



Navigating Value Dynamics

A tool for mapping multi-stakeholder
value ecosystems in the LIFE Project

Welcome to my thesis!

Navigating Value Dynamics
A tool for mapping multi-stakeholder
value ecosystems in the LIFE Project

Master thesis

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Summary

The Energy transition is driving systemic changes in energy systems to reduce CO₂ emissions. The Local Inclusive Future Energy (LIFE) Project, a ‘Living Lab’ consortium, seeks to accelerate this transition in Amsterdam Zuidooost, by preventing energy congestion inclusively (LIFE project, 2022). The complexity of the challenge requires multi-sector collaboration to develop urban innovations (Energielab Zuidooost, 2023, Parsons DESIS Lab, 2022).

Multi-actor collaboration is essential to develop and integrate new energy systems, evident in actors’ interconnection in value networks and complex value propositions for integrating these product services (Weiller, C., & Neely, A., 2013). However, ecosystem collaboration comes with challenges, as each actor operates under different principles and seeks different benefits (Bos-de Vos, 2020). In this context, service designers face the challenge of developing methods and approaches to improve actors’ capabilities in navigating systemic complexity, and translating abstract values into concrete actions (Sangiorgi, 2009, Vink, J., 2021, Bos-de Vos, 2020).

To address these issues, this thesis examines the LIFE project, employing both theoretical research and empirical data. One significant theoretical gap is the lack of tools for value modeling from an ecosystem perspective. Within the LIFE project, complex conversations regarding values emerge due to differing perceptions, leading to value misalignment, siloed ways of working, and intricate decision-making processes. The prevailing view of value focuses on unidirectional exchanges, lacking an ecosystem or systemic perspective of the project. Thus, a need arises for a tool that provides an ecosystem view and allows multiple stakeholders to engage in explicit value conversations.

To bridge this gap, this thesis introduces the ‘value ecosystem canvas,’ supporting collaborative networks in value ecosystem modeling (Figure 1). This ‘project-centric’ tool is designed for co-creation sessions, enabling actors to visually model value exchanges iteratively with the aid of a clear value guide (Bos-de Vos, 2020), exploring potential links between actors and concretizing value exchanges. Additionally, it facilitates an ecosystem understanding of how product-services add value to other actors and what value could be potentially exchanged (created and captured).

In conclusion, the value ecosystem canvas aims to foster effective collaboration, align values, and promote a shared understanding of value exchanges within the LIFE Project consortium and other urban innovation initiatives. By enabling a systemic view, the tool empowers collaborative networks to navigate complexity and contribute meaningfully to the ongoing systemic transitions.

Figure 1: Value ecosystem canvas actor cards

Glossary

This section defines and provides brief descriptions of terms and abbreviations used throughout this report.

Key Terms

Value creation

How and by what means do stakeholders create value, using resources and capabilities within the organization.

Value co-creation

Users, organizations, and other stakeholders actively contributing to the collaborative creation of value.

Value capture

How and what value is derived and retained from the process of value co-creation for specific stakeholders.

Value proposition

Represents the benefits delivered to stakeholders for which payment or another value exchange takes place.

Value exchange

Interaction between two or more stakeholders in which different sorts of values are interchanged.

Value network

A web of value exchanges between different stakeholders to establishing value propositions.

Value ecosystem

Set of stakeholders who contribute to larger systems and are interconnected; each plays a unique role in the creation of value.

Large Asset Owners

Organizations or institutions that own a type of energy asset, with the potential to generate, store, or distribute energy.

Johan Cruijff Arena

A sports and entertainment venue, a large asset owner of a battery and LIFE project partner.

DSO

Entities responsible for distributing and managing energy from the generation sources to the final consumers. For this project, Alliander is the company that develops and operates the energy network.

Gemeente Amsterdam

The Municipality of Amsterdam

Abbreviations

DSO

Distribution system operators

LAO

Large Asset Owners

LIFE

Local Inclusive Future Energy

JCA

Johan Cruijff ArenA

IDE

Industrial Design Engineering Faculty of TU Delft

AMS Institute

Amsterdam Institute for Advanced Metropolitan Solutions

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Reading Guide

This thesis is divided into five sections as outlined below:



1. Introduction

Systemic shifts, the servitization of businesses, and the evolution of the service design field all frame the thesis context. The LIFE project is presented as a Case Study applying design values in the field of service ecosystem design. The methodology, design approaches, methods & practices are described.



2. Theoretical Background

Literature immersion to better comprehend and define value, value for organizations, value for the ecosystem, service ecosystem design, and value modeling tools.



3. Empirical Research

The case study is described, along with the qualitative, participatory and desk research that led to the empirical research's findings.



4. Tool Development

The application of theoretical and empirical findings to the creation of a tool and method for ecosystem value modeling. Covers the development process, tool description and validation within the LIFE project.



5. Conclusions

Master's thesis conclusion, limitations, and suggestions for future research.

1. Introduction

This section provides an overview of this Master's Thesis. First, the project's context and its relationship to the LIFE Case Study are defined. Then, the scope of the undertaking is examined, including the project's research question and associated sub-questions. The chapter concludes with the project's approach and the report's structure.

1.1 Project Context

The context of this project is influenced by the following three factors.

Currently, energy transition is one of the developments that demand systemic changes, which involves the modification of energy systems to reduce CO₂ emissions. In this context, systemic transitions generate technological innovations that aim to address social challenges such as energy equality and decentralized future energy visions, necessitating social participation and cross-sector partnerships for the development of these initiatives (Ryszawska, B., et al., 2021).

Innovation laboratories and research projects are implementing pilots and experiments to determine the scalability of these innovations in the real world (Energielab Zuidoost, 2023, Parsons DESIS Lab, 2022). The LIFE project is a 'Living Lab' initiative aiming to accelerate the Dutch energy transition by developing flexible energy systems in a multi-sector project consortium. Partners from the private sector, public sector, society, and knowledge institutions have joined forces to develop urban innovations in response to these challenges (AMS Institute, 2023). However, the collaboration between multiple parties is complicated by the fact that various parties are governed by different principles and seek different benefits (Bos-de Vos, 2020).

Secondly, the servitization of organizations and the rapid pace of technological advancements have augmented the complexity of value propositions (Vargo and Lusch, 2011). This complexity is reflected in dynamic, multi-actor exchange channels in which the actors combine their experience, knowledge, and abilities to provide products and services (Weiller, C., & Neely, A., 2013). Understanding these exchanges becomes important, as both the behavior of users and other actors (such as users, suppliers, competitors, and government) are influential in the adoption of technology (Talmar, M., et al., 2020). For the LIFE project, collaboration is required for the development of a digital platform, with each stakeholder contributing their knowl-

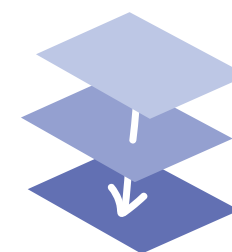
edge, resources, and competencies to shape the value proposition. In addition, the introduction of smart energy technology requires the involvement of numerous stakeholders in Amsterdam Zuidoost, ranging from residents to large organizations (LIFE project, 2022).

Lastly, the practice of service design has matured as it strives for long-term impact, shifting from a section-based to a systemic comprehension of the services it designs (Patricio, Gustafsson and Fisk 2018; Sangiorgi, Patricio and Fisk 2017). To aid organizations in the design, development, and implementation of products and services, service designers are challenged to create practical methods and approaches to navigate through systemic complexity (Sangiorgi, 2009, Vink, J., 2021). Within the LIFE project, service designers are integral partners, actively supporting the consortium by providing essential guidance, inspiration, and exploration of the social aspects of the platform.

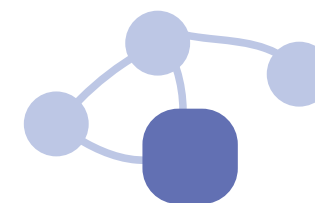
In conclusion, these three factors constitute the project's context (Figure 2):

- Systemic challenges:** this requires collaboration of cross-sectors in the development of innovations.
- Servitization & technological developments:** complex and interconnected value propositions.
- Transformation of service design practice:** aid organizations to navigate systemic understanding.

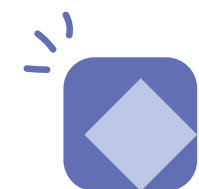
The LIFE platform initiative operates within this context. The consortium's goal is to reduce energy net congestion while maximizing the area's acceptability and social inclusion. Currently, the complexity of the project, involving stakeholders from different sectors, poses difficulties when designing the project and identifying its value proposition when multiple stakeholders are involved. Therefore, they are searching for another way to identify potential value opportunities for the area's diverse set of stakeholders.



Systemic challenges



Servitization & technological developments



Transformation of service design practice

Figure 2: Three factors that constitute project's context



1.1 Project Scope

The project scope is determined by the following factors.

Designing values into service ecosystems

New forms of collaboration combined with the development of complex products and services with interconnected value propositions increase the complexity of value co-creation in a multi-stakeholder context (Vink, J., 2021). These approaches indicate the need for novel methods that develop actor competencies (Karpen, Gemser, and Calabretta, 2017). This project's context is the transition to service ecosystem design, together with the development of methods and tools for value modeling in the early phases of product and service development. Following a review of the relevant literature, this project is guided by the following research question:

How can methods and tools for value modeling in service design support collaborative networks in a multi-stakeholder ecosystem?

To contribute to answering the research question, the theoretical background seeks to investigate further into what is known in the literature. This assists in defining the terms used in the research query and provides context for the case study. The following sub-questions guide this search:

- What is value in the field of service design?
- How to design for value in a multi-stakeholder ecosystem?
- What tools exist for value modeling?

