Tampere University

Hanna Rekola

PRODUCING URBAN ECOSYSTEM SERVICES WITH STAKEHOLDERS

Faculty of Management and Business
Master's Thesis
March 2021

ABSTRACT

Hanna Rekola: Producing urban ecosystem services with stakeholders
Master's Thesis
Tampere University
Master's degree programme in responsible business
March 2021

Climate change is already impacting our habitat. In addition to restraining the climate change on proceeding people need to start adapting to inevitable changes that climate change will bring. Increasing storm waters in urban habitat is one of the consequences caused by climate change. There are natural ways to manage those increasing storm waters in our urban habitat, but the practice of producing these is relatively young. Using natural ways of managing storm waters increases the diversity of urban ecosystems as well. Previous research calls for more multidisciplinary research on ecosystem service production in collaboration with stakeholders. Stakeholder involvement in ecosystem service productions needs to be researched to figure out who can benefit from the ecosystems and what would be the best practices to produce and govern the ecosystem service. The purpose of this study is to increase understanding on the role of stakeholder involvement in producing natural and urban ecosystem services and what kind of values it creates to stakeholders or to the process.

Case projects used in this study shows three different processes of producing urban and natural storm water management systems. Main characteristics for three different processes are pilot, flagship and mundane. There were six interviews conducted for eight different persons who were the key persons involved in the cases. Using qualitative content analysis, this study recognizes key values generated for different stakeholders in all three cases. Theoretical background used in this study consists of previous research on stakeholder involvement in ecosystem service contexts and value co-creation. Using hierarchical value dimension framework, identified values are categorized to utilitarian values and hedonistic values. Utilitarian values are divided to functional values and economic values. Hedonistic values are divided to emotional values and symbolic values.

As findings in this study there are 12 key values identified. Functional values were learning, development and new routine and they were most essential values in the cases. Producing natural storm water management systems is a new practice globally and especially in Finland so it is natural and essential that testing and figuring out best practices is highlighted. Learning was also identified as a most missed value. Economic values were reference, business potential and monetizing. Private businesses are gathering reference to use in future offerings and there is a need to figure out costs for these kinds of projects. Emotional values were aesthetics, legitimation and community. They were mainly occurring at individual level and fostered personal values. Symbolic values were good example, imago and being green and they were occurring on individual and organizational level.

Findings in this study supports previous research on the subject and as previous research has already suggested there is still need for further research on this subject. Some of the values were also identified as missing values. With more systematic stakeholder involvement there could have been more learning and development between different stakeholders. Observing stakeholder involvement during the production of urban storm water production would offer a better understanding on the generated and missed values for different stakeholders. Including more private businesses and other potential private actors to the processes and research would generate understanding on present and future business potential that producing natural storm water management system has.

Keywords: Ecosystem services, Stakeholder involvement, Stakeholder engagement, Value co-creation, Values

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

Climate change is here, and it is starting to affect our urbanizing habitat. In addition to restraining climate change, cities will also have to adapt to changes that climate change and urbanization will inevitably bring. One of the many challenge's climate change is bringing is increasing amount of storm waters and pollution of waters followed by storm water flows (Bergström et al. 2011). Institutional innovation is required in creating new sustainable ways to manage the storm waters in cities. Natural storm water runoff systems are new and sustainable way to manage these increasing storm waters. (citywater.fi). In order to develop and construct these natural runoff systems we need research, pilots, good examples, courage and collaboration between different stakeholders.

Natural storm water runoff systems will also increase quality of the urban ecosystem and ecosystem services the nature provides to people (citywater.fi). Ecosystem services are natures complex systems and processes, which maintain human life and biodiversity. Human beings and ecosystem services are tightly linked together, and human well-being is dependent on functioning and sound ecosystems. (Daily 1997.) Ecosystem services provides goods such as food, and raw materials and services such as storm water management, waste assimilation, purification of air and water and climate regulation to name a few (Costanza et al. 1997).

Ecosystem services are divided to natural and human made ecosystem services. Human beings directly control various ecosystem services and nowadays almost all ecosystems are influenced by human activities. (Vitousek 1997.) Urbanization, industrial revolution and human actions have had a damaging impact to the environment and thus to ecosystem services (Rockström et al. 2009).

Seppelt, Dorman, Eppink, Lautenbach & Schmidt (2011) are concerned about the arbitrary use of the term 'ecosystem service'. The term is established as a paradigm for

ecosystem management and attempts to promote the significance of the prosperity of the environment in decision-making and politics. The object of the term is to enhance sustainable use of environmental resources connecting social, economic and ecological aspects to human well-being. (Hiedanpää, Suvantola & Naskali 2010; MA 2005.) In environmental studies ecosystem services has been observed from many perspectives (Seppelt et al. 2011) but in organization studies the term 'ecosystem service' is underused and true effects on business activities to ecosystem services are marginally examined (Whiteman, Walker & Peregon 2013; Winn & Pogutz 2013).

According to Winn & Pogutz (2013) organization researchers has a responsibility to study how organizations can manage to operate in such a way that their actions do not destroy the life-supporting foundations provided by nature. Both Winn & Pogutz (2013) and Whiteman et al. (2013) are calling for multidisciplinary cooperation between organization and environmental researchers to study the true effects of business activities to ecosystem services. Although the corporate environmental responsibility and the business-nature relationship has gained wide attention in organization studies, multidisciplinary research is still needed to combine the knowledge from business activities, economical motivations and human behavior to the measurable data from the environmental studies to accomplish comprehensive data on true effects and deepen the understanding on business-nature relationship (Whiteman et al. 2013; Winn & Pogutz 2013).

Scientist and researchers have worked on trying to prove social and economic values and business potential of ecosystem services to be considered in political, economic and commercial decision-making (TEEB 2010). Seppelt et al. (2011) has suggested that research and discussion about ecosystem services should be examined through some of the following four methodological facets: (1) biophysical data, (2) local trade-offs, (3) off-site effects and (4) stakeholder engagement. Stakeholder engagement is seen as a tool to connect human well-being to ecosystem services. Stakeholders help to identify relevant ecosystem services and re-evaluate appropriate indicators. By ranking the importance of ecosystem services the stakeholders evaluates possible management options. (Lopez & Videira 2016). Seppelt et al. (2011) claims that it is a common misconception that stakeholder engagement leads to better commitment to made

decisions about ecosystems and more environmentally sustainable strategies. But the research on stakeholder involvement in context of ecosystem services is just in its infancy (Seppelt et al. 2011) and more research about engaging stakeholders into ecosystem services is needed (Hein et al. 2006; Lopez & Videira 2016).

As we increasingly demand more responsibility and actions from private companies, the lack of obvious business benefits in building natural storm water runoff systems demands cooperation with political decision makers, public institutions and private companies. We are slowly incorporating our dependency on nature also in economic policies and understanding that we can have economic development, create new jobs and keep Nature's system intact (Juniper 2013). Restricting climate change and adaptation to new circumstances are supporting strategies to encounter climate change (Bergström et al. 2011) and these kinds of actions are now needed.

The term to define stakeholder involvement is not established in the field of stakeholder research in environmental studies nor in business studies. Other terms to define the subject are stakeholder engagement (eg. Greenwood 2007) and stakeholder participation (eg. Reed 2008) etc. Stakeholder engagement might be the most common term in use, but stakeholder involvement is used in this study. Reasoning to use involvement rather than engagement for instance is semantic. The term involvement enables describing the cooperation between primary actor and its stakeholders more broadly and freely. The term itself doesn't define the nature of the cooperation too strictly so it can be used in both to describe more voluntary cooperation and cooperation that is based on agreements or obligations. Stakeholder engagement delimits the nature of cooperation to be too obligatory whereas stakeholder dialog can be interpreted such that the stakeholders are only heard in the cooperation but not necessarily considered as a serious decision-making partner. Involvement is the term I choose to use since it also allows more voluntary participation from the stakeholder point of view. The relationships between different stakeholders reviewed in this study are rather obligatory and based on agreement but since there are other stakeholders involved whose obligations are more consultative and voluntary, the term involvement is more suitable in the broader context of this study and it can be used to describe different forms of stakeholder cooperation that took place in the cases used in this research. Where the

term ‘involvement’ has its benefits it also has limitations for the same reasons. The term itself doesn’t bring any descriptive value to the form of stakeholder cooperation, but that limitation is accepted in this study.

Runoff water is the flow of water that outcomes from rain, storm or melting snow. Some of the water stays on the surface of the ground, before it absorbs into a soil or flows into the waters. Runoff management system is the surface, plants and soils that the water is in touch before it absorbs in the surface. They are important ecosystems to manage these waters. In urban areas, where the soil is vastly coated with concrete or pavement, runoff waters needs a runoff management system where the waters are controlled and directed to a wanted destination. While the runoff waters run in the ground surface it can be contaminated with pollution, salt, oil and other impurities from the ground. Runoff waters spreads the impurities and takes them to the final waters they flow, which can be seas, lakes, rivers, rapids, water tables etc. These runoff waters need to be managed and purified so that they won’t defile the waters and water table. (Bergström et al 2011; vesi.fi).

There are three, human made natural storm water runoff systems as cases in this research. One in Vuores Tampere, one in Metsälä Helsinki and one in Vantaa. All three cases were different and the process and objective on building them was different. Vuores can be seen as a flagship project for these kind of natural runoff systems and it was built to a new neighborhood that also acted as a housing fair. Metsälä runoff system was a pilot project to test if the quality of waters can be improved with natural biofiltering methods and estimate costs for such projects. Vantaa runoff system was more of a mundane assignment and doing “business as usual”. The cases are introduced in more detailed in chapter three.

1.2 Objective of the study

The objective of this research is to construct understanding on how ecosystem services are produced with relevant stakeholders and what kind of values it creates to stakeholders and the process. In previous research, ecosystem co-production, ecosystem beneficiaries and best practices for governing ecosystems has been

recognized as an area of study requiring further research (Bennet et al. (2015, 76). This study aims to build on some understanding regarding all mentioned needs.

The research questions are:

1) What kinds of values does the stakeholder involvement generate when producing urban storm water runoff systems?

2) How are values generated in stakeholder involvement in producing urban ecosystem services?

The examination concentrates on stakeholder collaboration and the values the collaboration provides to natural storm water runoff system production. Empirical data is gathered from three storm water management systems build in Vuores Tampere, Metsälä Helsinki and Kolmikallionpuisto Vantaa.

The questions will be answered by analyzing empirical data collected by interviewing relevant stakeholders of the ecosystem services in question and from documentation that is accumulated during the processes of building these storm water runoff systems. The findings of this study help us better understand how stakeholder involvement could be utilized most effectively to get the most values out of the processes on involving stakeholders in building storm water runoff systems.

The theoretical part gathers literature on stakeholder involvement and value co-creation especially in environmental projects. Literature about stakeholder involvement techniques is a vast area and this study mainly concentrates on a literature about stakeholder involvement in the context of ecosystem services production or conservation or has specifically formulated to be used in environmental context. Also, a framework of value dimensions by Rintamäki, Kuusela and Mitroinen (2007) is introduced and that framework is used to categorize the findings of this research.

This research is a part of an interdisciplinary research project business to nature (B2N) at the university of Tampere. “The aim of the B2N research project is to understand

how business-stakeholder-nature relationships evolve and contribute to value creation in the process of generating new ecosystem services" (b2n.fi).

1.3 Research design and report structure

The process for this study started with familiarizing existing literature on the stakeholder involvement in ecosystem services. After conceptualizing the theoretical outlook needed for this study the collection of the empirical data begun. After the interviews and collecting the empirical data, started a deep dive to the material alongside crystalizing the theoretical framework. The theoretical framework needed adjustment in every step of the research process. The research process is visualized in figure 1.

