercial innovation intermediary organisations focussed on the brokerage niche market.

### **Sub-sectoral culture - Inter-organisational collaboration within Delta technology - Behavioural additionality**

Within top-sector Water & Maritime the added value of establishing a new core-team inter-organisational collaboration should be researched. Beside the existing core-teams internationalisation and human capital, establishing a core-team team inter-organisational collaboration that is focussed on "learning from what we have done well together and where opportunities for improvement lie" seems promising. This new core-team could be the embodiment of ‘the alliance between current innovation intermediary organisations’ described in the managerial implications. This core-teams strategy paper should include; connecting the sectoral connectors (innovation intermediary organisations and other types of organisations that already have created a dense network within the sectors, including SME’s), Innovation, Knowledge management (including kennisdoorwerking as it is done within the Dutch Flood protection Program) and obviously communication & media. Given the mission and transition thinking in shared challenges, their focus should not only be sectoral, but cross-sectoral. Putting an active effort in ‘importing lessons learned in other sectors’ into the Water & Maritime sector this way. Because this top sector is build up out of three sub sectors already, the opportunity for ‘practicing internally’ is obvious. When looking at the programs like the Dutch Coastline Challenge, the Dutch Flood Protection Programme, TKI Deltatechnology and Ecoshape, much insights and inspiration can be found for the shaping and coordinating of such a new sectoral core-team. Finally, collaboration between the core-team internationalisation could potentially result in strong outcomes. These are ideas however, further research should be done if the establishment of such a core-team will in fact result in the envisioned power network.

Women are not scary, not even in top positions. Gender diversity is getting more attention in modern times, and rightfully so! When analysing inter-organisational collaboration, it deals with mutual gains, knowing each-others stakes, approaching matters in an integrated way, reading (body) language, feeling the undercurrent in communication and about making connections. These are all particularly ‘more feminine capacities and skills’. So when the inter-organisational connection is what is needed for a brighter future, are we making sufficient use of the female top potential within this sector? Why are there so many men and so little women on the top in this sector? Yes, also in middle management!? What are men afraid off? If the answers is ‘nothing’, figuring out if the sector would be benefited from more women in top positions with regards to inter-organisational collaboration and innovation intermediary organisations is worthwhile.

During the research the role of trade associations in inter-organisational collaboration was encountered several times. Intuitively, however, this requires caution. Impartiality, as Klerkx and Leeuwis (2008a) reports, is clearly an added value of innovation intermediary organizations. Whether it is sensible to utilise trade associations in the role of innovation intermediary organization and what their role in inter-organisational collaborations should be otherwise, has not sufficiently been surfaced in this research. Further researching the most beneficial role of trade organisations in the context of inter-organisational collaboration would add value to the Dutch sub-sector Delta technology.

### **Projects - Creative innovation projects in project-oriented world Delta technology - Output additionality**

During the research ‘the pilot paradox phenomenon’ emerged. Investing in all these pilots, living labs, testing gardens and other types of test-setups, but not sufficiently filtering out the lessons learned and not being able to implement these lessons into the mainstream, is its essence. This suggests that, in the context of pilot type initiatives performed, recent history holds a lot of unlearned lessons available for learning. A lot of unanalysed data seems to be available in these context, both content focussed as well as with regards to the inter-organisational collaboration process. What can in fact be learned retroactively from recently finalised pilot projects? Is this indeed a cheap way to harvest and share knowledge? To what extend can recently finalised pilots be linked to future missions and transition goals? Looking back in time on a project basis and cash in on the gold mine of lessons learned, programmed learning from this recent history, is that in fact possible and does this add value? Is it indeed time for the less sexy work now? Besides that, in a speech during one of the conferences the new director of the top sector Water & Maritime suggested that the sector is "pilot tired". Is that statement correct? What does this mean and what other ways to learn should be utilised in that case?

### **Knowledge Articulation - Government driven innovation intermediary organisations focussed on Knowledge Articulation - Output additionality**

The fact that the Dutch delta technology sector is very government driven comes with opportunities regarding inter-organisational collaboration. If the Dutch government wants to achieve cross-sectoral, interdisciplinary and blood-type mixed inter-organisational collaborations, more extensive development of applied knowledge, improved knowledge disclosure (making pilot knowledge mainstream) and change the mind-set of the sector, adapting the requirements of subsidy programs and contracts seems like a quick and easy way to stimulate this process. Currently the focus of subsidy's is very much on content. It would be beneficial if the government would also create more subsidy's specifically stimulating inter-organisational collaboration as well as adapting the requirements for content driven subsidy programs in its favour. The government could also stimulate inter-organisational collaboration in the competitive part of the building process by incorporating inter-organisational collaboration as a contract requirement. More explicit research regarding the effectivity of enforced inter-organisational collaboration seems promising.