Case study LIFE project

This project aims to establish a connection between theoretical insights and their practical application by using the LIFE project consortium as a case study. Through a combination of empirical and theoretical research, this study guides problem understanding and design processes. For the LIFE project, the focal point is the integration of various stakeholders in Amsterdam Zuidooost, identified as Large Asset Owners (LAO's) within the LIFE project (Figure 3).

As the project progressed, both theoretical and empirical research expanded the understanding of value exchanges and value modeling, moving beyond the traditional notion of 'value propositions.' However, it is essential to acknowledge that this question still reflects the perspective and value understanding of the client and the project.

The empirical research was guided by the following research questions:

How can we develop value propositions that benefit the multi-stakeholder ecosystem of Amsterdam Zuidooost?

By carefully considering these research questions and leveraging the insights gained from both theoretical and empirical research, the project aims to develop a more comprehensive understanding of value co-creation and its practical implications within the context of the LIFE project consortium. Comparison to other case studies was beyond the scope of the undertaking. Nonetheless, the results may be applicable to other collaborative networks and project consortiums.

Figure 3: Amsterdam Zuidooost

1.1 Project Approach

In order to answer the research questions, this project follows the double-diamond framework for innovation (British Design Council, 2005) (Figure 4). The framework is sufficiently adaptable to switch between convergent and divergent reasoning as the design process advances. The Discover and Define phases involve divergent thinking, which involves understanding the context and framing the problem space. Subsequently, the Develop and Deliver phases are convergent in their approach as they move to the solution domain.

First, I reviewed relevant literature and immersed myself in the context of the case study. To acquire a more

thorough understanding, internal project documents were reviewed and ethnographic research and interviews were conducted to comprehend the context and frame the problem. The following step involved analyzing the data to identify patterns and themes and synthesizing the conclusions into initial insights. Participatory design through co-creation sessions helped to generate ideas, identify specific opportunities and challenges, and formulate the direction for moving forward by re-framing the problem.

The third phase involves tool ideation and prototyping. Converging between theoretical and empirical research,

utilizing research through design in a testing, and iteration process. The final phase consists of presenting the findings to internal stakeholders, refining and evaluating the method and the tool in order to assess the potential for the case study.

Although the double diamond is the overall approach for the project, a variety of design approaches, methods, and practices are utilized throughout the various design phases, as detailed in the following pages.

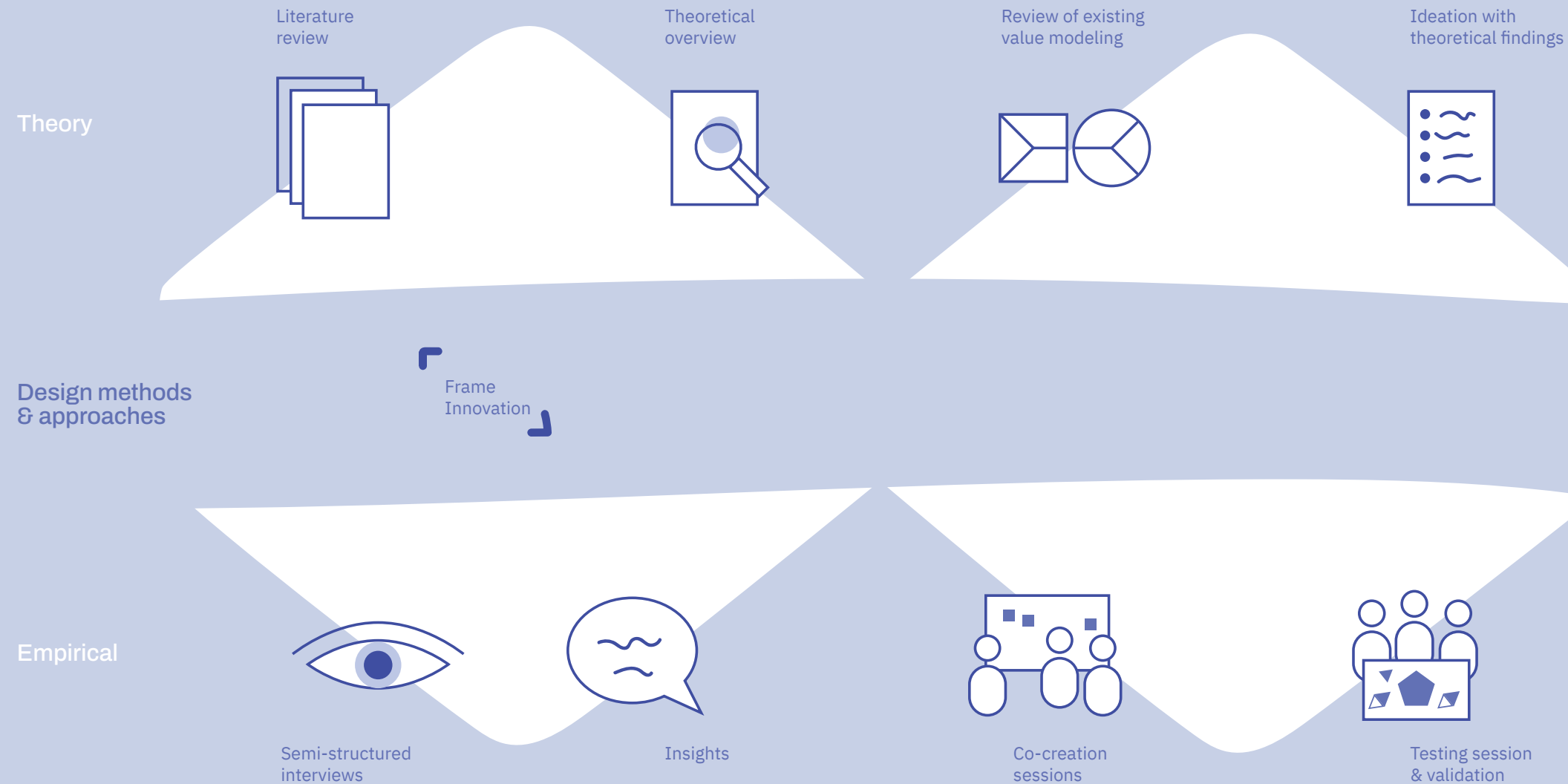


Figure 4: Project approach adapted from double diamond framework for innovation (British Design Council, 2005)

Design Approaches

Frame Innovation

Complex issues, such as the energy transition, require government, citizens, and stakeholders to interact on multiple levels (Ryszawska, B., et al., 2021). Traditional, reductionist problem-solving methods have proved ineffective in addressing these challenges (Dorst, 2011). Framing innovation is appropriate for open-ended, networked, complex, and dynamic problems (Dorst, 2015). The “framing” of a problem, a term adapted by Schon (1991) in the field of design, refers to the continuous process of acquiring information about the problem’s context, which leads to a new approach or framing of the problem situation (Dorst, K., & Cross, N., 2001; Dorst, 2015).

This problem is open-ended by considering a multi-stakeholder dynamic, with different perspectives and framing. The development of new services that support the implementation of a just energy transition is one of such problem described above. Complex, as it is part of simultaneous changes within a system; dynamic as it is currently unfolding and networked, as it is influenced by numerous societal developments. The concept of framing is utilized throughout the project to identify the current understanding of the problems at hand and as part of an iterative process of reframing, used to view the problem from a variety of angles.

Research through design

A research-through-design approach often uses actions that are recognized as design activities to contribute to the generation of knowledge (Stappers, PJ, & Giaccardi, E, 2017). These design activities involve understanding a complex situation by constantly rethinking it through an iterative process of prototype development (Stappers, PJ, & Giaccardi, E, 2017). This thought process, which confronts theoretical and empirical opportunities and limitations, creates knowledge (Stappers, PJ, & Giaccardi, E, 2017). This occurs through reflective practice and “framing” (Schon, 2010), in which the act of designing becomes a generative research action, resulting in the acquisition of new insights (Stappers, PJ., 2017). In this respect, prototypes (of potential tools or design techniques) play a crucial role, as they promote discussion and enable previously nonexistent interactions (Stappers, PJ., 2017).

Throughout the project, a research-through-design approach is utilized, in which design activities, prototypes, and methodologies aid in understanding the problem, opportunities, and obstacles. Facilitating conversations and discussions with stakeholders, led to a generation of insights and further steps in the process.

Participatory Design

A Participatory design approach actively involves the stakeholders being served in the design process (Sanders & Stappers, 2008). The distinction between user-centered design and participatory design is the user’s role. The user is considered an active participant in participatory design (Stappers & Visser, 2007). Traditionally, it would involve the ‘users’ of the final product. However, in the case of a project consortium, the definition of a ‘user’ is more complex, as there are a variety of stakeholders involved who may be users at various phases of the development of the product service.

Given the complex context of the consortium at hand, participatory design is a useful approach as it invites the stakeholders involved in the project to be part of it, making sure outcomes are aligned with goals and objectives. The project utilizes physical artifacts (tools, canvases) as thinking tools (Sanders & Stappers, 2008). This aims to foster ownership of results, which facilitates later implementation.

Methods & practices

Strategic Design

Strategic Design focuses on the ‘fuzzy’ strategic step preceding product development (Voûte, E., et al., 2020). A strategy connects the company’s operations to its vision of the future (Reymen, I., et al., 2017). Assisting organizations in imagining the future, aligning multidisciplinary teams, and working toward a desired future (Calabretta, G., & Kleinsmann, M., 2017). As defined by Calabretta et al. Strategic design is ‘The use of design principles and practices to guide the co-formulation and co-implementation of an innovation strategy toward outcomes that benefit people and organizations alike’. (Calabretta, G., et al. 2016)

An innovation strategy is composed of four building blocks. Strategic designers move along the four blocks: from developing a vision, steps, and actions to get there (strategic plan), understanding existing and potential resources and capabilities, or developing processes, methods, and practices for implementation system (Calabretta, G., et al. 2016). Similar to other design disciplines, it employs the tools, techniques, and methods of participatory design, user-centered design, and generative design research (Sanders & Stappers, 2008).