Figure 1 Research process

This report has five different chapters. The first chapter presents the background, key concepts and objective for the study. The subject on this study is defined in collaboration with the research project B2N - Business to nature. The research project is a multidisciplinary project between organization studies and environmental politics. This study focuses on the stakeholder involvement and value co-creation of producing urban ecosystem services. Earlier studies are calling for multidisciplinary research on this subject matter (eg. Whiteman et al. 2013; Winn & Pogutz 2013).

The second chapter introduces the theoretical framework used in this study. Theoretical framework consists of two main lines, stakeholder involvement and value co-creation. Both main lines of theory are presented in a context of ecosystem services creation. Third chapter presents the methodology for conducting this study and the cases used in this study are also introduced in the third chapter. Material for the cases are collected from the interviews and documentation (minutes of meeting, e-mails, websites etc.).

Fourth chapter presents the findings of this study. Findings are categorized using the theoretical framework introduced in the second chapter. Chapter five concludes the findings and presents the theoretical and practical implications of this study. Also, critical examination of the study is presented in the fifth chapter.

2 STAKEHOLDER INVOLVEMENT AND VALUE CREATION

2.1 Stakeholder Involvement

2.1.1 Who are the stakeholders?

Stakeholder theory presents a different kind of approach for doing business. Idea is that businesses should always consider the stakeholders not just the shareholders when they are evaluating the effects on their decisions. It is a convenient tool to assess the process in producing urban storm water systems including private and public organizations and other stakeholders. Greenwood (2007) highlights a point that stakeholder engagement is seen as a positive and an essential part of corporate responsibility as a default. She argues that stakeholder engagement is a morally neutral practice and not positive or negative itself.

In business research the classic definition for a stakeholder is that for a business the stakeholders are those individuals and groups who affect or can be affected by the business operations (Freeman 1984). Ecosystems also have their stakeholders. For ecosystem services the stakeholders are the individuals, organizations and groups who has an interest to utilize, use, control or benefit from the ecosystem service. Or those who are affected by the ecosystem services directly or indirectly. (Hein et al. 2006; TEEB 2010.) Hence the businesses operating with ecosystem service should consider the stakeholders for both, themselves and the ecosystem service.

A broadened stakeholder analysis indicates that stakeholders can be empowered to influence a decision-making process and not just to be considered in the decision-making process. This enriches and complicates the classic definition of a stakeholder approach. (Reed, Grave, Dandy, Posthumus, Hubacek, Morris & Stringer 2009.) Normative approach for stakeholder analysis recognizes that different stakeholders

might have different interests on the same common problem, and it is important to understand these differences in order to agree on actions (Reed et al. 2009).

After decades of debating the position of nature as a stakeholder for a company is nowadays not quite self-evident, but widely recognized among stakeholder theorists (see eg. Laine 2010; Driscoll & Starik 2004). In this study nature has a position as a stakeholder by default.

2.1.2 Stakeholder involvement

Greenwood (2007) mentions, stakeholder involvement can exist in many different forms and can be analyzed from many different theoretical points of views. Stakeholder involvement as a subject is very familiar in the matter of corporate responsibility studies, but it is not agreed whether stakeholder involvement always has or hasn't moral dimensions or can it be morally unbiased. Stakeholder involvement must be seen closely related to corporate responsibility but still as a separate function and not necessarily related to corporate responsibility. (Greenwood 2007, Noland & Phillips 2010.)

There is not one single accepted concept evolved to describe stakeholder involvement especially in environmental purposes. There are concepts like stakeholder participation, stakeholder dialogue, stakeholder collaboration and stakeholder engagement, which are used to describe and observe same kinds of actions and techniques to involve stakeholders into decision-making processes. According to Greenwood (2007) the 'more is better' is not the best way to enforce stakeholder involvement and it is too often misunderstood that way. There is very little empirical evidence that participating stakeholders to the process of environmental decision-making would bring real benefits. Usually the studies concentrate on the process rather than the outcomes. (Reed 2008.)

Stakeholder involvement can have many forms and it can be used only as a facade for responsible actions in processes. World Bank (1997) defines stakeholder participation as "a process through which stakeholders influence and share control over development

initiatives and the decision and resources which affect them". This view is also paradigm or an objective for vast amount of corporate responsibility research (eg. Luyet 2012). According to Reed (2008) the success of stakeholder engagement is highly dependent on the nature of the project. Observing stakeholder engagement, the emphasis should be on the participation as a process rather than focusing on the selected tools to carry out the stakeholder engagement (Reed 2008).

In this research the moral premise of the stakeholder involvement is not evaluated. Some stakeholder involvement happened in the cases "because it was a right thing to do", but mainly the nature of involving stakeholders were consultative and morally neutral. For most of the stakeholders the well-being of nature and ecosystems was a personal value so indirectly the nature of stakeholder involvement in context of this research has a heavy moral dimension on a personal level.

Haddaway, Kohl, da Silva, Schiemann, Spök, Stewart & Wilhelm (2017, 1) indicates that stakeholder involvement can bring many different values to environmental projects including, "improving the evidence base, greater public acceptance, higher likelihood of intervention success, wider communication of findings and increased likelihood of impact on decision-making".

2.2 Value creation in ecosystem service building

2.2.1 Ecosystem services and stakeholders

Despite of wide range of studies about ecosystem services, common people, policy makers or even the relevant stakeholders in question do not understand the meaning of the term ecosystem services (Thompson, Kaiser, Sparks, Shelton, Brunden, Cherr & Cebrian 2016). The concept of ecosystem service links human beings and nature tightly together and acknowledges that human well-being depends on functioning and healthy ecosystems (Daily 1997). Ecosystems should be conserved and sustained so they can support human well-being and human well-being is usually seen as a driver to conserve and support ecosystem services (Menzel & Teng 2010; Seppelt et al. 2011). The most well-known classification of ecosystem services is from Millennium Ecosystem

Assessment (MA) (2005) It divides the services into four categories: (1) provision, such as fresh water, raw material and food, (2) regulation, such as air regulation, flood mitigation and erosion prevention, (3) cultural, such as recreation, religious and educational values and (4) supporting services, such as nutrient cycling and photosynthesis. Hein et al. (2006) divides ecosystem services in to three categories based on what kind of values they provide to human beings: (1) production services, such as food, fuel, fiber and medicinal resources; (2) regulation services, such as climate regulation, regulation of ground water flows, pollination and purification of water and air; (3) cultural services, such as cultural and historical heritage, scientific and educational information, recreational use and tourism attraction. In this division the supporting services offers a basis for all other services as it enables nature to function (Hein et al. 2006).

Production of ecosystem services happens in a complex social–ecological interplay and therefore cooperation is needed between social and natural sciences (Bennet et al. 2015). Stakeholders can be providers, beneficiaries or degraders of ecosystem services and involving stakeholders to ecosystem service projects helps to identify the "real" opportunities and motivations to use ecosystem services (Rode, Wittmer, Emerton & Schröter-Schlaak 2016). Bennet et al. (2015) claims that we still have too little understanding about the diversity of stakeholders and their role and motivations for certain ecosystem services. Different stakeholders have different interests regarding different ecosystem services depending their values, cultural background and their opportunity to use and impact the service (Hein et al. 2006). We still don't understand the distribution of benefits to different stakeholders of ecosystem services. In order to do so we should examine the different stakeholders involved and relationships between them. We need to understand the diversity of stakeholders and their preferences. Why they use ecosystem services and what are the potential social conflicts that can arise from different stakeholders using a particular ecosystem service. (Bennet et al. 2015.)

Ecosystem services are rather largely examined from an economical point of view where values of different alternatives are weighted (TEEB 2012). To economically value ecosystem services, identifying relevant stakeholders is critical (Hein et al. 2006). To understand the values of ecosystem services to different stakeholders we need to

identify the stakeholders in question and their capabilities, value-systems and preferences toward a specific ecosystem service (Bennet et al. 2015). Also, prioritization of different stakeholders involved based on their degree of influence and dependency on ecosystem service should be identified (Hein et al. 2006). Understanding the stakeholder preferences and motivations will help us to understand and prepare to the possible conflicts between the stakeholders involved. We also do not understand the preferences and access of different stakeholders that drives to producing ecosystem services nor how specific services contribute to human well-being (Bennet et al. 2015)

Usually in the stakeholder literature stakeholder participation is seen as an asset to improve processes and operations (Reed et al. 2009). Attention is usually paid in stakeholder conflicts and the benefits that involving stakeholders bring to processes (Luyet et al. 2012). Also, in ecosystem services production and conservation proclaims the need for involving stakeholders in ecosystem services management to improve the decision-making and commitment to made decisions (Hein 2006, Lopez & Videira 2016). Reed et al. (2009) argues that enabling different stakeholders to learn by sharing and validating their understanding of the situation enables sustainable management of ecosystem services. Just doing the stakeholder analysis doesn't bring any additional value itself but stakeholders should be given a platform to negotiate and share what they have learned.

Businesses have a significant role in destroying the biodiversity and ecosystems and they experience increasing pressure from stakeholders to reduce the negative effects companies have on the environment (Houdet, Trommetter & Weber 2012). Population growth, urbanization, economic growth, ecosystem decline, politics, environmental policies and information and technology development all contribute to loss in biodiversity and the weakening of ecosystem services. The loss in biodiversity and ecosystem services are linked to all other ongoing trends and to change the course of action to be more sustainable it needs an integrated business response. Businesses can associate risks or opportunities to decline in ecosystem services. Risks can relate to company's effects on biodiversity or the company's dependency on a specific ecosystem service or indirectly for example through supply chain (TEEB 2012).

Ecosystem services can also provide new business opportunities. Most obviously when companies are selling goods and services directly associated to an ecosystem, such as fishery or nature-tourism (TEEB 2012). The ongoing climate change requires new ways to develop urban planning and increase producing management system to increasing storm waters. Natural storm water runoff systems would be a sustainable way to manage the increasing amount of storm waters.

Luyet et al. (2012) have gathered a state-of-the-art overview on methods to implement stakeholder participation and the benefits or values stakeholder involvement can bring to environmental projects. They argue that in order to involve stakeholders as best possible way the stakeholders need to be identified, characterized and organized. After identifying relevant stakeholders, a relevant technique to involve a specific stakeholder should be selected based on the participation need. Involving stakeholders in an irrelevant way may conclude to unwanted results inducing risks to the whole project. (Luyet et al. 2012). Based on Luyet et al. (2012, 214), involving stakeholders wrongly might cause following risks to the projects.

- Expensive process
- Time consuming process
- Potential stakeholder frustration
- Identification of new conflicts
- Involvement of stakeholders who are not representative
- Empowerment of an already important stakeholder

Based on Luyet et al. (2020, 214), following benefits can occur when stakeholder involvement is implemented reasonably and properly.

- Better trust in decisions
- Improving project design using local knowledge
- Better understanding projects and issues
- Integration of various interests and opinions
- Optimizing implementation of plans and projects
- Public acceptance of the decisions

  Fostering and developing social learning

2.2.2 Value dimensions

Value co-creation describes collaboration, behavior, interaction, interpretations and experiences between different stakeholders (Ranjan & Read 2016). Value co-creation is a rather new term to define that relativistic value that occurs between people and situations (Anderson et al. 2006).

Customer value is a traditional concept in marketing studies. It is widely used to measure weather organizations can gain competitive advantage on their actions and to identify those actions that would give a competitive advantage for the organization. Customer value is a key strategic indicator for measuring present and future competitive advantage. Concept of customer value is experiential and relativistic between people and situations. (Anderson et al. 2006; Rintamäki, Kuusela & Mitronen 2007).