Research if knowledge institutes require more explicit government guidance. Are knowledge institutes motivated enough to focus on the government content as well as process goals? And do they in fact create the new knowledge required? If, for example, the expectation is that data analyses will become a next big challenge, are knowledge institutes sufficiently prepared for that? And, are the knowledge institutes currently engaged enough and willing to research the collaboration process in the context of inter-organizational collaboration more extensively?

To be able to develop knowledge and add value to the innovation ecosystem a stable workforce working in an innovation intermediary organisation is required. When working in alliances governmental organisations tend to have a rather fast exchange of staff. Most likely this situation is similar for the knowledge institutes and market parties as well. Are stable innovation intermediary organizations that add maximum value created in this manner? How does the (too fast) exchange of staff influence the internal value of an innovation intermediary organization? The way in which staffing of an alliance influences the quality of an innovation intermediary organization in general deserves further study.

### **Knowledge Creation - Market driven innovation intermediary organisations focussed on Knowledge Creation - Output additionality**

During this study reluctancy from market parties and knowledge institutions to invest in innovation intermediary organisations was reported. Acknowledgement of the importance of the inter-organisational collaborations process needs to grow and requires investments. What are the key motives to participate or to withdraw? Is this different between knowledge institutions, large companies and SME's? Is this an important factor influencing the potential added value of innovation intermediary organisation in the future? The willingness to invest more in inter-organisational collaboration via market, knowledge parties and SME should be further researched.

Globally, on a European scale, nationally and regionally a wide variety of subsidies and grants is available. During this research the impression was raised that, within innovation intermediary organisations, knowledge on this type of funding possibilities as well as on the consequences of actually getting a grants/subsidy can be improved. Having in depth insights in the opportunities, not only the obvious ones, could add to the sectors innovation potential. (Up front) knowledge about the complexity of the involved administration process that comes with subsidy's and grants, especially when granted by different governmental levels (local, national, European, global), seems opportune. Further research regarding the potential of becoming more knowledgeable on (inter)nationally available funds and on the involved administrations process within innovation intermediary organisations seems of added value.

**Brokerage - Innovation intermediary organisations focussed on the Brokerage niche market - Output additionality**

Brokerage network contacts and brokerage skills are very much dependant on individuals at current. In the context of expected sectoral growth in the demand for brokerage by innovation intermediary organisations this is something to be contemplated on. To be successful in the brokerage niche market different skills and required knowledge fields were identified during the interviews. Sometimes surprising ones to. Which are most important and their interrelations stays undetermined an implicit however. Making them more explicit and scalable offers future prospects for the sub-sector Dutch Delta solutions and the 'B.V. Netherlands' in its entirety.

*-END-*

## Appendices

### Appendix I - Typology of innovation intermediary organisations

Created for the Dutch agriculture sector by Klerkx (2009, p.854-855).

Innovation intermediary organisation type	Functions	Funding
1. Innovation consultants aimed at individual farmers and agri-food SMEs	<b>Demand articulation;</b> Network composition: scanning, scoping, filtering, and matchmaking; <b>Brokerage</b> within established networks (innovation process management, i.e. enhancing alignment of actors and mutual learning).	<b>Public funding</b> through subsidies; <b>Public/private funding</b> through subsidies and/ or shareholding; <b>User payments.</b>
2. Innovation consultants aimed at collectives of farmers and agri-food SMEs	<b>Demand articulation;</b> Network composition: scanning, scoping, filtering, and matchmaking; <b>Brokerage</b> within established networks (innovation process management, i.e. enhancing alignment of actors and mutual learning).	<b>Public funding</b> through subsidies; <b>Private collective funding</b> through subsidies; <b>Public/private funding</b> through subsidies and/or shareholding; <b>User payments</b>
3. Brokerage organizations that forge peer (interfirm) networks	<b>Demand articulation;</b> Network composition: scanning, scoping, filtering, and matchmaking.	<b>Public funding</b> through subsidies; <b>User payments</b>
4. Systemic intermediaries for the support of innovation at higher system level (systemic instruments)	<b>Demand articulation (including foresight);</b> Network composition: scanning, scoping, filtering, and matchmaking; <b>Research planning.</b>	<b>Public funding</b> through subsidies; <b>Private collective funding</b> through subsidies.
5. Internet-based portals and databases that display knowledge and information relevant to farmers and related parties	Network composition: scanning, scoping, filtering, and matchmaking.	<b>Privately funded</b> if targeted at all farmers (user fees); <b>Publicly funded</b> if targeted at project-related audiences and other specific audiences
6. Boundary organizations that act at the policy/ research/user boundaries in research planning (i.e. research councils with ‘innovation agency’)	<b>Demand articulation;</b> <b>Brokerage</b> within established networks (innovation process management, i.e. enhancing alignment of actors and mutual learning)	<b>Public funding</b> through subsidies
7. Boundary organizations that act at the policy/ education/research interface	<b>Demand articulation;</b> Network composition: scanning, scoping, filtering, and matchmaking.	<b>Public funding</b> through subsidies