Throughout the project, strategic design is utilized as a lens to zoom in and out of the problem. Often, this involves questioning the consortium activities, beginning with an understanding of the context (system and events that influence the ecosystem), the consortium (mission, vision, capabilities), and the people (stakeholders, organizations, users, and their interactions) moving between the system and the proposal. This project concentrates on the fourth innovation strategy building block through the development of a method and instrument.

Co-creation

Participatory approaches, such as co-creation, have emerged as a value-adding technique in the private and public sectors. It has been studied as a facilitator of green energy transformations (Ryszawska, B, et al., 2021). Co-creation is any act of collaborative creativity (Sanders & Stappers, 2008). This method also enables stakeholders to comprehend one another’s motivations, resulting in the creation of value that is mutually beneficial (Porter and Kramer, 2011; Bos-de Vos, M., 2020). Understanding the interactions between stakeholders is crucial not only for the design output but also for the values the design will promote (Friedman & Hendry, 2019). Therefore, co-creation is a promising method for identifying value-creation opportunities and addressing the complex dynamics of a multi-stakeholder ecosystem.

This method is used as an opportunity to bring consortium stakeholders together and establish a collaborative space for transforming challenges into opportunities. These creative sessions served as an arena for stakeholders to deliberate and work together. The objective was to reach a consensus, although the fact of bringing the subject up for discussion and provoking the reflection of various stakeholders brought these issues to the forefront.

2. Theoretical background

To have a better understanding of the context, relevant literature related to the research question and sub-questions were consulted. The concepts of value in the field of service design, the understanding of designing for value in a multi-stakeholder ecosystem, and the exploration of value modeling tools are emphasized. The foundational research led to conclusions that the sub-questions and provided theoretical knowledge guided the subsequent empirical research phase, which then laid the foundation for the development of the tool.

2.1 Defining Value

To better comprehend what designing with value entails, we will define value within the context of service design. In everyday practice, the word value is used frequently, but its meaning varies depending on the context. In order to understand value, it is essential to differentiate between the so-called levels at which value is perceived. Den Ouden identifies four levels of value in the context of innovation: value for consumers, value for organizations, value for ecosystems, and value for society, as illustrated in Figure 5 (Den Ouden, E. 2012).

perspective (Vandermerwe, S., Rada, J.,1988). This led to the establishment of service-dominated logic (S-D logic), which reframes the concept of value creation and exchange to one of value co-creation (Vargo and Lusch, 2004). According to S-D logic, the process of creating value is a collaborative endeavor (Prahalad & Ramaswamy, 2004). Customers now are active participants (co-creators of value) in the process of value creation, delivery, and consumption (Edvardsson et al., 2021; Prahalad & Ramaswamy, 2004; Ryszawska, B, et al., 2021).

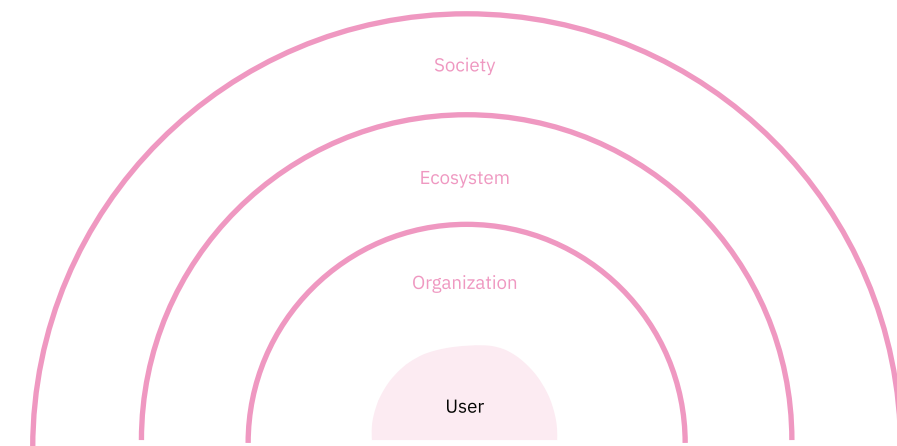


Figure 5: Value framework, levels of value adapted from (E.Den Ouden, 2012)

Providing value for consumers was the prevailing perspective in marketing for much of the 20th century, within a 'goods dominant logic' in which value was seen as embedded in tangible goods (Wise, R., Baumgartner, P.,1999). By focusing on features, attributes and functionality of products, organizations created and delivered value to consumers (Vargo and Lusch, 2004). In this context, users were the intended beneficiaries of innovation, and the flow of value was viewed as unidirectional from organizations to users. An attractive value proposition for the user was an indicator of value creation for consumers. Understanding the user's motivational values was essential for creating value (Den Ouden, E. 2012).

Since the early 2000's, the servitization of manufacturing proposed a shift towards a service-centered

The following terms will be used frequently throughout the report, thus their definitions are provided below and illustrated in Figure 6:

Value creation: How and by what means do stakeholders create value by using resources and capabilities within the organization (Bocken, N. et al, 2013).

Value capture: How and what value is derived and retained from the process of co-creation of value for specific stakeholders (Bos-de Vos, M. et al., 2019).

Value Proposition: Represents the benefits delivered to stakeholders for which payment or another value exchange takes place (Bocken, N. et al, 2013).

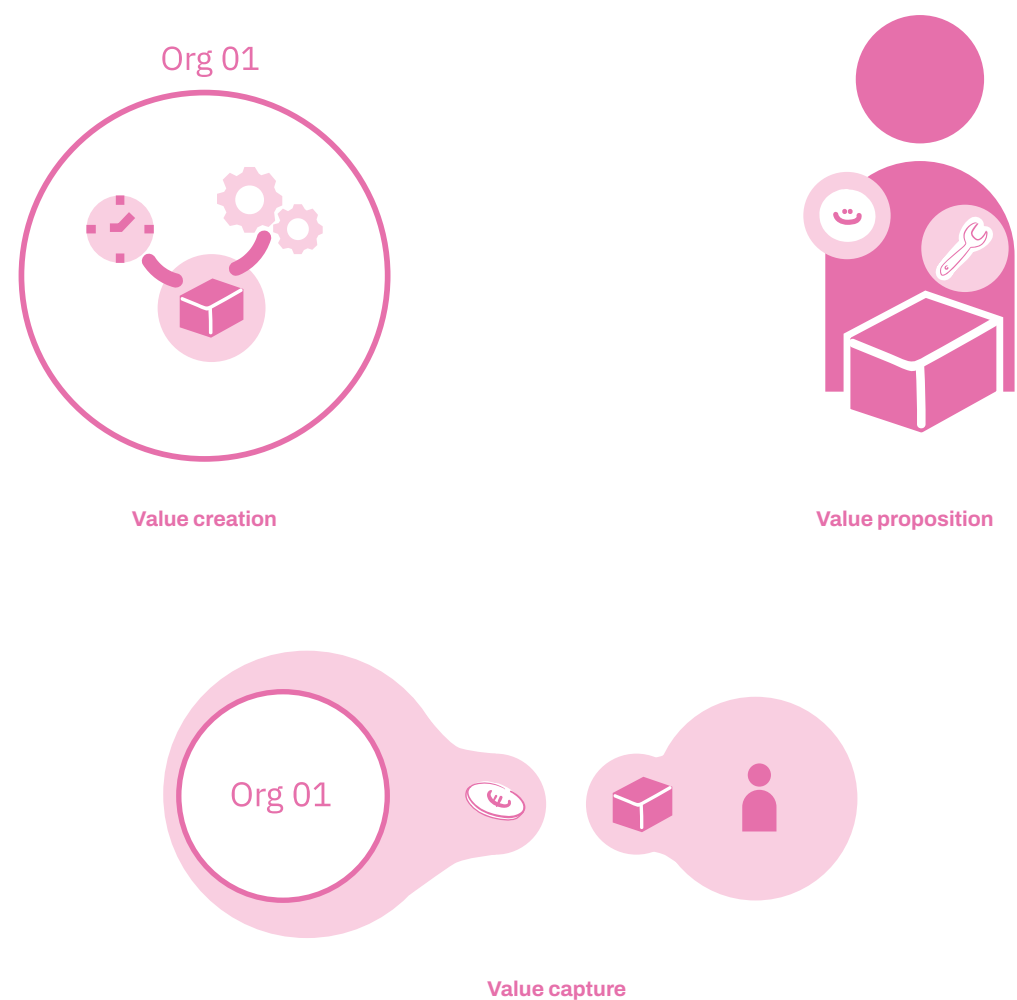


Figure 6: Guiding value terms used in this report.

In the context of value co-creation, organizations strive to provide added value to their customers while simultaneously creating value for their employees. As established by Den Ouden's, the next level of value perception is the value for organizations (Figure 7). Regardless of whether a company is for-profit or not-for-profit, they employ various value creation strategies to achieve these objectives (Den Ouden, E. 2012).

To enable innovation in value creation, a redefinition of value is necessary, which is possible only by comprehending unarticulated consumer desires. Den Ouden distinguishes two categories of innovation: **Transformational innovation** addresses unmet user requirements that are frequently unknown to users. **Radical innovation** instead, creates new meanings for users by proposing new products and services (Den Ouden,

E. 2012).

In the context of this thesis, an innovative service is being developed by the LIFE project to create value for a wide range of users. This multi-organisational collaborative setting increases the challenge of creating and capturing value, so it is crucial to understand how value can be approached for organisations.