Rintamäki, Kuusela & Mitronen (2007) have formulated a framework to identify hierarchical dimensions of customer value in retailing. Although customer value is completely defined from a customer point of view (Anderson et al. 2006), the framework is applicable in reviewing value in more holistic and objective point of view. The framework provided by Rintamäki, Kuusela and Mitroinen (2007) offers an interesting viewpoint to examine value as a separate object that benefits the processes, nature and unspecified stakeholders. In marketing research customer value is used often in the context of examining the competitive advantage. Customer value and competitive advantage as concepts are seen to be interrelated but separate from each other. Rintamäki, Kuusela and Mitroinen (2007) state that "competitive advantage and customer value are linked through value delivery (or value creation)". As the framework is implement in this research, customer value and competitive advantage can be interpreted as a united concept as the value delivery or value creation. It doesn't matter where the value is disclosed or who is experiencing the value or weather any person is even experiencing any value. Value is seen as an objective concept that fosters any actions, doings, processes, etc.

Rintamäki, Kuusela and Mitroinen (2007) divides value in four hierarchical dimensions: economic, functional, emotional and symbolic. Economic and functional

values are categorized as utilitarian values and emotional and symbolic values are categorized as hedonistic values. Hierarchical order in the framework goes from more objective and concrete to more subjective and abstract, from utilitarian values to hedonistic values.

Utilitarian value dimensions

Utilitarian value dimensions result from cutting down sacrifices: reduced prices, time and effort savings and contributions to better decisions are divided as "economic value" and "functional value". Economic value can be defined as "the best tradeoff between quality and price" and these values are rational, goal-oriented, task-oriented and defines the monetary worth of something. Economic values are usually primary drivers for consumers in decision making. (Rintamäki, Kuusela & Mitroinen 2007).

Functional values can be defined as savings in the process as time savings, better quality, convenience and effortlessness. When there is a need to investigate the most convenient solution for functional, utilitarian or physical performance. Functional value is about figuring out the right solutions and minimizing physical or cognitive efforts. (Rintamäki, Kuusela & Mitroinen 2007).

Hedonistic value dimensions

Hedonistic value dimensions follow more from subjective and abstract side of individuals and is related to their personality and expression. Hedonistic values are divided to "emotional value" and "symbolic value". Emotional value can derive from motivation, experience and feelings and they are experienced, pleasing and have absolute value for individuals. (Rintamäki, Kuusela & Mitroinen 2007).

Characteristics for symbolic values are that they stand for something, they have a meaning and it allows self-expression. Symbolic values represent something, and they are attached to self and usually communicated to others. Those values have a positive meaning and sacrificing on personal symbolic values can result as negative meanings.

Symbolic values are not as obvious and self-evident than utilitarian values. (Rintamäki, Kuusela & Mitroinen 2007).

These value dimensions are used in this study to categorize the values identified in the data. Although value creation is a secondary concept in the framework created by Rintamäki, Kuusela and Mitroinen (2007) and customer value and competitive advantage are the primary concepts, value creation applies better for the purpose for this study. To summarize the discussion on the framework, value creation can:

- increase productivity on a process
- increase revenue or lower costs for different parties
- build on competencies or resources on the area of substance
- foster wellbeing or conscience of individuals or nature
- foster wellbeing and diversity of nature

3 METHODOLOGY

3.1 Cases

There are three, human made natural storm water runoff systems as cases in this research. One in Vuores Tampere, one in Metsälä Helsinki and one in Vantaa. The function of natural storm water runoff systems is to clean the running water on the ground. The key idea in the storm water runoff system is that they combine nature and urban environments. The processes of building three separate structure are all different from each other. Cases for this study were selected within the research project B2N - Business to nature. In this chapter I present the overview on different cases. Introductions are based on the interviews and documentation. There was no specific method to identify nor prioritize different stakeholders in the cases. Stakeholders were identified based on the interviews and then based on the number of mentions in the interview they were considered in the analysis. In this chapter I present all the stakeholders per case, but the final analysis is combining the cases and stakeholders as one subject where single case or stakeholder can be still separated.

Metsälä

Metsälä is in Helsinki central park and an industrial area in Pasila was one reason why storm water structure was built in Metsälä. There was pollution draining from the industrial area to Metsälä area in central park. Storm water management system in Metsälä was a pilot project for natural runoff structures in Helsinki. Citywater initiative (2012 – 2015) was behind building the Metsälä runoff system. Citywater initiative was co-funded by the European Comission Life+ funding instrument, the Finnish Ministry of the Environment and its partners, the city of Helsinki, city of Turku, Tallin city and Tallin University. The objective of the project was to calculate costs for this kind of project and to study and test the quality of the water in the nearby river and research the effects of the natural storm water management system on the water quality. The Finnish Environment Institute was in charge of the project and funding for the project came from European Union and city of Helsinki. Metsälä was the first natural storm

water management system that uses biofiltering built in Helsinki. Initiatives for the whole project were climate change followed by increased waters, exponential urbanization, storm water strategy for city of Helsinki and personal interest for the persons involved in the project.

FCG was the company that designed the structure. The designer for the structure was selected based on normal procedure within framework agreement. Project was implemented in cooperation with Urban Environment Divison of city of Helsinki (previous city engineer's office of city of Helsinki, HKR). Stara was the constructor of the structure and some other miscellaneous actors were involved such as Suomen niittysiemen Oy delivered the plants and the seeds for the structure. Natural Resource Institute of Finland (Luke) wasn't formally involved on the project but they did own research about the plantations. There were few events organized for residents, resident associations and other interested parties e.g. Virho, which is an association to protect running waters. Identified stakeholders are listed in the list below.

Identified stakeholders for this study for Metsälä

- The Finnish Environment Institute (YKE)
- City engineer's office of city of Helsinki (HKR)
- FCG
- Stara
- Suomen niittysiemenseos Oy
- Natural Resources Institute Finland (Luke)
- Residents (Maunula, Haaga etc.)
- Virho

Vuores

Vuores is an area in Tampere that held a housing fair in 2012. The natural storm water management system in Vuores can be seen as a flagship structure in Finland. Aesthetics played an important part in designing the structure. Vuores also had more budget than Metsälä. German company Dreiseitl created the general plan for the area and then FCG created the more detailed plan for the structure. At the design phase there were no residents yet living in Vuores so they didn't held any events for the locals. Vuores has

its own website and they are using the ecosystem service as a means of marketing and calling the storm water management system as a service. The following quote is from the Vuores website (vuores.fi).

> ”Storm water of Vuores are handled naturally in a wide central park area. The design for the park is done by a German company Atelier Dreiseitl. Alongside the walking routes there are, storm water ponds, water channels and flood meadows.”

> ”Laajassa keskuspuistossa käsitellään Vuoreksen sade- ja valumavesiä eli hulevesiä luonnonmukaisella tavalla. Keskuspuiston suunnitelma on saksalaisen Atelier Dreiseitlin käsialaa. Puiston kävelyreittien varrella on hulevesialtaita, vesiuomia ja tulvaniittyjä.”

The storm water system in Vuores is a 17-hectare wide area including greenpark, basin, depressions and squares. Constructions of the greenery started in 2008 and the revision continues. City of Tampere is in charge maintaining and conserving of the area and the need for maintenance work is at least twice a year. The area has a central recreational value for residents. (Heinonen, Toivonen, Eitsi & Bossmann 2016.)

Identified stakeholders for this study for Vuores

- City of Tampere
- Dreiseitl
- FCG
- Different experts (water engineer, soil engineer, maintenance, parkland engineers)
- Nearby school
- Residents

Kolmikallionpuisto

The natural storm water management system built in Vantaa Kolmikallionpuisto was a normal and mundane project ordered by city of Vantaa. The design work started at 2013 and 2014 started the construction. FCG created the designs and Hyvinkään tieluiska Oy

was the constructor. Both companies worked within a framework agreement with city of Vantaa. There were no specific events organized or the residents. As a normal practice the handed-out newsletters about starting the project and cutting trees from the near forest. After the structure was ready, they held a walkthrough of the area, but there were only few people and mainly they didn't live at the area.

Identified stakeholders for this study for Kolmikallionpuisto

- City of Vantaa
- FCG
- Hyvinkään tieluiska Oy
- Vantaan energia (made sure that the structure fits under the power lines)
- Residents

3.2 Data collection

To study the stakeholder engagement in urban storm water projects 6 semi-structured interviews were conducted with key actors in 2016-2017. There were both group and individual interviews in the fields and indoors. In addition to interviews, documents such as call for offers, minutes of meetings and other related records were analyzed as well. Websites of the companies involved in the business for building storm water management systems and initiatives were also used as a material. At the beginning of the research the aim was to gain a comprehensive view on the processes and the actors operating in the processes. The interview material is described in table 1.

Table 1. Interview material

Interview	Interviewees (Anonymized)	Date	Length	Transcribed material
Metsälä	I1, I2	8.12.2016	68 min	29 pages
City of Tampere	I3, I4, I5	20.2.2017	135 min	27 pages
Vuores	I6	10.10.2016	111 min	26 pages
Kolmikallioinpuisto	I7, I8	8.12.2016	78 min	32 pages
FCG	I1	3.3.2017	91 min	24 pages

Finnish Environment Institute	I2	8.2.2017	78 min	17 pages

Stakeholders for the cases were identified from the interviews. There was no specific method to identify or prioritize different stakeholders nor was the stakeholders mentioned in the interviews questioned anyhow. It wasn't necessary for the characteristics of the study because the objective is to study the stakeholder involvement as the key actors describe it.

3.3 Qualitative content analysis

This study is executed using a qualitative content analysis method. Qualitative research aspires to formulate a holistic view of the studied phenomenon and it is a combination of different research approaches (Schreier 2014). The aim of content analysis is to describe and summarize the selected phenomenon (Tuomi & Sarajärvi 2009). Content analysis can be used when the aim is to describe individual's, group's, institution's or society's cultural models or social connections. In content analysis the data will be analyzed so the phenomenon can be compressed to a short and generalized form where relations between phenomena are exposed. The aim is to form a simplified depiction of the data and perceive meanings, intentions, consequences and context. (Janhonen & Nikkonen 2003). Using content analysis researcher can also test theoretical arguments to build on previous understanding of the issue (Elo & Kyngäs 2008).

Content analysis can be either inductive or deductive. When there is lots of previous research and the aim is to test previous theory, deductive analysis is useful. Inductive analysis is used when there are no previous studies, or the research field is fragmented, and the aim is to draw general conclusions from specific data. (Elo & Kyngäs 2008.) In inductive content analysis the qualitative data will be coded, categorized and abstracted. After this the categories will be grouped under more distilled headings to crystalize the understanding on the issue. The collected data will be classified into categories, words or phrases. The aim is to produce replicable and valid conclusions from data to enhance understanding on the issue and draw new theoretical insights and practical suggestions. (Elo & Kyngäs 2008.)

Sometimes a combination of both methods could be appropriate and that was the case in this study. Deductive analysis is relevant when researcher wants to test existing data in a new context. It could test earlier categories, concepts, models and hypothesis (Elo & Kyngäs 2008). The objective of this research is to evaluate three different processes of producing natural storm water management systems and the value co-creation with stakeholder involvement. As the base for the analysis there are theoretical framework consisting previous research on stakeholder in involvement and especially in ecosystem service production context. In addition, there is a framework used, created by Rintamäki, Kuusela & Mitroinen (2007), to identify and evaluate different value dimensions.

In this research the first round of analysis was done inductively without theoretical lenses. On first round there was no trying to find any connections to the literature but rather the goal was to find meaningful features of relevant mentions about stakeholder involvement and value creation. The second round of analysis also followed the inductive content analysis method to code and categorize findings. In the second round, similarities were connected, and the categories were abstracted. In the first round of analysis only the Metsälä case was analyzed. There were eight (8) frames recognized. Those frames were learning, good example, reference, being green, commitment/integration, ethical, development, business. The categories were used as a template to find similarities, differences and complementary data when analyzing cases Vuores and Kolmikallionpuisto. After analyzing the remaining cases there was three (3) new frames: routine, imago, better processes.