### Appendix II - Operationalisation

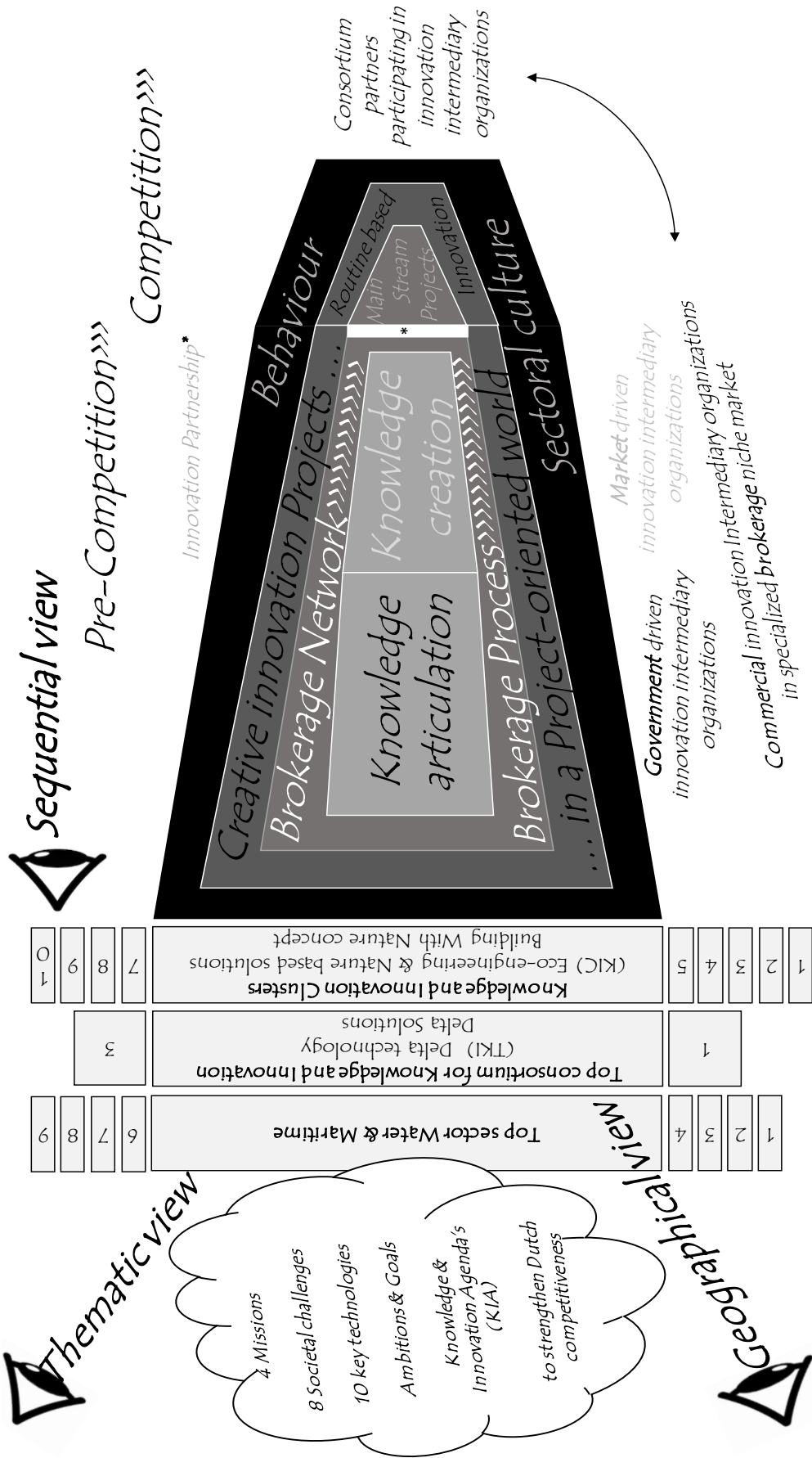
See next two pages.