2.2 Value for organizations

As stated in the previous section, organizations traditionally create value for existing or prospective customers and employees. This, while balancing value capture for their shareholders through profits and financial gains.

It is common to use the term "organizational values" to define the identity or perspective of an organization. An example of this would be a company characterizing their values as innovative, sustainable, or honest. However, it is important to note that the term value is distinct from a company's pursuit of economic value or commercial value.

An example would be Patagonia an outdoor clothing and gear company; their core values include environmental stewardship, transparency, and social activism. In terms of action selection, Patagonia prioritizes sustainable and environmentally friendly practices by selecting materials that have a minimal impact on the environment, such as using organic cotton and recycled polyester in their products (Patagonia, 2023). In terms of action evaluation, Patagonia regularly assesses the environmental impact of their operations. They conduct lifecycle assessments to evaluate the ecological footprint of their products (Patagonia, 2023).

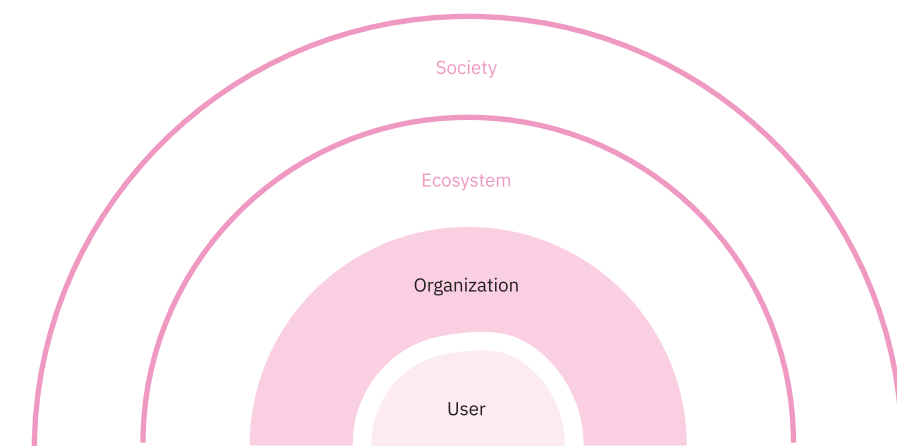


Figure 7: Value for organization, levels of value adapted from (E. Den Ouden, 2012)

This is due to the fact that **values are multidimensional and can play a variety of roles**. This thesis will employ the distinction between these different roles theorized by Bos-de Vos (Bos-de Vos, 2020) to determine the nature of the different values being exchanged, or exchanged values as we will call them from now on.

Bos-de vos (2020) defines actors beliefs or perceptions of what is important in life as **Values as guiding principles**. Not only can values characterize individuals, but also cultural groups, teams, organizations, and societies (Schwartz, 2012). In this sense, values are internal guides and convictions that motivate action, action selection, and action evaluation. Different parties or people may share the same values but might favor one value over another (Schwartz, 2012)(Figure 8).

Core values are the values as guiding principles of an organization. They are intended to help manage audience expectations of how companies want to be perceived by the audience. These values guide crucial decision making at an organizational strategy level.

Alternatively, **values as qualities of worth** are defined as a specific quality with a certain worth that is or could be realized through a design (Bos-de Vos, 2020). This worthiness was mostly seen as economic from the point of view of an organization (Heskett, 2009). However, value creation in the design process is no longer viewed as purely economic. As defined by Bos-de Vos, *use value* describes the user's perception of the qualities of the product, service, or company, sometimes attributing symbolic or emotional significance to it (Bos-de Vos, 2020, Bowman & Ambrosini, 2000). Other classi-

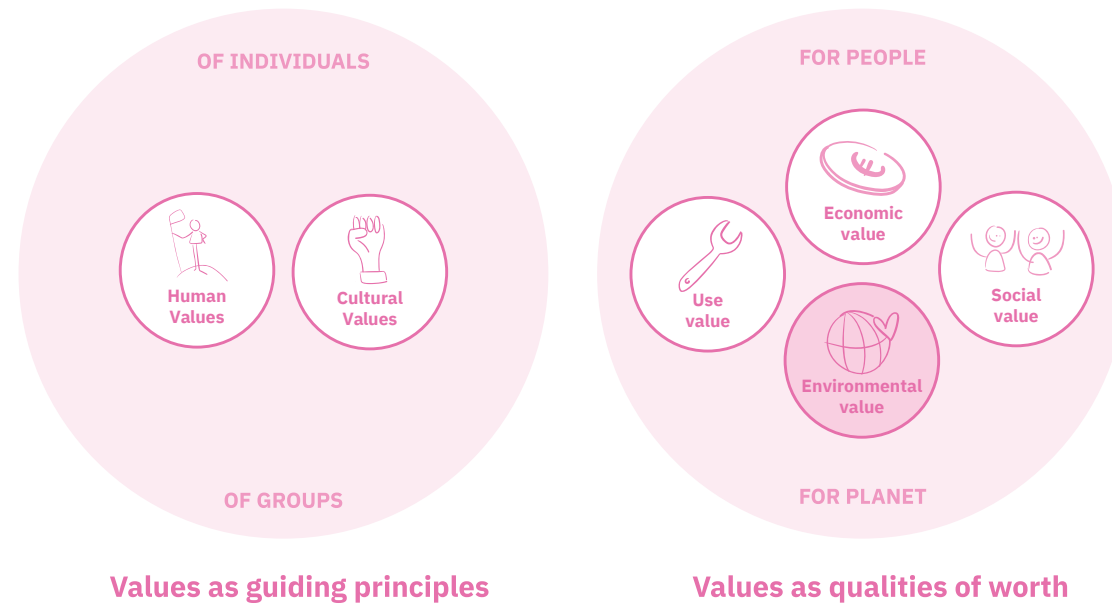


Figure 8: Framework for divergent values, adapted from Bos-de Vos (2020)

fications include *social value*, which emphasizes generating benefits for human society, and *environmental value*, which prioritizes generating value for the physical environment or preservation of the planet (Bos-de Vos, 2020).

In this regard, there are various types of organizations, yet what distinguishes them is their **purpose**, which prioritizes the value they strive to attain. Figure 9 illustrates a classification established by Alter, K., emphasizing that the boundaries between for-profit and non-profit organizations are blurring, with hybrid organizations aspiring for dual creation of value that does not necessarily position them in one extreme (Alter, K., 2007).

This classification is less thorough than Bos-de Vos as it only considers economic and social value, yet it is a useful starting point for understanding different types of organizations. In the context of this project, where various types of organizations are collaborating, this becomes crucial (Bos-de Vos, 2020).

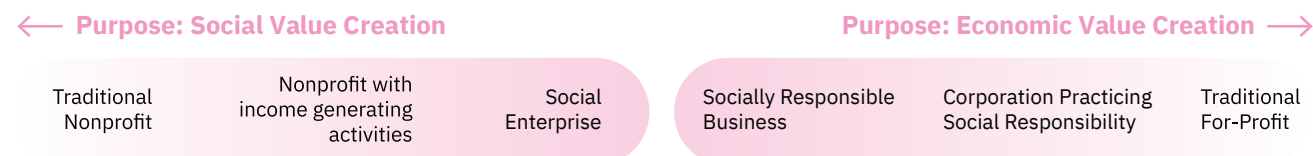


Figure 9: Social and economic value creation, adapted from Business model spectrum (Alter, K., 2007)

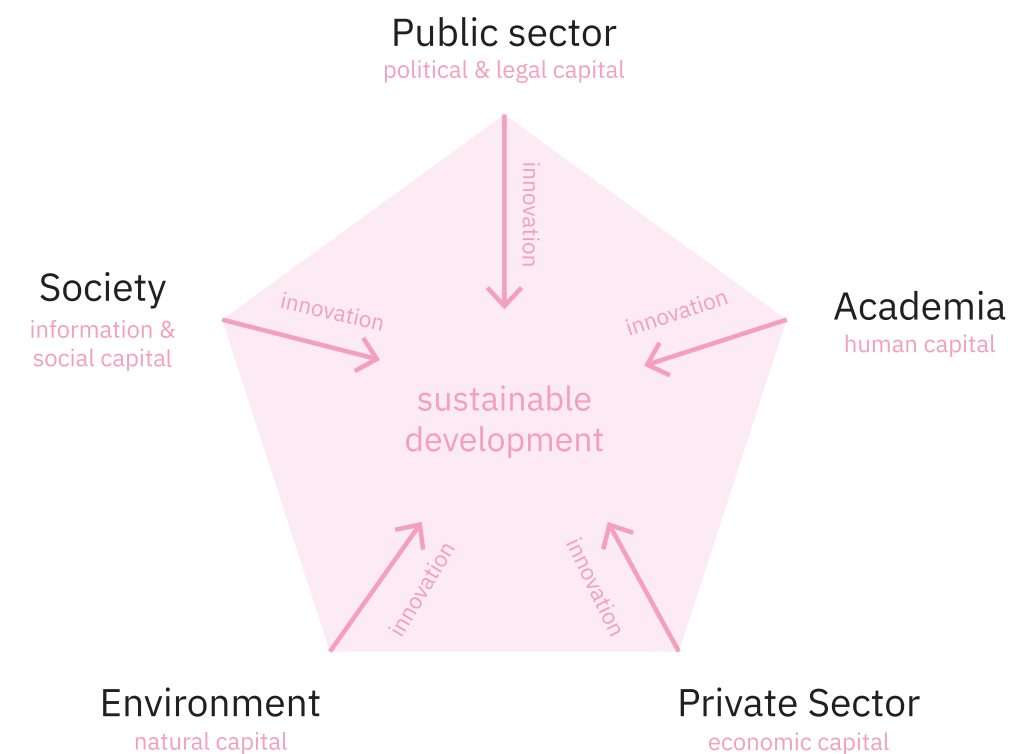


Figure 10: The Quintuple Helix model and its functions, adapted from (Carayannis, E. G., et al., 2012)

From organizations to multi-stakeholder collaboration

Diverse forms of participation and partnerships have evolved in project execution (Ryszawska, B., et al., 2021). Network collaboration, which entails individuals, organizations or entities working together and sharing resources, knowledge and expertise, has proved to be a successful approach for creating breakthrough innovations, as they are able to combine the experiences of different organizations and diverse perspectives into a single solution (E.Den Ouden, 2012), being able to generate more novel solutions (Nieto, M. J., & Santamaria, L., 2007).