Between second and third round of content analysis theoretical framework developed to its final shape. The final theoretical framework combines literature on stakeholder involvement in ecosystem service projects and value co-creation. The third and final round of analysis followed deductive content analysis method. The findings were distilled and re-abstracted with the theoretical framework. Some of the frames were combined or deleted. After final round of analysis there was 12 frames left and all the frames were categorized with value dimension framework created by Rintamäki, Kuusela, Mitroinen (2007).

4 FINDINGS

4.1 Utilitarian values

4.1.1 Functional values

Although Rintamäki, Kuusela & Mitroinen (2007) positions economic value dimension as the most important and most influencing dimension, functional values can be defined improvements in the process such as time savings, better quality, convenience and effortlessness and they were most repeated and highlighted in all of the cases in this study. It is justified to state that they were the most essential values and therefore addressed first. Functional values in these cases were all related to learning and improvement somehow. They were explicitly aimed at and occurred during the projects. That is quite compatible finding with the purpose of the projects itself as they were pilots. The identified functional value links are **learning, development and new routine.** It was reasonable to distinguish this many different dimensions which are all related to learning and improving. Different levels of different functional values related to development are all related and crucial on creating these new kinds of ways managing the urban storm waters. For private businesses it would be important to be part of the evolution of finding new routines that I represent in this chapter. Those who have the know-how will win the offers for the future projects. Below figure (figure 2) shows the relation between these functional values and following in this chapter I describe all the different value links under functional value dimension.

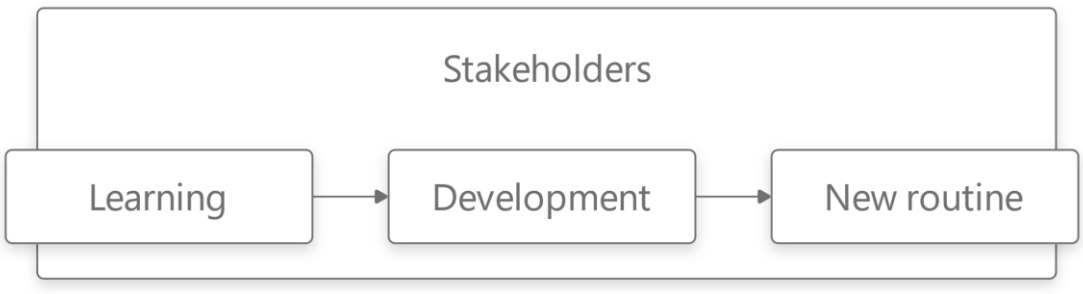

Figure 2. Process from learning to New routine

Learning was the most essential value that occurred for every stakeholder involved in these projects. It was repeatedly mentioned in all the interviews. The design company took the project in Metsälä even if they knew they wouldn't get enough money out of the project. They made the offer and took the project to learn more about building these natural storm water management systems. Initiative for participating in the project was personal interest and learning but it was also seen as a future business potential so not making so much profit on the project was considered as an investment. The following quote demonstrates this.

> "Because this was an interesting pilot object [laughing]. There was not that much money but…" (I1)

> "Koska tää oli kiinnostava pilottikohde [naurahtelua]. Rahaa ei ollu niin paljon mutta" (I1)

The premise for building the storm water management system in Metsälä was learning, piloting and testing. A lot of learning happened on the technicalities and tools to produce the storm water management system. That was also the explicitly mentioned that it was the wanted outcome in the Metsälä case but the same value appeared in other cases also. The following quotes demonstrates this.

> "..we realized that if the storm water management structure cannot use any basic soil or something, because there is too much nutrients and they will move further away" (I6)

> "tajuttiin... jos on niinku hulevesirakenne niin ei saa tota, ihan perus mitään noita niinku, multaa käyttääkään että, siinä on sitten liikaa ravinteita ja ne lähtee eteenpäin" (I6)

> "Well, actually now afterwards we have pondered whether these settling ponds should be stony. At least Vantaa maintenance has said that the suction dredging

> is laborious job. Meaning, these could be plant based and those plants with solids could be digged out regularly and new plants could be planted.” (I2)

> ”No itse asias nyt on jälkikäteen aika paljon puitu sitä et kannattaaks näiden lasketusaltaiden olla kivisiä. Ku ainaki Vantaan kunnossapito on sanonu et se imuruoppaus on jotenki työläs, homma. Että nää vois olla ihan kasvipohjasia ja kaivaa ne kasvit pois säännöllisin välein sen kiintoaineksen kanssa ja istuttaa uudet kasvit.” (I2)

Learning best practices how to carry out the process was also an objective. Quite many interviewee mentioned that they wished there would have been more comprehensive and systematic stakeholder involvement during the processes. One learning outcome was to actually include stakeholders more systematically in future projects and study the implications. The following quotes demonstrates these findings.

> “But in a wider perspective some workshops would be good and that is what we are considering. We are updating our storm water strategy and the stakeholder involvement is one topic. And it is also so that it [stakeholder involvement] affects on the strategy or the outcome of the program. But it is a good way to communicate about the subject and increase awareness.” (I2)

> ”Mut sillee laajemmas mittakaavas varmaan jotkut työpajat olis, hyvä ja sitä me mietitään. Me ollaan nyt päivittämässä meijän hulevesistrategiaa ni just tätä sidosryhmien osallistamista. Ja se on tietenki siihen että se vaikuttaa siihen sen strategian tai sen ohjelman lopputulokseen mut se on myös tapa kertoa siit asiasta ja lisätä tietoo” (I2)

> ”It’s more like getting examples from a grassroot level an we could once test the whole process how, and what kind of actors are involved and how this works” (I1)

> ”Et se on enemmän sitä ruohonjuuritasolta lähtevää, et sit saadaan sitä esimerkkiä ja saadaan kokeiltuu semmonen prosessi kerran et miten, mitkä kaikki toimijat tähän kuuluu ja miten tää toimii.” (I1)

Learning was also shared between different stakeholders during the building processes already. The following quote demonstrates this finding.

> ”I was telling for the constructors, generally about the storm waters and about the storm waters that occur during the construction. We want to get the message forward that it important to manage the storm waters also during construction so that the solids couldn’t move forward.” (I6)

> ”noille rakentajille, et siellä mä olin kertomassa just näistä niinku, ylipäänsä hulevesistä ja sitten, niistä rakentamisen aikaisista hulevesistä, että se menis se viesti eteenpäin, että on tärkeetä, että sillonkin, niinku rakentamisen aikana, huolehditaan siitä hulevesien käsittelystä että ne ei, pääsis just se kiintoaines eteenpäin” (I6)

Designing the Metsälä project they learned a lot about building the storm water runoff systems and got a valuable reference from it since it is known that these kinds of solutions will be produced in the future a lot more.

Learning happened in organizations, offices and on personal level. Learning was also an explicit objective in most of the cases. Learning functioned as a driver for the Metsälä case. Learning happened also in the office that ordered the Metsälä case. There was also a strong individual will to learn and understand more these natural storm water runoff systems. The following quote demonstrates this finding.

> ”Well no, not because of the work but surely I am personally interested about the topic and I might come here (Vuores), but not because of work, unless there are some cooperation going on.” (I6)

> ”Niin no ei sillai niinku, viran puolesta että toki sitten ittee kiinnostaa ja näin että sitten ehkä vapaa-ajalla tulee niinku pyörittyä täällä mutta, ei sillai että, töiden puolesta ellei oo jotain sitten tosiaan, yhteistyöjuttuja.” (I6)

Due to the info board located in Metsälä storm water system the local residents and other by-passers will learn about the structure and its functions. Some citizens have contacted the officers and asked about the structure and to give positive feedback and thanked about the info board.

Because of the learning value (info board) on the construction site, it was thought that they avoided negative comments and objections. Cutting trees down in the controversial Helsinki central park area where Metsälä runoff system was built, usually is a controversial topic and brings out objections. Now when there was the info board to tell why the trees are cut down, there was no contacts about cutting trees down. So, building a new ecosystem legitimates cutting trees down. The following quotes demonstrates this finding.

> ”And then I have been positively surprised that we of course have had some info board here all the time, where we have communicated what is happening here and so we haven’t received any negative feedback about cutting trees, even when we are at the central park area.” (I1)

> ”Ja sitte mä oon ollu positiivisesti yllättyny et meil on tietenki ollu tääl koko ajan joku infotaulu ja kerrottu mitä tääl tapahtuu ni ei oo toi puidenkaan kaato vaikka ollaan Keskuspuistossa ni, ei oo herättäny mitään negatiivista….” (I1)

> ”And when we were cutting trees I was afraid that what will happen. But then we had the info board where we explained that we are not building houses (but we are building a storm water management system) so maybe it helped” (I2)

> “Ja näist sillon ku kaadettiin puita niin sekin mua vähän jännitti et nyt, mitä tapahtuu mut, sillon ku meil oli kyltit siellä missä selitettiin et ei rakenneta taloja vaan (tähän tulee tämmönen) nii ehkä se autto sit asiaa.” (I2)

Turned out the construction workers wasn't familiar with what they were doing. They got some introduction about the project and the functions but with more planned workshops or presentations the construction company could have been able to develop their know-how on the subject matter. It was mentioned that the learning didn't trickle down all the way to the operational level, which caused some mistakes and to harmful actions on the construction site. The following quote demonstrates this finding.

> ”And there of course it is hoped that somehow the awareness would form or at some department. Whether it is construction control or whatever, or Vuores project or what, but so that we could get the information moving all the way to the end so that the understanding would form why there is a depression, which is planted as a meadow. That must be the hard and it takes the longest time and there will always be some blunderings” (I4)

> ”et siinä tietysti, toivois että jotenkin niinku se tiedostaminen syntyis tai jollakin taholla, onko se sitten rakennusvalvonta tai mikä tahansa tai, Vuores-projekti tai mikä että, se niinku saatais se tieto menemään sinne loppuun asti että syntyis se ymmärtämys et miks siinä on se painanne joka on niityksi kylvetty. Se on tietysti varmaan aika vaikee ja se vie pisimmän ajan ja, ainahan kömmähdyksiä sattuu” (I4)

The seeds for the project were gathered based on the design company's instructions and their knowledge were from Lepa's articles. The company, which delivered the seeds and the vegetation (plants) to the area didn't have to offer all the plants and seeds the designer wanted. Clearly the seed provider didn't have the know-how to build a most relevant seed-mix for the purpose. And there was no extra effort made to develop the seed supply for future purpose. The seed provider could have benefitted from more profound collaboration and stakeholder engagement so they could have improved their products and services to use in future storm water runoff projects. So the potential for the learning value was not filled in the process between different stakeholders. The following quote demonstrates this finding.

> “Q2: So did they have the knowledge already, did they have the competence?”
> “No, I don’t think so. They had the given mixes and then we needed to plant additional plants like red clovers and such that worked in this use” (I1)

> ”K2: Niin, niin tota, oliks heillä sitä tietoo ja, osasko he jotain?”
> ”Ei, ei mun mielestä et niillä on ne, tietyt sekoituspussit että, tavallaan sitten, lisättiin niihin perennaistutuksiin just niitä kasveja sitten jotka, ja varmistettiin et siinä siemensekoituksessa on sitten just sitä Puna-apilaa ja muuta jotka, oli hyviä tässä tapauksessa.” (I1)

With more innovative and comprehensive stakeholder engagement techniques could have been more extensive learning through all the stakeholders. When a solution is totally unknown for most of the actors involved there could have been more collaboration about the methods, needs and ideas about the production.

Some stakeholders were part of the project only for learning purposes. Luke wasn’t officially part of the project, but they were involved as per their own research interest. The following quote demonstrates this finding.