<b>Independent variable</b>		<b>Dependent variable</b>	
Value capture within innovation intermediary organisations.		Sustainable continuation of innovation intermediary organisations existence, enabling continuation of (perceived) positive impact on innovation outcomes of innovation ecosystem.	
+ →			
<i>To what extent can ‘capturing, maintaining and communicating the internal value of innovation intermediary organisations’ contribute to ‘improvement of their perceived added value within connected innovation ecosystems’?</i>			
<b>Theoretical concept</b>	<b>Practical construct</b>	<b>Items</b>	<b>Item specification</b>
<p>Each variable in the model was considered in three layers.</p> <p>I) internal value ‘within’ the innovation intermediary organisation and its ability to grow its internal value by inwards focus.</p> <p>E) (perceived) external added value of the innovation intermediary organisation in the innovation ecosystem served.</p> <p>C) communication about the added value of the innovation intermediary organisation for the innovation ecosystem served.</p>			
<b>BROKERAGE &amp; KNOWLEDGE – Output (or result) additionality</b>			
Brokerage	Brokerage network structure	<ul style="list-style-type: none"> <li>• Innovation ecosystems’ network dimensions.</li> <li>• Competition and reciprocal contact.</li> </ul>	<ul style="list-style-type: none"> <li>• Shared understanding and definition of sectoral boundaries.</li> <li>• National focus vs International focus i.r.t. “BV-The Netherlands”.</li> <li>• Internal mechanisms to map innovation ecosystems’ network dimensions.</li> <li>• Correct data about innovation ecosystems’ network dimensions.</li> <li>• Sectoral competition amongst innovation intermediary organisations</li> <li>• Sectoral competition with other organisation types.</li> <li>• Cross-sectoral contact between innovation intermediary organisations.</li> </ul>
Brokerage	Brokerage process	<ul style="list-style-type: none"> <li>• Visibility, brand awareness, accessibility, quality of interaction, past performance and reputation.</li> <li>• Interaction intensity level and future potential.</li> <li>• Density growth of networked connections within innovation ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>• Visibility &amp; Brand awareness; Familiarity with innovation intermediary organisations existence within innovation ecosystem.</li> <li>• Accessibility &amp; quality of interaction; Easy to find and pleasant in contact.</li> <li>• Past performance &amp; reputation; Feeling connected and feeling of trust, impartiality &amp; credibility.</li> <li>• Interaction intensity level &amp; Being actively approached for (new) connections.</li> <li>• Level of dependence on single actors networks; company versus person.</li> <li>• Future potential; successful internal business processes for brokerage.</li> <li>• Density growth of networked connections within innovation ecosystem.</li> </ul>
Knowledge	Individual knowledge	<ul style="list-style-type: none"> <li>• Involvement in new knowledge created by self and others.</li> <li>• Availability of knowledge and knowledge management &amp; sharing (systems).</li> <li>• Knowledge effect (<i>kennisdoorwerking</i>); knowledge growth within innovation ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>• Active search for new knowledge created by others.</li> <li>• Actively creating new knowledge by self.</li> <li>• Access to appropriate (weak tied) knowledge and information relevant to innovation process.</li> <li>• Internal knowledge management &amp; sharing (systems).</li> <li>• Being approached regarding available or accessible knowledge.</li> <li>• Growth (and application) of individual knowledge within innovation ecosystem.</li> </ul>
Knowledge	Knowledge Articulation	<ul style="list-style-type: none"> <li>• Uncovering future knowledge (types) needs.</li> <li>• Involvement in strategy &amp; policy regarding future knowledge (types) needs.</li> </ul>	<ul style="list-style-type: none"> <li>• Internal mechanisms in place for uncovering ‘(future) needs regarding specific knowledge (types) within innovation ecosystem’.</li> <li>• Co-creation with research institutes or universities regarding research planning.</li> <li>• Internal mechanisms in place to determine strategy &amp; policy regarding ‘creation of new knowledge within innovation ecosystem’.</li> <li>• Co-creation with governmental policy makers or research councils regarding research planning.</li> </ul>