Addressing complex issues, such as the energy transition, calls for multi-level interaction between government, citizens, and stakeholders (Ryszawska, B, et al., 2021). These emerging kinds of collaboration require a multi-stakeholder setting to work closely together and develop viable innovations (Parsons DESIS Lab, 2022).

To develop viable innovations, it is essential to comprehend the interdependencies and interactions between sectors, which contribute to innovation, economic growth, and social well-being. The *quintuple helix* is an example of a framework for understanding the dynamics of innovation and knowledge creation within society, which includes the five main actors in innovation: Academia, public sector, society, private sector and environment (see Figure 10)(Carayannis, E. G., et al., 2012).

Using the Cambridge Dictionary, the following categories describe the collaborative networks that this thesis focuses on (Figure 11).

—**Consortium:** an organization of several businesses joining together as a group for a shared purpose

—**Coalition:** a group formed of different organizations or people who agree to act together, usually temporarily, to achieve something

—**Organization:** a group of people who work together in an organized way for a shared purpose.

Emerging forms of collaboration present new challenges in multi-actor dynamics and create interdependencies in complex service systems (Sangiorgi, Patricio and Fisk, 2017). Similarly, these value propositions become more complex when there is more than one company providing the resources to develop and commercialize a product-service from start to finish (Appleyard and Chesbrough, 2017, Kapoor and Furr, 2015).

When organizations need to rely on other actors, an ecosystem-wide value proposition is required to combine the individual contributions of various actors (Ad-

ner, 2012; Hanaah and Eisenhardt, 2017; Talmar, M., et al., 2020). This complex value proposition poses new challenges in restructuring the value network, in which **value propositions are intertwined**, as are the value exchanges between different organizations. As Weiller and Neely expressed, ‘it’s not about selling a car, it’s about integrating a vehicle in the energy system’ (Weiller, C., & Neely, A., 2013).

When value is co-created it is not enough to focus on a single actor: instead, it is fundamental to understand the configurations of a multitude of interconnected actors, who might perceive the outcomes differently (Vink, J., 2021). This resonates with Bos-de Vos’s value classification, as each organization will have its own values as guiding principles and will strive to acquire its values as qualities of worth (Bos-de Vos, M., 2020). This creates a dilemma in value perception, due to the subjectivity of values, which means that different actors within the network may have conflicting or divergent interpretations of what constitutes value and how it should be pursued.

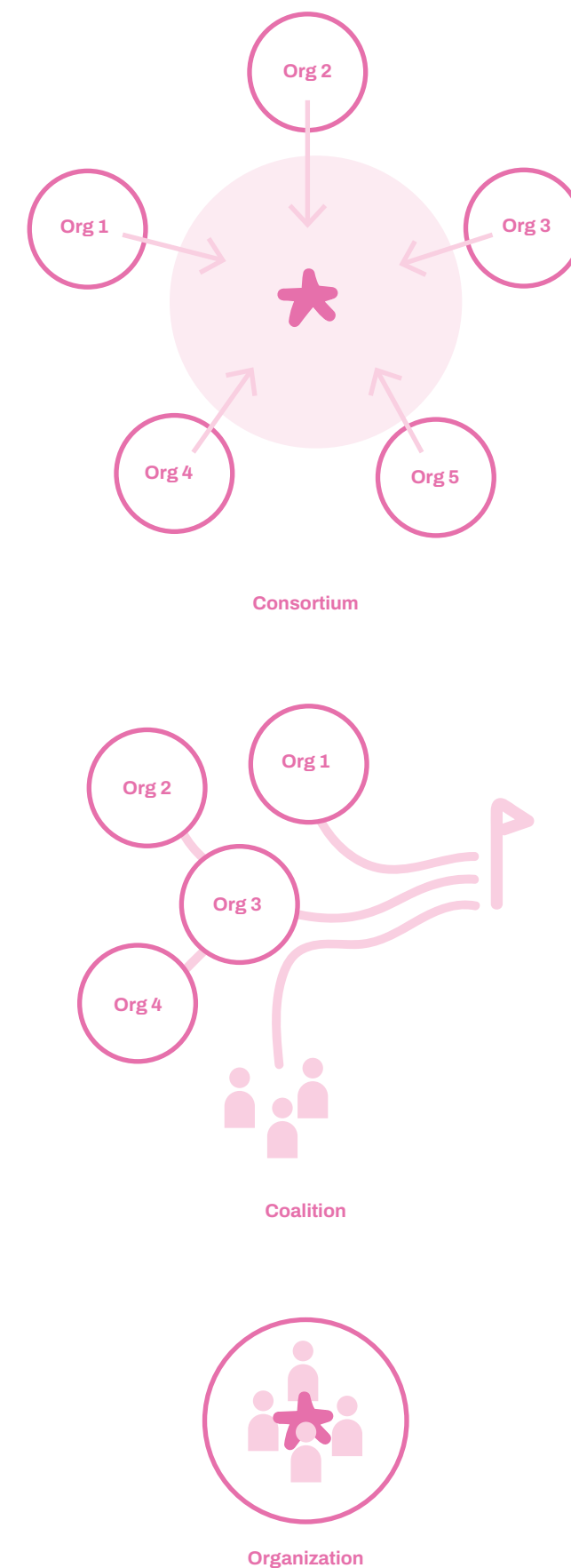


Figure 11: Examples of collaborative networks

2.3 Value for the ecosystem

The third level of value perception, according to Den Ouden, is the value for the ecosystem. The Cambridge Dictionary defines an ecosystem as “any complex system consisting of various organisms, processes, and activities and their interdependence.”

For Den Ouden, it is a collection of diverse organizations that participate in larger systems, but play distinct roles in the ecosystem (Figure 12). Ecosystems surpass conventional value chains by placing greater emphasis on the knowledge, competencies, and relationships that define each organization’s role within the ecosystem. This collaborative process consists of a value network involving all stakeholders with a direct or indirect contribution to the innovation phases (definition, creation, realization, extension) (Den Ouden, E. 2012).

Other authors differ from the organizational point of view taken by Den Ouden. These emphasize the interactions between various stakeholders such as custom-

ers, suppliers, partners, and employees, as enablers of the creation of value for the ecosystem (Adner & Kapoor, 2010; Grönroos, 2011). From a business standpoint, value perception is shifting from a static linear value chain to a value network, which has become the predominant model (Den Ouden, E. 2012). We will adhere to this distinction in this project, considering that organizations, users, and other stakeholders can be co-creators of value.

The behavior of the ecosystem

A particular feature of an ecosystem is its ability to change over time. Members enter and exit the ecosystem, which impacts the value proposition and a company’s ability to create and capture value (Den Ouden, E. 2012). The change of focus to value networks alters the strategies of actors seeking to shape or integrate into the ecosystem. The strategies that are most significant to this project and the case study are presented below.

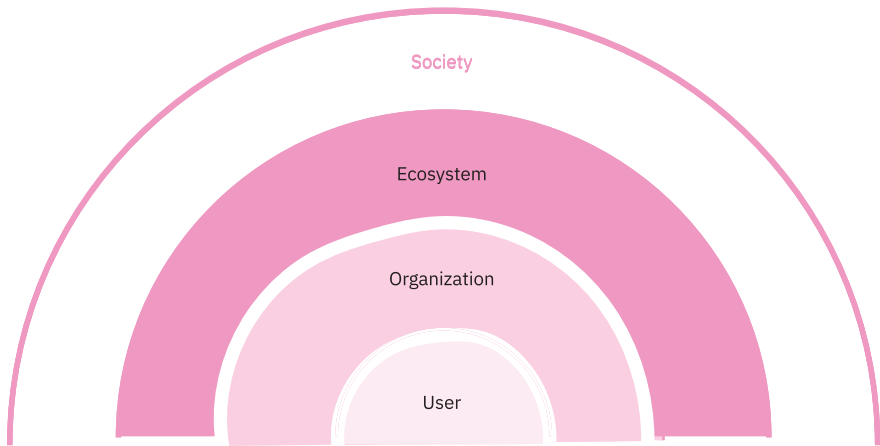
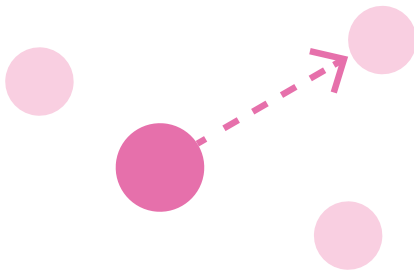
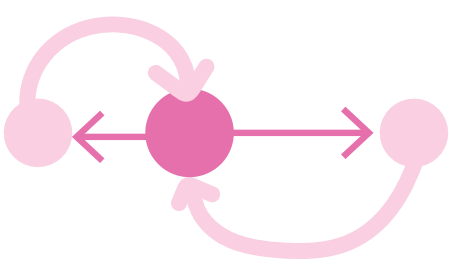


Figure 12: Value for the ecosystem, levels of value adapted from (E. Den Ouden, 2012)



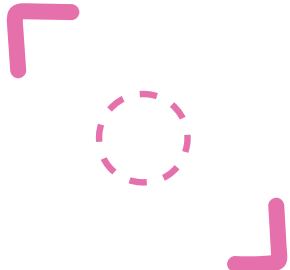
Alliances to shape the ecosystem

If a company intends to be a pioneer in molding the ecosystem in accordance with its business “vision”, then the formation of collaborations and alliances becomes increasingly vital. Consulting potential suppliers, partners, and customers in the beginning of the process could be advantageous for co-developing the ecosystem and forming alliances with non-traditional business partners (Weiller, C., & Neely, A., 2013).