> ”No they were not as a partner in this project but… they had their own project and this was a good tracking object for them to use.“ (I1)

> ”Ei ne periaattees, partnerina tai näin ollu täs hankkeessa mut… Ja niil oli oma hanke johon tää sopi hyvin semmoseks seurantakohteeks” (I1)

The new ecosystem constructions had also an educational dimension. Due to the info board in Metsälä they have received some contacts to ask if they could come and tell more about the construction and what it is about. The following quote demonstrates this finding.

> ”It has evoked some interest and I have been getting contacts and queries to tell about the project” (I1)

> ”on herättänyki kiinnostusta tai muhun on otettu yhteyttä ja pyydetty et voiks tulla kertomaan tästä.” (I1)

Also, the teachers in school next to Pöllövuori got interested and implemented the natural storm water management system to their teaching curriculum. The following quote demonstrates this finding.

> ”Teachers have been interested on the vegetation so that they can educate the children about the vegetation, because there are wild Finnish shore plants, willows and such.” (I4)

> ”Opettajat ovat olleet sit kyllä ihan niinku, kiinnostuneita siitä kasvillisuudesta sinänsä et he voi opettaa lapsille sitten ja oppilaille näitä, tätä kasvillisuutta koska siellä on ihan Suomen luonnonvaraisia rantakasveja ja, pajuja ja, tämäntyyppisiä.” (I4)

Development. If learning was the mostly repeated and essential value that occurred, then development was the most valuable value. When learning has been implemented and utilized in human interaction and processes then development has happened. Development was mentioned as improved processes, better interactions, increased common understanding and decreased need for teaching others involved in the process. Development also occurred as more positive and enabling atmosphere on building these kinds of new ways of managing storm waters. It was clearly mentioned many times that the aim was that different stakeholders involved can learn, improve and develop their products and understanding on the cases. The following quotes demonstrates these findings.

> ”Yes, now when we think about the same things after implementation the atmosphere is much more positive and enabling, because now it has been done once and everybody noticed that it is not so hard after all.” (I2)

> ”Niin kyl tän toteuttamisen jälkeen nytte ku mietitään taas näitä samoja asioita, niin se ilmapiiri on paljon positiivisempi ja mahdollisempi, koska (nyt) tää on tehty kerran ja kaikki huomas et ei se nyt niin hankalaa sit kuitenkaan ollu” (I2)

> ”Contact persons are collaborating in a different way among these things… And I feel like many city workers who have been involved doesn’t think it is as difficult anymore as it was before this project” (I2)

> ”yhteyshenkilöt on nyt eri lailla taas yhteistyössä tämmösten asioiden parissa... Ja must ainaki tuntuu et monet kaupungin työntekijät, jotka on ollu mukana ni, nyt ei koekaan tätä enää niin hankalaks niin ku se oli ehkä sillon ku mealotettiin tän tekeminen. (I2)

> ”We gain experience of this all… collaboration, the tools. And we understand and discuss many times about why this is done and how it should be done. And then of course the tracking part is now important so that we know it works and it gives nice cases to tell further” (I2)

> ”tulee kokemust kaikesta…” (I2)
> ”yhteistyöstä ja,... niist työkaluista. Ja ymmärretään, (sit) keskustellaan monta kertaa siitä et miks tätä tehdään ja miten tää kannattaa tehdä. Ja sit tietenki tää (seurantakiosuus) nyt on tärkee et huomaa et se toimii ja se antaa semmost et (se) on kiva kertoo” (I2)

Pilot case (Metsälä) was seen as the best setting for learning and improvement. Aim was to test, and improve cooperation, tools and “mental capacity” to understand more of these kind of construction projects. The lessons learned from the pilot case is already considered in the next construction project in Kuninkaantammi.

It was also noticed that the whole potential for development value was not succeeded. Services and products could have been improved more with more open and better planned stakeholder cooperation.

Almost all stakeholders that were involved in producing these ecosystems were able to develop their skills, products, services or processes. Maybe the only stakeholder group that didn't benefit from the development value link were the residents. They benefitted from the learning link so also that is why it is good to separate these links from each other. Separating the links also enables more detailed review on the link.

From learning usually follows development and from that development new ways of working are implemented and hopefully that development becomes routine when proceeded. This evolvement was seen in these cases as well.

I wanted to separate learning and development, since there can be learning without development. Both learning and development were the most important and repetitive values in all cases. These dimensions were featured more in Metsälä case since it was purposely meant to be as development and pilot case.

Development happened on personal level, organization level and in cooperation with different stakeholders. The following quotes demonstrates these findings.

> ”Of course also my own experience and competence accumulates but how we now collect projects so somehow the environment institute and other actors, the competence and project competence has increased and it is easier now. (I2)

> ”tietenki (mun omaki) kokemus ja osaaminen täs karttuu (mut et mä mietin) miten me nyt kasataan hankkeita nii on jotenki, ympäristökeskus ja muutki toimijat ni osaaminen, hankeosaaminen on kasvanu ja se on helpompaa tällä hetkellä” (I2)

> “It actually started to grow and the latest idea was to take the cards in to use. So it kind of first was the idea and a need and then when there are more experts involved like maintenance, park designer, water engineers and everyone brings their own something and then it is actually fruitful and it continues to formulate to a final result with the current understanding that we have at that point.” (I4)

> ”Ja se lähti niinku siitä laajenemaan että, ja ihan viimeisin idea oli sitten se et okei me otetaan ihan kortit tähän nyt sitten mukaan. Että se tavallaan ensin on idea ja tarve jostakin ja sitten kun siinä on, otetaan mukaan kunnossapitäjää, otetaan mukaan vihersuunnittelijaa, otetaan mukaan vesipuolen insinööriä niin se aina jokainen tuo siihen omansa ja, sitten se on sinänsä ihan hedelmällistä et sit se muotoutuu ja syntyy se lopputulos, sillä ymmärryksellä mikä on sillä hetkellä, ja sen kokemuksen pohjalta.” (I4)

More competence is still needed to the field of business, which comes up in the following quote.

> ”Very far, maybe I should say that the competence we have in Finland is quite new and I would hope that someone would research and investigate it and come up with new ideas.” (I4)

> ”Hyvin pitkälle, ehkä täytyis sanoa että, sit kuitenkin ehkä se viimeinen tietämys niin se on meillä Suomenmaassa sen verran nuorta että, sitä varmaan, toivoisin et sitä joku mielenkiinnolla tutkis ja saiskin siihen jotain ehdotuksia” (I4)

New routines were seen as the last step of learning process. Learning alone is not a valuable dimension for the bigger picture, but the outcomes of learning needs to be implemented to the “business as usual” through development. The following quotes demonstrates this finding.

> ”And so it should be I think. Constructions in Vuores started already ten years ago and I think some of the solutions should be already business as usual. Everything cannot be piloting.” (I5)

> ”niin pitääkin mun mielestä olla, Vuoresta on rakennettu kuitenkin jo kymmenisen vuotta siinä, siitä kun ensimmäisiä rakenteita on tehty niin kyllä mun mielestä, jotkut ratkaisut pitääkin olla niinku jo business as usual, muuten, et ei kaikki voi olla pelkkää pilotointia” (I5)

> ”First of all, the awareness they described is a build-in tool for us to reflect and discuss with different people… it has been brought out more because we ourselves have learned it the hard way.” (I4)

> “ensinnäkin tuo tiedostaminen mitä [hän] kuvaili että meillä on, se on niinku työkalu sisäänrakennettu ja meillä on henkilöt joittenka kanssa heti jutella ja peilata sitä asiaa... että sitä on ruvettu enemmän tuomaan esille koska se on itse ymmärretty kantapään kautta” (I4)

There is still a lot to do and a lot to learn and only new routines have been implemented concerning natural storm water management. These were just the first projects in Finland and the know-how about the needs that increased storm waters will bring would needs to be implemented extensively through public organizations. The following quotes demonstrates this finding.

> ”It is just a lot of work to integrate this notion to the whole city organization. So that everyone would know in their own process that how can I take the storm waters or climate change into account in my work.” (I2)

> ”Se on vaan todella paljon työtä vaatii se et me saadaan jotenki integroituu tää ajatus koko kaupungin organisaatioon. Et jokainen tietää siin omassa prosessivaiheessa et miten mä voin huomioida hulevedet tai ilmastonmuutokseen sopeutumisen mun työssä.” (I2)

> ”One is that we update or improve, integrate our storm water program so that it would serve better in all city of Helsinki offices. We have a good strategy already, but there are some gaps in the implementation.” (2)

> ”Yks on se että me päivitetään tai parannetaan, integroidaan meiän hulevesiohjelma niin että se paremmin, olis toiminnassa kaikissa virastoissa, Helsingin kaupungissa et meillä on olemassa ihan hyvä strategia tällä hetkelläki, mut toimeenpanossa on joitaki aukkoja” (I2)

New routines are not yet spread to all the organizations that should take storm eater into account in their work. Helsinki has a good strategy for the storm water management, but it is still not implemented to the operational levels of different organizations. The need is to spread awareness on increased storm waters and how it is important to consider them and how they can be managed. The following quotes demonstrate this finding.

> ”For example the city planner would know that they don’t need to master storm water management in the whole Helsinki area but they would know what they can impact in their own territory and what are the tools” (2)

> ”esimerkiks kaavottaja tietää et ei tarvi hallita koko Helsingin hulevesien hallintaa mutta tietäis et mitkä on mun vaikutuspiirissä olevat asiat mihin mä voin vaikuttaa ja mitkä mun työkalut on.” (I2)

> ”How is my work related and how can storm waters be considered” (I2)

> “Miten omat työt liittyvät ja miten esim hulevedet voitaisiin ottaa huomioon.” (I2)

This whole evolution of functional values is reflected on the different cases. First is a pilot where testing and learning are the main objectives and profits are not considered as important. After learning the outcomes needs to be implemented to the ways of working and the improved ways of working can be called as development. After repetitions and when the new ways of working become a practice it can be called as routine.

4.1.2 Economic values

Economic values were also important values in all projects. It was explicitly mentioned, that figuring out costs for natural storm water management systems is an objective for Metsälä case. Economic values van also include business potential for future when the

costs are happening now, but the profits are achieved in the future. Identified economic value links are **reference, business potential and monetizing.**

References are important for winning offers. With references companies can demonstrate their competence on the substance. Participating in the first projects might not be as profitable as the normal business would need to be, but getting references before others can be really valuable in the future when presumably the demand for storm water management systems will increase. Getting the reference was seen as the most valuable economic value from private company point of view. Sacrificing on profits they were ready to participate on projects in order to get the reference for future project. It is predicted that the demand for these kinds of storm water management systems will increase notably in the future and it was considered valuable to gather references for future offerings. References have a heavy weight when supplier is selected to an assignment. The following quotes demonstrates these findings.

> ”Yes, it was kind of a decision in principle that needed to get the approval from higher management. The money in these EU-projects is usually low and I knew it would require double the work that the money covers. So, we needed to discuss with management if we could do this because it is a pilot project and we would get a good reference. These kinds of filtering structures are not a lot in Finland, and this was the first one in Helsinki” (I1)

> ”Joo, no täytyy ymmärtää et siinä oli eräänlainen periaatepäätös joka piti vähän ylemmältä taholta kysyä koska se on, no EU-rahat on yleensä aika pieniä ne, suunnittelusummat niin, piti käydä kysyy pomolta et saadaanks tehdä, mä tiedän et siihen menee melkein tuplasti enemmän tunteja mitä, on niinku tohon EU-projektiin rahaa mut mietittiin että kun se on pilottikohde niin, siitä saa sit niin hyvää, referenssiä. Tommosia suodattavia rakenteita ei oo paljon tehty Suomessa, eikä Helsingissä ollenkaan, et se oli ensimmäinen.” (I1)

> ”Ordering customer would see that we have already done these things, so it is easier to get new projects” (I1)

> ”asiakas joka tilaa niin näkee et meillä on niinku tehtynä niin sitten aina pääsee, helpompi päästä mukaan semmosiin hankkeisiin.” (I1)

Gathering references now in piloting phase increases possibility to benefit from the future business potential.