<b>Independent variable</b>		<b>Dependent variable</b>	
Value capture within innovation intermediary organisations.		Sustainable continuation of innovation intermediary organisations existence, enabling continuation of (perceived) positive impact on innovation outcomes of innovation ecosystem.	
+ →			
<i>To what extent can ‘capturing, maintaining and communicating the internal value of innovation intermediary organisations’ contribute to ‘improvement of their perceived added value within connected innovation ecosystems’?</i>			
<b>Theoretical concept</b>	<b>Practical construct</b>	<b>Items</b>	<b>Item specification</b>
Each variable in the model was considered in three layers. I) internal value ‘within’ the innovation intermediary organisation and its ability to grow its internal value by inwards focus. E) (perceived) external added value of the innovation intermediary organisation in the innovation ecosystem served. C) communication about the added value of the innovation intermediary organisation for the innovation ecosystem served.			
<b>GETTING THINGS DONE – Output (or result) additionality</b>			
Projects	Creative innovation projects in a project-oriented world.	<ul style="list-style-type: none"> <li>Enabling successful initiation and management of creative innovation initiatives and organizations (or movements).</li> <li>Being an active and explicit partner in innovative projects.</li> </ul>	<ul style="list-style-type: none"> <li>Actual focus on pre-competition-phase of building process.</li> <li>Variety of organisational types participating in inter-organisational collaboration.</li> <li>Shared strategic inter-organisational purpose; focus on a common goal.</li> <li>Innovation/business process management in place, enabling successful initiation and management of creative innovation initiatives and organizations (or movements) in a project-oriented world.</li> <li>Sectoral regulatory pressure.</li> <li>Workability with imposed requirements and demands imposed by available subsidy programs.</li> <li>Employability of legal-cooperation-forms and utilized-contract-types.</li> <li>Being actively and explicitly approached regarding (pilot) project initiation &amp; coordination.</li> <li>Being actively &amp; explicitly approached as ‘unique project partner or team member’ in newly emerging and temporary (pilot) organizations (or movements).</li> </ul>
Projects	Routine based innovation	<ul style="list-style-type: none"> <li>Being an active and explicit partner in routine projects and improvements.</li> </ul>	<ul style="list-style-type: none"> <li>Involvement in predictable and incremental (knowledge) projects/tenders.</li> <li>Application of existing/proven knowledge in routine tenders/projects.</li> <li>Becoming ‘a regular (knowledge) partner’ of innovation ecosystem members for day-to-day predictable and incremental improvements.</li> </ul>
<b>BEHAVIOURAL CHANGE (by members innovation ecosystem) – Behavioural additionality</b>			
Behaviour	Individual behaviour in day-to-day practice	<ul style="list-style-type: none"> <li>Ability to collaborate inter-organisationally.</li> <li>Strategic repositioning within innovation ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>Familiarity with sectoral culture; context awareness &amp; sensitivity, customs, stakes and force-fields</li> <li>Organizational self-awareness; ability to correctly explicate own identity and positioning in sector.</li> <li>Ability to collaborate inter-organisationally; Required means (€), mandates and necessary skills.</li> <li>Attitude towards inter-organisational collaboration; Mind-set and willingness.</li> <li>Strategic repositioning within innovation ecosystem / sector; Required means (€) and necessary (communication) skills.</li> </ul>
Behaviour	Inter-organisational collaboration in day-to-day practice	<ul style="list-style-type: none"> <li>Actual inter-organisational collaboration.</li> <li>Reaction to new opportunity and failure.</li> </ul>	<ul style="list-style-type: none"> <li>Governmental recognition and supporting-sectoral-policies for establishment and continuation of innovation intermediary organisations.</li> <li>Cultural acceptance in sector of ‘innovation intermediary organisation concept’ in respect to inter-organisational collaboration.</li> <li>Actual (ongoing) inter-organisational collaboration and variety of organisational types represented.</li> <li>Actual (pro-active) anticipation on new opportunity for inter-organisational collaboration.</li> <li>Attitude and consequential action towards mutual learning from and improving by failure in context of inter-organisational collaboration.</li> </ul>

# Appendix III - Sectoral innovation route map - A birds eye view



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