Interdependence in ecosystem

Involving various participating organizations (with different needs) enables the firm to achieve higher value creation by leveraging ecosystem relationships compared to what it would have been able to achieve on its own. However, relationships within the ecosystem can limit an organization’s access to resources (Dattee et al., 2018).



Value opportunities

Value capture is a primary driver for ecosystem participation (Lepak et al., 2007; West and Wood, 2014). Discovering the value exchange across the interaction of stakeholders leads to the identification of relationships, exchanges, and opportunities for collaborative value creation that are mutually beneficial (Porter and Kramer, 2011). Mapping opportunities for value capture could assist businesses in identifying reasons for an organization to join an ecosystem (Den Ouden, E. 2012).



Actors influence

Creating shifts in activities or actors involved can have an effect on the ecosystem’s behavior. As mentioned by Talmar, M., the adoption of a technology is influenced by the role of actors and their value exchanges. For instance, municipalities can impose stricter requirements, which in turn alter the demand and investment within an ecosystem. Granting certain actors the power to reduce competitiveness increases the likelihood that a value proposition will be adopted (Talmar, M., et al., 2020). Therefore the development of an industry can be

steered by the influence by specific actors at a local or national level (Weiller, C., & Neely, A., 2013).

Moreover, systemic alterations can have an impact on the ecosystem. Changes in macroeconomic conditions,

2.4 Designing service ecosystems

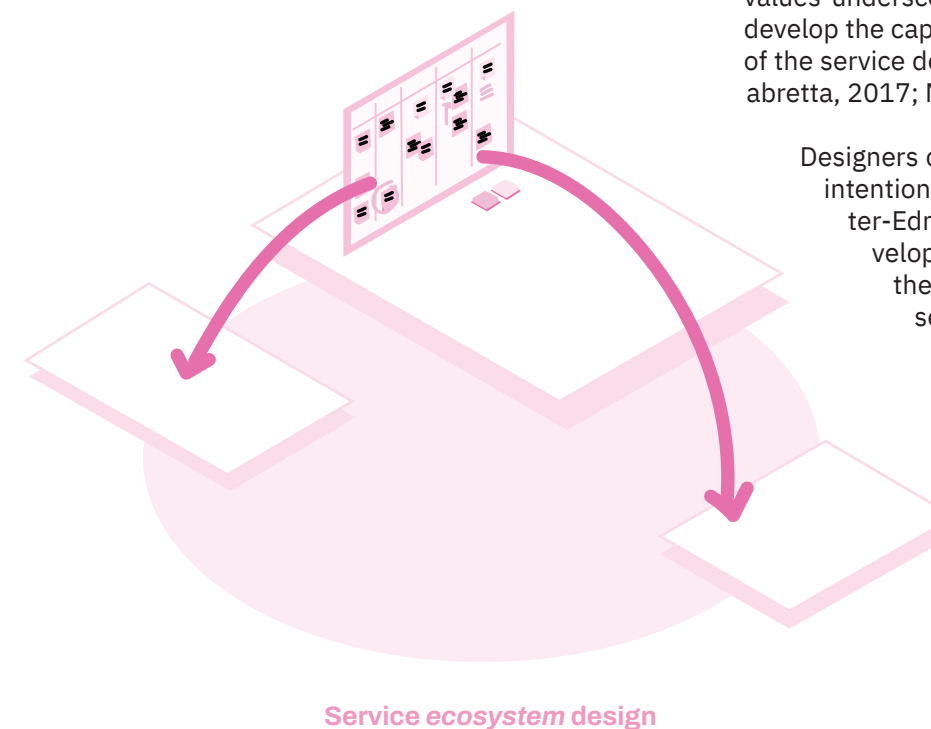
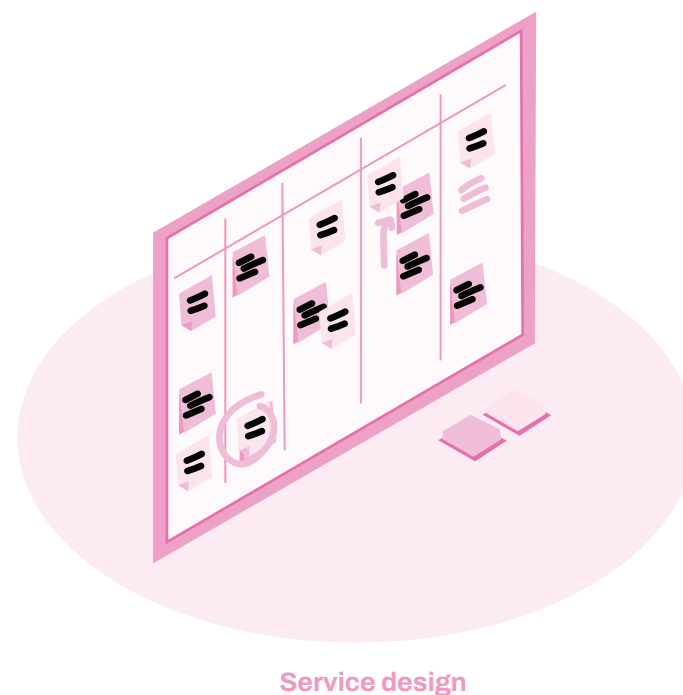
Service design has also been influenced by the evolution of value perception. Formerly, service design focused on analyzing and modifying a section of the service system in isolation, with modifications made without analyzing the system as a whole (Vink, J., 2020). As the field of service design has developed, researchers have begun to recognize that its long-term impact is limited (Ian Stuart, F., 1998). To facilitate long-term change, it is necessary to go beyond the service as an analytical unit and to comprehend the collective as a whole (Vink, J., 2021; Chandler and Vargo, 2011).

This has shifted the focus from service design to service ecosystem design, where services exist within a system and service systems serve as the unit of analysis (Patricio, Gustafsson, & Fisk, 2018; Sangiorgy, Patricio, & Fisk, 2017). Service ecosystem design concentrates on a broader understanding of the ecosystem and how stakeholders enable co-creation of mutual value through their dynamics, service exchanges, and applied resources (Lusch and Vargo, 2014).

Service design methods and approaches

The service ecosystem paradigm employs collective processes to configure service ecosystems (Vargo and Akaka, 2012). Value co-creation involves many actors with various goals, objectives, and motivations (values as guiding principles) and expecting different values as qualities of worth. Thus, understanding these values is crucial in the service design practice, helping organizations to create tailored value that meets the demands of stakeholders (Bos-de Vos, 2020, Porter and Kramer, 2011).

On the other hand, Den Ouden stresses that organizations within the ecosystem may have their own ideals (values as guiding principles), but they must share an overall mission for the ecosystem. Agreeing on the main drivers that will guide ecosystem participants' decisions and behavior in the ecosystem is crucial, as otherwise there is a danger of misalignment with the ecosystem vision (Den Ouden, 2012).



Within the design process, the interaction between stakeholders and a design will influence whether the outcome promotes or inhibits specific values. (Friedman & Hendry, 2019). To prevent this from hindering collaboration, it is essential to require communicating goals, to align responsibilities, and to foster understanding of each other's motivations. However, identifying these motives and objectives is challenging since it is often difficult to translate abstract values into concrete and executable requirements (Bos de Vos, 2020).

The increase of processes involving an extended network of actors highlights the need for participatory approaches (Holmlid, 2009; Patricio et al., 2018). These new ways of collaboration and dealing with abstract values underscore the necessity for service design to develop the capabilities of organizational actors as part of the service design process (Karpen, Gembser, & Calabretta, 2017; Marmberg & Wetter-Edman, 2016).

Designers can stage such processes, leading to an intentional change in the service system (Wetter-Edman, Vink and Blomkvist 2018). The development of these capabilities emphasizes the practical methods and approaches that service design uses to facilitate this co-operation (Sangiorgi, 2009), enabling actors to collaborate intentionally within complexity (Vink, J., 2021), thereby bridging the gap between service design and ecosystem perspectives of value.

Figure 13: From service design to service ecosystem design

2.5 Value modelling tools

As service ecosystems are in constant flux and continue to shift beyond the control of a single actor, the application of tools and methods could aid organizations or consortiums in the modeling of the shifting interactions (Chandler et al. 2019). This would enable the ecosystem’s actors to adapt to its instabilities and prepare for uncertainty and unpredictability (Gunderson and Holling, 2002).

In the initial phase of business model development, when investigating the introduction of new product-services, it is crucial to scan possible industry configurations to gain a better understanding of the ecosystem (McNamara et al., 2008; Chesbrough, 2010). This process is iterative and necessary to promote the adoption of novel product-service combinations, as well as to develop an efficient value network configuration and value creation and capture strategy (Gunderson and Holling, 2002, Weiller, C., & Neely, A., 2013). Using this knowledge as a foundation, the subsequent step involved an examination of available service design tools.

At the outset of the empirical phase of the project, in discussions with the company mentor and the EnergyLab Zuidoost, the LIFE project’s current value exploration methods were discussed. An analysis of the tools was conducted in order to gain insight into the different types of value analyzed by these tools as well as their applicability for mapping value ecosystems.