Business potential is something that is in the future. Now the focus has been in learning, development and gathering references. But as the same challenge with increasing storm water concerns globally all over the world the future business potential can be massive in the future. The following quote demonstrates this finding.

> ”all of a sudden everyone should master and plan storm waters” (I2)

> ”yhtäkkii nää hulevedet on tullu niin, et kaikkien täytyy osata ja suunnitella.” (I2)

Some business potential was already missing and due to new subject matter companies haven’t yet developed compatible products to use. It was identified here already earlier that this was also a missed learning link during the projects and the seed provider didn’t do any product development and they weren’t involved in the development in any for of stakeholder involvement. The following quotes demonstrates this finding.

> ”I think the challenge has always been and still is to find the correct plants for the storm water management system.” (I1)

> ”mun mielestä se haaste onkin ollu ainakin, ja varmaan edelleenkin, näissä tämmösissä hulevesijärjestelmissä että, saatais, löydettäis ne kasvit mitkä selviää siitä” (I1)

> ”Should we start suggesting to Suomen Niissysiemen Oy [seed supplier] that there could be seed mixes 1, 2, 3 and 4 for flood meadows so there would some variety. Now we are always using same plants” (I1)

> ”Pitäsköhän sille Suomen Niittysiemen Oy:lle ruveta vihjailee että vois olla, tulvaniittysiemenseos yks kaks kolme neljä et ois erityyppisiä, lajitelmia koska nyt huomaa et tulee laitettuu sitä [naurahtaa]...samoja.” (I1)

Monetizing was also an explicitly noted objective for the projects. The need was to find out costs for building natural storm water management systems. Challenges occurred putting the price tag to all gained benefits. How to include other experienced values to the monetized value? The following quotes demonstrates this finding.

> ”When people give some estimate value for question like “what they would pay for a clean beach”. Those values can be artificial, but then again they have given some value for it.” (I2)

> ”Nii, ilman että, ku nehän on, välillä ne on vähä teennäisiä sitten ne vaikka ne nyt perustuu ihan ihmisten omiin antamiin arvoihin et mitä mää maksasin siitä että mulla on puhdas uimaranta tossa. Nii onhan se tietenki ne on arvottanu sen.” (I2)

> “But if public decision maker could identify all the benefits of a wetland it would be great. If they could see that it is not just a decision between a pipe and a puddle.” (I2)

> ”Mut jo se että kuntapäättäjä pystys miettimään näin, et jos se rakentaa hulevesiratkasun nii se ei nyt vaan oo se putki näin, ja sit meillä on tää lätäkkö ja kumpi, kumman teen. Vaan siihen kosteikkoon liittyy kaiken näköstä muita hyötyjä (pystyy) tunnistamaan se niin se oli ehkä se suurin.” (I2)

it was also seen as problematic when the profits are seen to be further in the future and far away from the costs. The following quote demonstrates this finding.

> ”This has been discussed a lot and the problem is that the construction company also knows that the property can be more valuable after 50 years or so when

> there are some green parks or some recreational possibilities. But the problem is that the benefits are not realized at the same with the costs.” (I2)

> ”No tästä on keskusteltu paljon, ja se ongelma on siinä että, kyl mä luulen et rakennusyhtiötki tiedostaa sen että se kiinteistö voi olla paljo arvokkaampi 50 vuoden tai, jälkeen sen takia että siellä on vihreetä ja siellä on virkistysmahdollisuuksia ja näin. Mut kun ne, hyödyt ei tuu sille rakennuttajalle just sillon, ku se myy sitä, ni tää on ongelma et ne hyödyt kohdistuu eri kohtaan ku missä ne kustannukset ehkä on.” (I2)

Utilitarian values were seen as the most important part of all the projects. Even if all the projects had different characteristics (pilot, flagship, business as usual) they all had still a pilot value since building these natural storm water management systems are rather new in Finland and globally. Most importantly they wanted to learn about costs, cost structure and the best technical implementations. The following quote demonstrates this finding.

> ”Starting point is that what is economically and technically most reasonable and then the storm water management system and use and safety of park. It is like twisting Rubiks’ cube to solve what seems to be working most favorable.” (I4)

> ”täytyy aina lähtee siitä että mikä on taloudellisesti ja teknisesti järkevintä, ja sitten kuitenkin tavallaan tää hulevesijärjestelmä ja puiston käyttö, ja puiston turvallisuus monissa eri tekijöissä toimii että, kyllähän ne on niinku, Rubikin kuution kääntelyä että, siinä otetaan sitten aina se puoli mikä näyttää niinku toimivan edullisimmin” (I4)

4.2 Hedonistic values

4.2.1 Emotional values

There were clearly some emotional values that appealed to experiential aspects. Emotional value can derive from motivation, experience and feelings and they are experienced, pleasing and have absolute value for individuals (Rintamäki, Kuusela, Mitroinen 2007). Emotional values were occurring more on personal level than other value dimensions and they were occurring almost for all stakeholders involved in the projects. Identified emotional values were **aesthetics, legitimation and community**. Emotional values appeal to personal experiences and they were also used as a legitimation for the constructions.

Aesthetics was the most repetitive emotional value. Aesthetics was an important value for the purchasers, designer company and residents and it brings up both negative and positive emotions. Designer felt sorry for some details in the construction what she fell was conflicting with the natural surroundings. Then again as a whole the structures were seen as works of art also. Following quotes demonstrate these findings. The following quotes demonstrates this finding.

> ”But I’m not happy about the visual look because we have made a hole into a slope and that conflicts with the scenery.” (I4)

> ”mut mä en oo ollenkaan tyytyväinen niihin, visuaaliseen ilmeeseen koska ensinnäkin se että meillä on täällä rinne, me ollaan tehty rinteeseen kuoppa, niin se niinku, se taistelee niinku sitä maiseman katsomista vastaan et se on niinku vähän pahassa paikassa” (I4)

> ”It is kind of work of art overall” (I2)

> ”et se on ihan semmonen kokonaistaideteos tavallaan.” (I2)

Having the storm water management systems being close to residents influences the design of the structure. But what is beautiful for others might not be beautiful for others. People were quite concerned about the aesthetics on their home surroundings and it was important for the residents to have a pleasing looking surrounding. They reacted quite heavily if they felt the looks and feel of the surroundings were not pleasing or what they thought were ugly. Residents seemed to react purely on aesthetics and didn't know about all the other reasonings for some solutions. The following quotes demonstrate these findings.

> ”Yes the people nearby impact the work. For example, when we think about the vegetation in Kolmikallio we wanted to maintain a nice visual look” (I1)

> ”Kyl se vaikuttaa [ihmiset lähellä] just kun mietittiin niitä kasvilajeja siinä Kolmikalliossa että, jättää ne kaikkein korkeimmat et säilyy se semmonen niinku, vähän siistimpi ulkonäkö” (I1)

> ”We can think of ourselves that we create nice environment and biodiversity and there are butterflies, insects and all and it is great but then someone can be like “it is ugly” please send lawn mower quick.” (I5)

> ”..kaikkea voi aina nousta esille et me voidaan ite kuvitella että me tehdään niinku, tosi kivaa ympäristöö ja, on niinku luonnon monimuotoisuutta ja siinä on perhosia ja hyönteisiä ja kaikkee ja me tehdään niinku tosi kivaa niin sit tulee puhelu että, lähettäkää ne ruohonleikkurit tänne ja äkkiä. (I5)

Legitimation was strongly related to stakeholder involvement and it mainly concerned aesthetics and environmental values. Involving stakeholders such as organizing events for residents and other interested parties brought legitimation for the construction work. Legitimation also taught the makers how to communicate on the projects and what are the presumptions and expectations of residents.

> ”It has been a learning for us also to understand what it means in practice to protect the quality of storm waters. We secure that the bigger runoffs can run

> without problems and without causing any damage to people and their property.” (I4)
>
> ”meillä on ollu tässäkin opittavaa että mitä tää tarkottaa käytännössä että me turvaamme hulevesien laadun, me turvaamme sen että ne hulahdukset, suuret hulahdukset mahtuu ongelmitta menemään aiheuttamatta ihmisille tai heidän omaisuudelleen suurta vaaraa” (I4)

Environmental issues needed legitimation. Some people react strongly always when there are trees cut down in the Helsinki central park. There was a need to cut trees for the Metsälä structure. This caused some concerns for the designer and the residents. However, the environmental aspects legitimated cutting trees in the central park. When residents and the designer internalized that the storm water management system is needed because there was pollution flowing to near waters it was then ok to cut some trees out of the way. The following quotes demonstrates these conflicting emotions on legitimation for cutting trees.

> ”Yes it was in a mutual agreement. I was also nervous when we started to cut trees, and I would have been surprised as a resident when there are trees cut in the central park. But when there was the info board to communicate the plan people could see that ok there will be a wetland for storm waters.” (I1)
>
> ”Oli se yhteisymmärryksessä ja, itteäni mua niinku, eniten jännitti se kun sinne mentiin kaataa ne puut ton kosteikkoaltaan, itte ainakin asukkaana niinku säikähtäis että mitä ihmettä tänne niinku Keskuspuistoon tullaan kaataa puita mutta kun siellä oli heti sitten tää, suunnitelmataulu ja selostusta, selkeesti siinä työmaataulussa niin, ihmiset heti huomas että ahaa täähän onkin tämmönen, hulekosteikko.” (I1)

Information also legitimated the constructions and ready structures. With info-board the makers could communicate what is coming up and why are they cutting trees for example. Then again there was some challenges on ensuring people would understand what they are making and what is the purpose of it. Some aesthetical solutions also

needed some legitimation from stakeholders. People didn't quite understand the purpose and operations of the structures so with communication they tried to gain legitimation to the solutions. The following quotes demonstrates this finding.

> ”They can realize it is not just for tease. Many things can seem absurd if you don't know what the origin is.” (I3)

> ”nyt mä tajuan ton et meitä ei vaan kiusatakaan. Siis ihan just et, monet jutut voi tuntua älyttömiltä jos ei tiedä mikä siellä on taustalla.” (I3)

> ”If somebody wants to make sure to get the water theme under their window and then they can be very disappointed when they find out that there is not nearly always water.” (I5)

> ”joku haluaa että, niinku varmistaa että hän ikään kuin saa sen vesiaiheen siihen ikkunansa alle ja sitten on kovin pettyny kun kerrotaan että siinä ei suinkaan aina ole vettä näkyvissä” (I5)

Trouts also brought some legitimation to the storm water structure in Metsälä. Trouts are an endangered species in Finnish waters and the river where the waters flow from Metsälä area is known to be a habitat for trouts.

Community aspect was also present in building the storm water management system. Involving residents to the construction was principally important. There was some level of engaging residents during constructions work. When they were involved to the topic they became more interested on the system and welcomed the new way of handling storm waters. It was also wanted that children would make use of the structures on their games and play. The following quotes demonstrates this finding.

> ”We yes residents are very interested and they monitor the water levels and how it lives.” (I3)

> ”No kyllä sillai, kyllähän toi niinku kiinnostaa siis paljon toi että, asukkaat niinku seuraa just ton, altaankin ja tossa sitä vedenpinnan korkeutta ja niinku että miten se, elää että, semmosia.” (I3)

> ”I think it would be fun to bring storm waters to playground areas and combine water and play and all.” (I1)

> ”Must ois tosi hauska tuoda hulevesi toiminta-alueille leikkialueille ja sillä taval yhdistää se vesi ja leikki ja kaikki tämmönen.” (I1)

Overall emotional value links were present in the cases but the importance of them was not primary. Emotional values were highlighted on individual level and for residents. Emotional values are easy to grasp even if you don’t understand the whole structure and construction.

4.2.2 Symbolic values

Identified symbolic values are **good example, imago and being green**. These values occurred on personal and organizational level and for multiple stakeholders involved in the projects. Characteristics for symbolic values are that they stand for something, they have a meaning and it allows self-expression (Rintamäki, Kuusela & Mitroinen 2007)

Good example serves as a reference for future projects. It is easier to justify other projects in the future when there are good examples to refer to. Metsälä and Vuores had the most important role as good examples, but also Kolmikallionpuisto has gained some interest from external parties. Metsälä being a pilot initiative is supposed to serve as a good example for potential new solutions in new construction projects and show how storm waters can be managed in a sustainable and easy way. The pilot has already led to new storm water projects in Kuninkaantammi Helsinki. Metsälä case is also supposed to serve as a good example to show other offices and officers how they can take storm waters into account in future projects they are involved in. The following quote demonstrates this finding.

> ”It is also influencing to bring out examples what it could be” (I2)

> ”Tämmösii myös et tää on myös sitä vaikuttamista et, (jotenkin nää), tuodaan (niit esimerkkejä), mitä se vois olla.” (I2)

All the cases had the good example value. The makers receive contacts to request them to show the management system from residents to international guests. The following quote demonstrates this finding.

> ”There has been calls from residents. I have done ten to fifteen excursions for groups who want to know more about it” (I2)

> ”Niin ja tost ratkasusta et tullu jonku verran soittoja ihan asukkailta. Mut sitte kans et oon mä nyt tehny siellä ehkä kymmenen, viistoista semmost ekskursiota et tulee joku ryhmä tai joku joka kysyy et voisko tulla esittelemään sitä ja” (I2)

Imago was most prominently present in Vuores case but also identified in Metsälä. Vuores can be seen as a flagship and ambitious implementation of natural storm water management systems in Finland and Vuores is also using the storm water management system as a means of marketing the neighborhood. Tampere was also seen as a forerunner for handling storm water and other cities “will take an example” from Tampere. The following quote demonstrates this finding.

> ”Tampere is s forerunner in storm waters and others take example. Tampere is doing it already, could you just copy.” (I3)

Tre

> ”Tampereella ollaan kuitenkin aika, niinku, etunenässä menty hulevesiasioissa, niin sitten taas muut kaupungit ottaa mallia Tampereesta et sit niinku, pystytään esittää jo muille esimerkkiä että no Tampere on tehny näin että joko niinku, voisitte kopioida” (I3)

Storm water management system built in Metsälä is also getting requests that people want the makers to come and demonstrate the structure. They have both Finnish and international guests visiting on the premise. The following quote demonstrates this finding.

> ”Yes, they have been water protection associations and we have had some international experts visiting from other cities.”(I2)

> ”Joo, ne on ollu viesiensuojeluyhdistyksiä tai sit meillä on ollu aika paljo kansainvälisiiki jotain kaupunkivierailuja et tulee asiantuntijoita muista kaupungeista.” (I2)

Being green served as a compensation, legitimation and fostered personal and company values in the studied cases. The design company took the case for themselves even when they knew they wouldn’t get that much profit out of it. In addition, for getting a reference for future work the project was ‘sold’ to the company management by declaring environmental responsibility by saying that they are involved in protecting the Baltic Sea. Being green was also an important personal value for some of the key actors in the process. In the Metsälä case the whole process got started due to few individual’s personal interests and values to protect the Baltic Sea and other waters in the city area. The following quote demonstrates these findings.

> ”When they saw the pictures of ready wetland, we put them in our intra saying that FCG landscape design is protecting Baltic Sea” (I1)

> ”No, sitten kun ne näki noi valmiit, valmiin kosteikon nää kuvat niin, me laitettiin siitä aika isosti meidän intraankin, sisäiseen verkkoon niinku kuvia ja muuta että, FCG:n maisemasuunnittelu suojelee Itämerta, otsikolla” (I1)

> ”it is great when you can clean waters and produce divers nature during. it is a big reward from the job” (I1)

> ”onhan se upeeta jos, pystyy niinku puhdistamaan vesiä ja, sit samalla tuottamaan niinku, monimuotoista ympäristöä niin onhan se, iso palkinto työstä.” (I1)

4.2.3 Synthesis on all value dimensions

All the findings in this study are gathered into two tables (table 3, table 4). There were three different levels of values identified (table 2) based on the incidence of the values. Some of the values were clearly occurring and some values were identified but not occurring in the process. Values are presented for each stakeholder with the incidence of the occurrence.

Utilitarian values identified in this study are learning, development, new routine, reference, business potential and monetizing (table 3). These value dimensions were mostly occurring and clearly identifiable as most important values. Utilitarian values were explicitly mentioned as an objective in few of the cases and they occurred in personal level, organizational level and between stakeholders. Hedonistic values identified in this study are aesthetics, legitimation, community, good example, imago and being green (table 4). These value dimensions were identified as secondary values and primarily they occurred in personal level, but also according on organizational level and between stakeholders.

Table 2. Incidence values occurred

	Realized values
	Realized values, but not with full potential
	Lost values

Table 3. Utilitarian values

Utilitarian value dimensions						
	Functional values			Economic values		
Stakeholders	Learning	Development	New routine	Reference	Business potential	Monetizing
Metsälä						
YKE						
HKR						
FCG						
Luke						
Stara						
Suomen niittysiemen Oy						
Other offices						
Residents						
Virho						
Individuals						
Vuores						
City of Tampere						
FCG						
Dreiseitl						
Different experts						
Nearby school						
Kolmikallionpuisto						
City of Vantaa						
FCG						
Hyvinkään tieluiska Oy						
Vantaan energia						
Residents						

Table 4. Hedonistic values

Hedonistic value dimensions						
	Emotional values			Symbolic values		
Stakeholders	Aesthetics	Legitimation	Community	Good example	Imago	Being green
Metsälä						
YKE						
HKR						
FCG						
Luke						
Stara						
Suomen niittysiemen Oy						
Other offices						
Residents						
Virho						
Individuals						
Vuores						
City of Tampere						
FCG						
Dreiseitl						
Different experts						
Nearby school						
Kolmikallionpuisto						
City of Vantaa						
FCG						
Hyvinkään tieluiska Oy						
Vantaan energia						
Residents						

5 DISCUSSION AND CONCLUSIONS

5.1 Theoretical implications

This study has reviewed the relationship between stakeholder involvement and value co-creation in three different processes of building natural storm water management systems. All three projects had a different premise, but all the processes and outcomes had common characteristics with each other. As a main argument for this study is that there are some clear values created in the cooperation between different stakeholders. But the full potential of generating all potential values were not nearly achieved due to deficient and systematic stakeholder involvement in all projects. The purpose of this study is to increase understanding on the role of stakeholder involvement in producing natural and urban ecosystem services. Stakeholder involvement in the projects was not systematically planned or implemented. So, in this study the focus was not on the methods and tools how the stakeholders were involved but the in the processes and collaboration between different stakeholders. The objective was to review what kind of values involving stakeholders to the processes can bring.

Material analysis in this study was conducted in three rounds of analysis. First two rounds of analysis were conducted using inductive content analysis methods and not considering the theoretic framework to the analysis. Third round followed deductive content analysis method. Findings were categorized and analyzed utilizing theoretical framework gathered for this study. Findings in this study are complementary with previous research. The primary objective of this research is to build knowledge to the ongoing discussion whether stakeholder involvement in relation to value co-creation helps to improve the conservation and production of urban ecosystem services and thus provide more rich biodiversity in cities. It aims to develop understanding about the business opportunities and stakeholder values that nature conservation and production of ecosystem services can provide without harming the nature but rather giving back to it.

Outcome of the analysis is to build up a model, conceptual system, conceptual map or categories to broadly describe the phenomenon (Elo & Kyngäs 2008). In this study the values are categorized to understand the stakeholder involvement and the values in producing ecosystem services. What enables them and what prevents them? The purpose is to understand the relations of factors that take part in creating sustainable business opportunities and stakeholder values from ecosystem services.

There were many findings in this study that supports previous research on the subject. Luyet et al. (2012) mention for example legitimation, better trust in decisions, Fostering and developing social learning, optimizing implementation of plans and projects, improving project design using local knowledge. All those values identified previously were also identified in this study.

According to Reed (2008) the success of stakeholder engagement is highly dependent on the nature of the project. The stakeholders involved in the case projects could have benefitted much more if there would have been more systematic and well though stakeholder engagement implemented. This appeared many times during the interviews. Missing on some utilitarian values was most crucial for private companies involved in the projects. Private businesses that delivered the seeds for Metsälä case for example, didn't have the right and ready fitting product for the purpose. They could have had a good opportunity to trying to involve them more to the development of the service and products. Also, the design company that created the vision and high-level plan to Vuores was not involved in the latter design or construction process at all. There were some message changes with them, but they were lacking on the learning and development values. Also, in case Kolmikallionpuisto, being a mundane project and not involving residents more closely to the processes, there were some misunderstandings on the ecosystem service. Residents didn't understand the role of the storm water management system or they didn't understand all the commutated solutions for the ecosystem service. In turn, residents near Metsälä project seemed to understand the role and value of the storm water management system and hence accepted it more easily. As Reed et al. (2009) argues, enabling different stakeholders to learn by sharing and validating their understanding of the situation enables sustainable management of ecosystem services.

According to Greenwood (2007) the ‘more is better’ is not the best way to enforce stakeholder involvement and it is too often misunderstood that way. There is very little empirical evidence that participating stakeholders to the process of environmental decision-making would bring real benefits. Focus needs to more on the quality and different ways of implementing stakeholder involvement with different stakeholders. The language used during projects has an important role when communicating with different stakeholders. Using professional jargon with non-professional stakeholders could lead to misunderstandings and frustration. This finding supports Reed et al. (2009) argument that insufficient stakeholder involvement might lead to stakeholder frustration.

As Bennet et al. 2015) argues, we still don’t understand the distribution of benefits to different stakeholders of ecosystem services. After this study, we know just a tiny bit more on the topic that still stays under researched. Future research still needs multidisciplinary research to truly connect the nature, business and social studies. Including social studies to the mix with nature and business research we can comprehend more the human behavior, needs and objectives related to the ecosystem services. There is also still a need to closely observe the urban ecosystem building projects and the stakeholder cooperation in them. More understanding is also needed on identifying the diversity of stakeholders and their preferences and how they could benefit form ecosystem services as Reed et al. (2015) also proclaims.

Theoretical framework used in this research consists of stakeholder involvement in ecosystem service production and value co-creation. Also, a framework to categorize different value dimensions was borrowed from marketing studies. The value dimension theoretical framework was never used in the context of describing value co-creation between different stakeholders in the context of ecosystem services.

As Luyet et. al. (2012) argues the stakeholder participation in projects concerning ecosystem service production is still in development and not utilized in its full potential that same argument can be applied to this study. The interviewees mentioned that there

could have been more systematic stakeholder involvement and that is something that is considered in future projects.

5.2 Practical implications

As a suggestion for future similar projects it would be beneficial to involve stakeholders more systematically to the processes. As Hein (2006) argues stakeholder involvement induces commitment to ecosystem services. Involving residents to nearby ecosystem service projects already in the design and construction phase they could be better improved, valued and protected. This would also teach how to communicate about the ecosystem service, the value it has on nature and legitimation for the construction phase. Presenting previous references and use cases from other previous projects would help stakeholders that don't have previous knowledge on solutions like this. The whole concept seemed to be unfamiliar for residents, as in persons who doesn't have previous knowledge or interest on the topic. Then communicating correctly and avoiding professional language would be important.