To effectively categorize these tools, their perspective on value was considered in relation to the evolving perception of value in service design discussed in the theoretical context. The categorization distinguished between tools that viewed value as a one-way exchange and those that embraced a value co-creation approach. Appendix C provides a summary of these instruments.

Tool Name	Tool Purpose
Stakeholder canvas	‘Representing, charting and/or analysing of the various groups (such as staff, customers, partner organizations, and other stakeholders) involved with a product or service’ (Stickdorn & Schneider, 2011, p. 150)
Value proposition canvas (Osterwalder et al. 2014)	Strategic management tool to design, test, build and manage products and services.
Business model canvas (Osterwalder & Pigneur, 2010)	Strategic management tool to describe how an organization creates, delivers and captures value.
City model canvas (Timeus, K., et al. 2020)	Framework that city councils can use to articulate how they expect to create and deliver value in an economically, environmentally, and socially sustainable way through smart services.
Value mapping tool for sustainable business models (Bocken, N., et al. 2013)	Help companies create value propositions to support sustainable business modeling.
Ecosystem pie model (Talmar, M., et al., 2020)	Visual strategy tool to map, analyze and design (i.e., modeling innovation ecosystems)

Table 1: Value Modeling tools analyzed with its purpose.

Among the available value modeling tools for unidirectional value exchange are “Stakeholder mapping”, “Value proposition canvas”, “business model canvas”, and “city model canvas”.

Stakeholder canvas

The stakeholder canvas is project-focused, with an organization-level perception of value. It facilitates the identification of pertinent stakeholders and evaluating of their influence and interest in the project. It permits the mapping of interactions and sometimes connections between the ecosystem’s actors. Nevertheless, this typically does not encompass value exchanges between stakeholders. There is no obvious distinction between the actors included in a stakeholder map, though they are sometimes categorized as internal or external to the project.

Value proposition canvas

Regarding levels of value perception, it emphasizes value to consumers. The tool is organization-centric, with the offering of a product or service which fulfills the needs of the consumer. There is no opportunity for value co-creation because value is created in a unidirectional manner, from the product-service offer to the satisfaction of customer requirements. The stakeholder benefits for which an economic or other form of value can be mapped are classified as “pain creators”, “pain relievers”, “gains”, and “pains” (Osterwalder, A., et al., 2014). There is no differentiation between values and other attributes. Different values as guiding principles or qualities of worth are neither highlighted nor categorized.

Business model canvas

The business model canvas is organization-centric and focuses on the organization’s and consumers’ levels of value perception. It describes how a company creates, exchanges, and captures value. This model emphasizes economic value in value capture with ‘revenue sources’ and ‘cost structures’ primarily. The interactions and exchanges between the different elements are simplified (Geissdoerfer, M., Bocken, N. M., and Hultink, E. J., 2016). The value proposition is limited in scope because it focuses on specific value created for a consumer segment. There is no examination of values as qualities of worth from a customer perspective. It examines partnerships to deliver the value proposition and mentions “partnership motivations.” However, the motivations are organization-centric, relating to values as qualities of worth in order to acquire utilitarian, economic value, resources or activities.

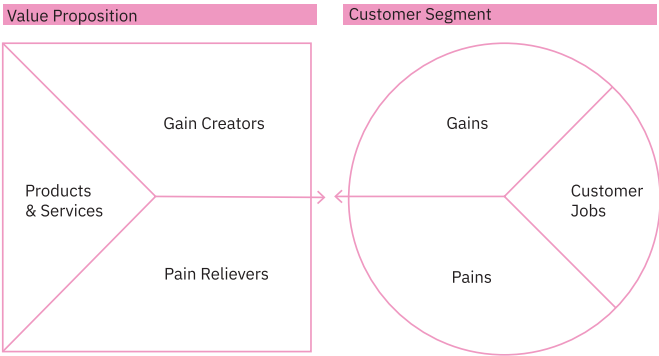
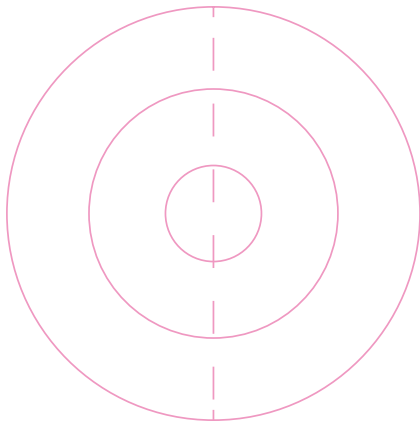


Figure 14: Value modeling tools, adapted from (Osterwalder & Pigneur, 2010, Osterwalder, A. et al., 2014, Timeus, K., et al., 2020)

Mission statement					
Key Partners	Key Activities	Value Propositions	Buy-in & support	Beneficiaries	
	Key Infrastructure and resources & key regulatory framework		Deployment		
Cost Structure		Revenue Streams			
Environmental costs		Environmental benefits			
Social risks		Social benefits			

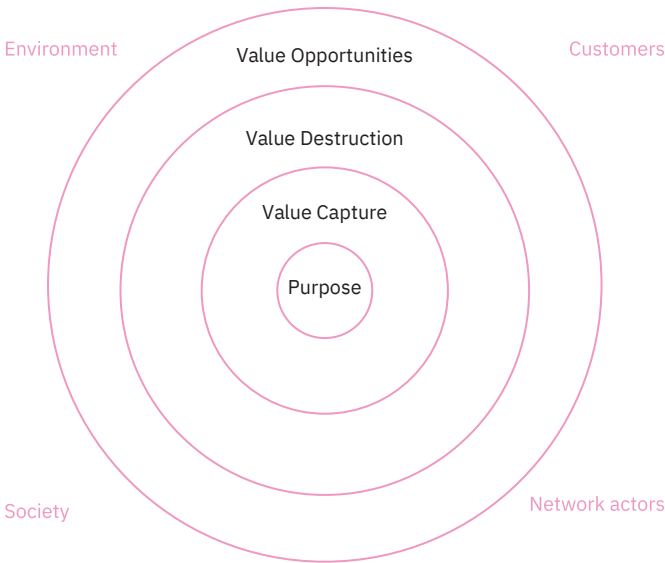


Figure 15: Value modeling tools, adapted from (Timeus, K., et al. 2020, Bocken, N. et al, 2013)

The City Model canvas

In terms of levels of value perception, the city model canvas focuses on value for beneficiaries, which may include organizations or society. The model is institution-centric, which means the city is the focal point of analysis. The model was developed with a mission-driven perspective (government, non-profit organizations) in mind (Timeus, K., et al., 2020), as indicated by the mission statement at the top of the canvas. In terms of values as qualities of worth, societal and environmental perspectives of value creation are included alongside economic value. In this case, the city’s service provision is analyzed in terms of its potential value creation and destruction for society and the environment.

Value mapping tool for sustainable business models

This instrument prioritizes consumer and ecosystem value perception. It places the purpose of the unit of analysis (product/ service/ business unit) at the center of the tool, making it organization-centric. This approach to modeling value includes value captured, destroyed, and opportunities per stakeholder group, striving for a multi-stakeholder view of value creation (Bocken, N., et al., 2013). Focusing on the form of value per segment, environment, aims at environmental value, customers at utilitarian value, and society at societal values, values are centered on qualities of worth. The category of value is not specified for the network actors categories, but transaction value is mentioned according to the type of organization. The concentric aspect of the instrument enables the visualization of various ecosystem actors, but does not investigate value exchanges between stakeholders. With a centralized perspective on the product-service system, value opportunities are developed; however, value opportunities between actors are not explicitly investigated. Potential partnerships are not explored; rather, the comprehension of the actors is reliant on their use of the tool.

Ecosystem pie model

The value perception of the ecosystem pie model is ecosystem-centric. The value proposition of the ecosystem is positioned at the center. The beneficial contribution of actors is referred to as ‘value addition’ in the context of value creation. Value capture can be classified in terms of type, mechanism, and quantity, but the type is left undefined, non specific qualities of worth are mentioned. This model depicts the dependence of the actors’s to the ecosystem’s success, as indicated by the small circles between each actor. However, the interdependence of ecosystem actors is not taken into consideration. Concentrically, actors are mapped according to how they capture and create value to the ecosystem. In this model, exchanges between actors are depicted

by an arrow. Instead of focusing on their interactions or understanding of each actor, the focus is on how the ecosystem goal is achieved.

After reviewing these state of the art tools and frameworks, a striking lack of ecosystem-oriented analysis has been noticed. This makes them unsuitable for organizations seeking to evolve in the innovation ecosystem or to develop a strategy that takes the ecosystem perspective into account (Weiller, C., & Neely, A., 2013; Talmar, M., et al., 2020). Existing ecosystem tools fail to adequately address the roles of various actors within the value structure (Dedehayir et al., 2018) and are primarily suited for single organizations (Weiller, C., & Neely, A., 2013) rather than collaborative ventures and emerging forms of collaboration. Therefore, there is a clear need for the development of tools that can effectively capture the complexities of ecosystems and support organizations in their ecosystem-driven activities.