As it is mentioned in the TEEB (2012) report, ecosystem services can also induce business opportunities. The findings in this study also supports that argument. The need for producing urban and natural storm water managements systems is rising due to climate change and increasing storm waters in cities. Demand for building the systems is increasing. Seems like there is a demand for innovations and new products and services in producing storm water management systems. Some level of stakeholder engagement could encourage private actors to come up with new ways to produce urban ecosystem services. Sharing information, building awareness and organizing workshops could bring up new and more efficient ways to identify relevant stakeholders and collaborate with different stakeholders. It can also bring totally new actors to the field. When companies develop new products and services to build storm water systems the process would come more efficient and faster.

These operations and functions are still mainly in the hands of public sector. Know-how and interest of private business is increasing little by little but how they could be more involved? For example, Rambol is already marketing their services on "Climate

adaptation & Landscape architecture" and showing of references from their pilot natural storm water management systems project in New York and other cities in the world. Companies should be more open minded and participate on these pilot projects with less profit to learn more on the production in order to learn and develop services for the problem on increasing storm waters in cities. The whole market for building natural storm water management systems is still in its infancy, but these kinds of references will be crucial when the adaptation to climate change will predictably increase and cities will start to build urban and natural storm water management systems. When companies have references on similar projects and can show that these kinds of projects are already routine for them it is easier to win offers. Then again after routine it is important to continue testing and piloting new ways of working since all the possibilities are not tested yet.

The mind set for considering storm waters is spreading to different parts of public organization in Helsinki. When the topic is internalized more thoroughly, in public organization, the demand for the projects will probably increase. When that happens there is a need for experts who can execute the projects. Contribution of private companies was relatively limited in the three cases reviewed in this study. In the future these projects could be more in hands of private companies even if a purchaser is a public organization. Findings in this study shows that there is a demand for solutions, products and know-how from private companies in this subject matter.

Future will show if there ever will be a market for these kinds of projects handled only with private resources and private actors. If there wouldn't be any public money or political will involve, would privately owned companies or private persons be willing to invest in these kinds of products and services. It is not impossible prospect that products and services for example specific purifying plants or natural storm water management systems could be in business-to-consumer markets as well. Green roofs are already taking space in private markets so why not other natural ecosystem services. It would be interesting to find out whether the hundreds of thousands summer cottage owners in Finland would prefer to plant specific plants based on their purifying quality to their summer cottage properties to protect the nearby lakes and waters from

impurities'. So, doing more research on this topic and using it as a marketing technique might be unreasonable.

5.3 Assessment and suggestions for further research

Credibility of a research can be evaluated by reviewing the openly stated methodological decisions (Tuomi & Sarajärvi 2009). Selected methodologies and reasonings behind them are presented openly and the research process are described in detail. The study could have been conducted in numerous different ways and the outcomes may have differed based on selected methodologies. Due to prisonization, emphasis and selected theoretical framework used in this study, the focus could have been in other values found from the data.

The findings of this study are not to be applied to other similar cases. The findings are unique for the three cases used in this study and should not be generalized to other ecosystem service production. However, the findings of this study support previous research on the subject matter.

As Reed (2008) mentions, observing stakeholder engagement, the emphasis should be on the participation as a process rather than focusing on the selected tools to carry out the stakeholder engagement. The timing of the study has also an impact to the data and findings in this research. If it would have been possible to observe the projects and cooperation between different stakeholders in real time rather than conducting the interviews afterward, could have been given a different perspective and findings to this study. Also, since all the stakeholders were not interviewed there are probably some values left unobserved. Data would have been a lot richer if all the stakeholders involved would have been interviewed.

The framework to categorize the values was initially developed to describe customer value in retail business (Rintamäki, Kuusela & Mitroinen 2007) so there were some limitations on using it in the context of identifying values between different stakeholders in a process. Biggest deficiency was when the value was clearly about benefitting the nature.

As a suggestion for further research would be beneficial to really get involved to follow these kinds of projects in real time and facilitate some of the stakeholder involvement workshops. Then the researcher could really interview all the relevant stakeholders involved and measure what kind of benefits there can be when involving stakeholder more openly and systematically.

Another interesting research topic would be to interview more companies that are involved in building these kinds of urban ecosystem and what are the best practices internationally. For example, Ramboll tells on their website that they have implemented stormwater management systems in Singapore and New York and Copenhagen. Rambol would be an interesting case company to further study the business potential in building natural storm water management systems. The need is of course global and global references on these matters can be valuable.

REFERENCES

Anderson, J. C., Narus, J. A., & Van Rossum, W. (2006). Customer value propositions in business markets. *Harvard Business Review*, *84*(3), 90.

Bennett, E. M., Cramer, W., Begossi, A., Cundill, G., Díaz, S., Egoh, B.N., ... & Lebel, L. (2015). Linking biodiversity, ecosystem services, and human well-being: three challenges for designing research for sustainability. *Current Opinion in Environmental Sustainability*, *14*, 76-85.

Bergström, I., Mattsson, T., Niemelä, E., Vuorenmaa, J. & Forsius, M. (2011). Ecosystem services and livelihoods – vulnerability and adaptation to a changing climate. VACCIA synthesis report. Finnish Environment Institute

Business to nature. Research project website. Available: https://www.b2n.fi/ Visited: 20.12.2020

Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., ... & Raskin, R. G. (1997). The value of the world's ecosystem services and natural capital. *Nature*, *387*(6630), 253-260.

Daily, G. (1997). Nature's services: societal dependence on natural ecosystems. Island Press, Washington, D.C.

Driscoll, C., & Starik, M. (2004). The primordial stakeholder: Advancing the conceptual consideration of stakeholder status for the natural environment. *Journal of Business Ethics*, *49*(1), 55-73.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107-115.

Freeman, R. E. (1984). Strategic management: A stakeholder approach. Boston: Pitman

Greenwood, M. (2007). Stakeholder engagement: Beyond the myth of corporate responsibility. *Journal of Business Ethics*, *74*(4), 315-327.

Haddaway, N. R., Kohl, C., da Silva, N. R., Schiemann, J., Spök, A., Stewart, R., ... & Wilhelm, R. (2017). A framework for stakeholder engagement during systematic reviews and maps in environmental management. *Environmental Evidence*, *6*(1), 11.

Hiedanpää, J., Suvantola, L., & Naskali, A. (2010). Ekosysteemipalvelun käsitteen lupaus. Hyödyllinen luonto; Ekosysteemipalvelut hyvinvointimme perusta/Ed.

Heinonen, P., Toivonen, K., Eitsi, E. & Bossmann, E-V. (2016). Case hulevesirakenteesta: Vuoreksen keskuspuisto. Viherympäristö 4/2016.

Houdet, J., Trommetter, M., & Weber, J. (2012). Understanding changes in business strategies regarding biodiversity and ecosystem services. *Ecological Economics*, *73*, 37-46.

Hein, L., Van Koppen, K., De Groot, R. S., & Van Ierland, E. C. (2006). Spatial scales, stakeholders and the valuation of ecosystem services. *Ecological Economics*, *57*(2), 209-228.

Janhonen, S & Nikkonen, M. (2001). Laadulliset tutkimusmenetelmät hoitotieteessä. WSOY, Helsinki.

Juniper, T. (2013). What has nature ever done for us? How money really grow on trees. Profile Books, London

Laine, M. (2010). The nature of nature as a stakeholder. *Journal of Business Ethics*, *96*(1), 73.

Lopes, R., & Videira, N. (2016). A collaborative approach for scoping ecosystem services with stakeholders: the case of Arrabida Natural Park. *Environmental Management*, *58*(2), 323-342.

Luyet, V., Schlaepfer, R., Parlange, M. B., & Buttler, A. (2012). A framework to implement stakeholder participation in environmental projects. *Journal of Environmental Management,* 111, 213-219.

MA (2005). Ecosystems and Human Well-Being: Synthesis. Island Press, Washington DC.

Menzel, S., & Teng, J. (2010). Ecosystem services as a stakeholder-driven concept for conservation science. *Conservation Biology*, *24*(3), 907-909.

Ranjan, K. R., & Read, S. (2016). Value co-creation: concept and measurement. *Journal of the Academy of Marketing Science*, *44*(3), 290-315.

Reed, M. S. (2008). Stakeholder participation for environmental management: a literature review. *Biological Conservation*, *141*(10), 2417-2431.

Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., ... & Stringer, L. C. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*, *90*(5), 1933-1949.

Rintamäki, T., Kuusela, H., & Mitronen, L. (2007). Identifying competitive customer value propositions in retailing. *Managing Service Quality: An International Journal*. Vol. 17, No. 6, pp. 621-634.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., ... & Nykvist, B. (2009). A safe operating space for humanity. *Nature*, *461*(7263), 472-475.

Rode, J., Wittmer, H., Emerton, L., & Schröter-Schlaack, C. (2016). 'Ecosystem service opportunities': A practice-oriented framework for identifying economic instruments to enhance biodiversity and human livelihoods. *Journal for Nature Conservation*, *33*, 35-47.

Schreier, M. (2014). Qualitative content analysis. The SAGE handbook of qualitative data analysis, 170-183.

Seppelt, R., Dormann, C. F., Eppink, F. V., Lautenbach, S., & Schmidt, S. (2011). A quantitative review of ecosystem service studies: approaches, shortcomings and the road ahead. *Journal of Applied Ecology*, *48*(3), 630 -636.

SYKE (2019) Mitä on hulevesi? Available https://www.vesi.fi/vesitieto/mita-on-hulevesi/ Visited 20.12.2020

Tuomi, J. & Sarajärvi, A. (2009) Laadullinentutkimus ja sisällönanalyysi. Jyväskylä: Tammi

TEEB (2010), The Economics of Ecosystems and Biodiversity Ecological and Economic Foundations. Edited by Pushpam Kumar. Earthscan, London and Washington

TEEB (2012). The Economics of Ecosystems and Biodiversity in Business and Enterprise. Edited by Joshua Bishop. Earthscan, London and New York

Thompson, J. L., Kaiser, A., Sparks, E. L., Shelton, M., Brunden, E., Cherry, J. A., & Cebrian, J. (2016). Ecosystem–What? Public Understanding and Trust in conservation science and ecosystem services. *Frontiers in Communication*, *1*, 3.

Vitousek, P. M., Mooney, H. A., Lubchenco, J., & Melillo, J. M. (1997). Human domination of Earth's ecosystems. *Science*, *277*(5325), 494-499.

Vuores website.
Available: https://vuores.fi/palvelut/palvelut-listana/13 Visited 20.12.2020

Whiteman, G., Walker, B., & Perego, P. (2013). Planetary boundaries: Ecological foundations for corporate sustainability. *Journal of Management studies*, *50*(2), 307-336.

Winn, M. I., & Pogutz, S. (2013). Business, ecosystems, and biodiversity: New horizons for management research. *Organization & Environment*, *26*(2), 203-229.

World Bank (1996). The World Bank Participation Sourcebook. World Bank, Washington.

APPENDICES

Appendix 1: Frame for semi-structured interview

All interview questions are directive and they were not presented in this order. Some of the questions were not asked from every interviewee and the interviews were more conversational than logically proceeding questions and answers.

Background

- What is/has been your role in the project?
- What is your professional background?
- Do you have some personal interest on the subject?
- What motivates you in the project?

Process in general

- How did the project proceed?
- How was the ecosystem built?
- What kind of actors were involved?
- How has been the cooperation between different actors in the project?
- What was missing during the projects?
- Did you have some challenges?
- What did you learn from the project
- Is there something you would do differently now?

Stakeholder involvement

- Did you do any stakeholder identification?
- Did you do any stakeholder analysis?
- What kind of stakeholders were involved?
- What kind of methods you used involving stakeholders?
- What were the outcomes of involving stakeholders?
- What kind of feedback have you been getting?
- Have you had any contacts/comments?
- How different stakeholders reacted to the ecosystem?
- How different stakeholders reacted to the constructions?