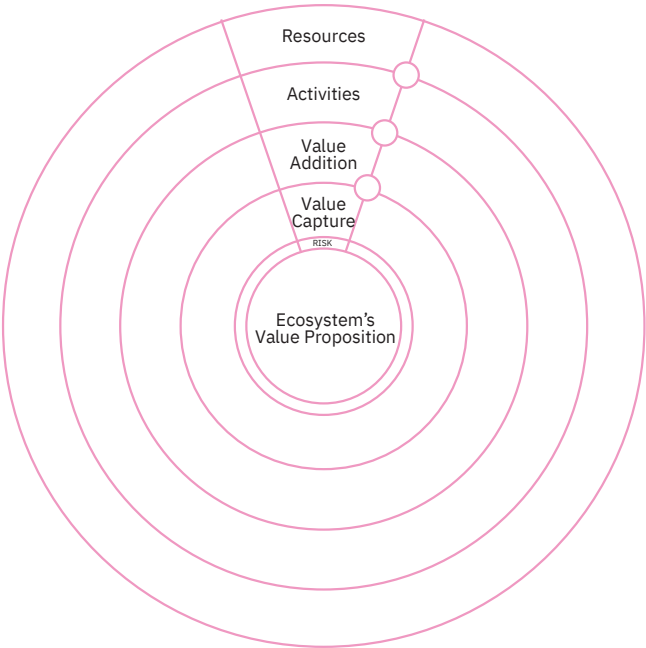


Figure 16: Value modeling tools, adapted from (Talmar, M., et al., 2020)

2.6 Theoretical overview

To answer the main research question, this theoretical background review contributes by clarifying the three research sub-questions.

Regarding the first one, **-What is value in the field of service design?**, the perception of value in the field of service design has shifted towards a value-cocreation approach. With this change, the approach has become more systemic, focusing on ecosystem comprehension and the facilitation of value co-creation by stakeholders (Lusch and Vargo, 2014). In this context, values can be perceived on multiple levels, not only as the creation of value for the consumer or organization, but also as the connection of value exchanges among stakeholders in an ecosystem (Den Ouden, E. 2012).

For an actor, values are multi-dimensional, either a compass of beliefs to evaluate and guide their actions, values as guiding principles (Bos de Vos, 2020), or as the worth of something, values as qualities of worth, (Bos de Vos, 2020). For instance, a product or service that can be considered from a utilitarian, economic, social, or environmental standpoint. In a multi-stakeholder ecosystem, the co-creation of value is defined as the generation of value through the interaction of a network of stakeholders. The values stakeholders strive to attain (value capture) will be determined by the type of organization/institution they belong to and how they are being influenced in the ecosystem. This also implies that there are a variety of perspectives from which value can be co-created, as well as a variety of values that may be perceived as more significant by the different actors (Vink, J., 2021).

Regarding the second sub-question **-How to design for value in a multi-stakeholder ecosystem?**, it seems that new ways of collaboration to co-create value in a value network have raised the complexity of ecosystem value propositions. First, to design in a multi-stakeholder ecosystem, the evolving nature of ecosystems needs to be taken into account as do the intertwined value propositions. Since value exchanges become more diverse, alliances and actor interdependence are more common. Value opportunities lead actors to join an ecosystem, if they see the opportunity to capture value. To establish this collaboration, however, it is necessary to deeply comprehend each actor in order to identify possible interconnections. How to explore ecosystem value opportunities in a multi-stakeholder ecosystem to establish value propositions is usually not investigated. The same holds for how to explore understanding each actors' perspective.

Lastly, with regard to the third sub-question - **What tools exist for value modeling?** -

This theoretical overview shows that design methods and approaches can help organizations create value while meeting stakeholder requirements, enabling agents to collaborate intentionally within complexity (Vink, J., 2020). Nevertheless, the abstract nature of values makes it challenging to translate them into concrete and actionable requirements (Bos de Vos, 2020). Existing value modeling tools concentrate primarily on the value exchange between two actors. There is an emphasis on analyzing the organization and a single stakeholder, but no other ecosystem actors are considered. Tools that include multiple stakeholders in the process of value creation do not delve further into the interactions between stakeholders in an ecosystem. Existing tools do not permit simultaneous comprehension of multiple stakeholders, despite the fact that a multi-stakeholder ecosystem necessitates knowledge of the pertinent values for each stakeholder. In terms of values, the majority of approaches take a transactional approach, although some include environmental or social dimensions of value. However, identifying these value exchanges within an ecosystem is not emphasized.

Regarding the case study question: **How can we develop value propositions that benefit the multi-stakeholder ecosystem of Amsterdam Zuidoost?** The literature does not provide concrete guidance on how to investigate value co-creation and value opportunities while taking into account the complexity of multiple stakeholders and their distinctive viewpoints on value (as guiding principles and qualities of worth).

To expand the answer to the research questions, empirical research was conducted to shed light on how project consortium members perceive the value proposition of the LIFE project and the value opportunities for stakeholders in the ecosystem of Amsterdam Zuidoost. Also, investigations were made on the LIFE project consortium as a collaborative network, as well as the challenges that this collaboration entails.

Figure 17: Johan Cruijff ArenA building, Amsterdam Zuidoost



3. Empirical Research

With the LIFE platform project consortium, empirical research was conducted to gain insight on the case study question: How can we develop value propositions that benefit the multi-stakeholder ecosystem of Amsterdam Zuidoost? First, qualitative research was done through semi-structured interviews with LIFE partners. Subsequently, two co-creation sessions were held. In addition, field observations during meetings, conversations with collaborators, and attendance at events were used to collect data.

This chapter describes the methodology and procedure of the empirical study, followed in each section by the research’s findings. The findings narrowed the scope of the research query by reframing the problem and redefining the primary goal of the next steps. They were then utilized as insights informing the development of the creation of a value ecosystem tool, which will be described in chapters 5 and 6.

3.1 Empirical research methods

The literature review provided a theoretical basis for framing the problem and acquiring knowledge of the various perspectives on values and modeling techniques and tools. To obtain a deeper understanding of the case study’s context, it is necessary to include the perspectives of various consortium members. On the basis of the case study question and the fact that abstract topics such as values, perception and challenges involving multiple stakeholder perspectives will be investigated, a qualitative research methodology is chosen to enable the collection of rich data and outline the complexity of the situation (Creswell, J. W., 2008, Braun & Clarke, 2013).

In addition, co-creation sessions are employed to combine the perspectives of a variety of stakeholders. Participatory design has been recognized as a valuable method as it enables a more inclusive and comprehensive understanding of the challenges and potential solutions and ensures that the outcomes are in line with their goals and objectives. Given the complex context

of energy transition and the consortium at hand, it can facilitate the development of ownership over the results and provide a pragmatic perspective on the project (Sanders & Stappers, 2008).

Other data collection methods were used for methodological triangulation (Ravitch & Mittenfeller, 2015). In addition to the main source of data, field observation and casual conversations were held during weekly consortium meetings and events (Table 2). Note-taking and memo writing supported data collection. Reviewing them helped understand the LIFE platform project goals, objectives, and purpose, its obstacles, and the challenges of engaging external stakeholders. Audio recordings from the interviews and co-creation sessions were transcribed.

The opportunity to directly engage and gain knowledge from the diverse members of the project consortium was a recurring source of input. The following is a record of the research activities conducted (Appendix B).

Date	Name	Activity	Location (or online)	Activity type	Role
2023/03/07	A	Interview LIFE Stakeholder Engagement Coordinator	Huis van de Toekomst	Interview	Interviewer
2023/03/14	B	Advisory Board Session	Huis van de Toekomst	Meeting	Field Observation
2023/03/21	C	Interview Johan Cruijff ArenA, LIFE project manager	Huis van de Toekomst	Interview	Interviewer
2023/03/28	D	Session-Battery Use Case	Huis van de Toekomst	Co-creation Session	Field Observation
2023/03/21	E	Interview Project Manager Alliander	Huis van de Toekomst	Interview	Interviewer
2023/03/30	F	EnergieLab Zuidoost Seminar	De Groene Hub	Event, Co-creation session	Support facilitator, Field Observation
2023/04/04	G	Interview Gemeente Amsterdam, LIFE Project Management Team	Huis van de Toekomst	Interview	Interviewer
2023/04/06	H	Interview Research Coordinator Spectraal	Online	Interview	Interviewer
2023/04/11	I	Communication Workshop	Huis van de Toekomst	Co-creation Session	Facilitator
2023/04/11	J	Interview University of Utrecht, Academic Researcher	Huis van de Toekomst	Interview	Interviewer
2023/04/13	K	Interview TU Delft, IDE Design Anthropology Researcher	TU Delft	Interview	Interviewer
2023/04/18	L	Workshop Value Opportunities	Huis van de Toekomst	Co-creation Session	Interviewer
2023/04/20	M	Interview Gemeente Rotterdam, Advisor	Online	Interview	Note-taker
2023/05/16	N	LIFE partner Day	AMS Institute	Co-creation Session	Participant
2023/05/23	O	Project coordination meeting	Huis van de Toekomst	Meeting	Field Observation
2023/07/05	P	Value ecosystem tool Validation	Huis van de Toekomst	Co-creation Session	Facilitator

Table 2: LIFE project research activity log

3.2 Case study: LIFE project

The Local Inclusive Future Energy (LIFE) project is a Research and Development initiative commissioned by RVO to accelerate the Dutch energy transition. LIFE project is developing a “digital platform” to facilitate smart energy management, with the objective of reducing net congestion and achieving maximum acceptability and social inclusion.

The LIFE project approach seeks to involve the five most important energy transition stakeholder groups. The Quintuple Helix consists of the Government, Industry/business, Research Institutes, Civil Society, and the Environment (LIFE project, 2022). The platform seeks to facilitate access to the benefits of the LIFE platform by incorporating the aforementioned Quintuple Helix, which includes the inclusion of local stakeholders.

Since the goal is to unite large and small energy end-users in a collective solution, the project aims to “develop results that resolve potential conflicting stakeholder interests and focus on creating synergies” (LIFE project, 2022).

LIFE platform stakeholders

The initiative is managed by a consortium of public, private, and academic organizations. Specific actors are responsible for the development of work packages and are designated to a specific project leader (Figure 19). As part of the overall coordination of the project, a group of three project leaders and a Stakeholder engagement coordinator, include representatives from the Municipality of Amsterdam, Resourcefully, Johan Cruijff ArenA and AMS institute (Figure 18).

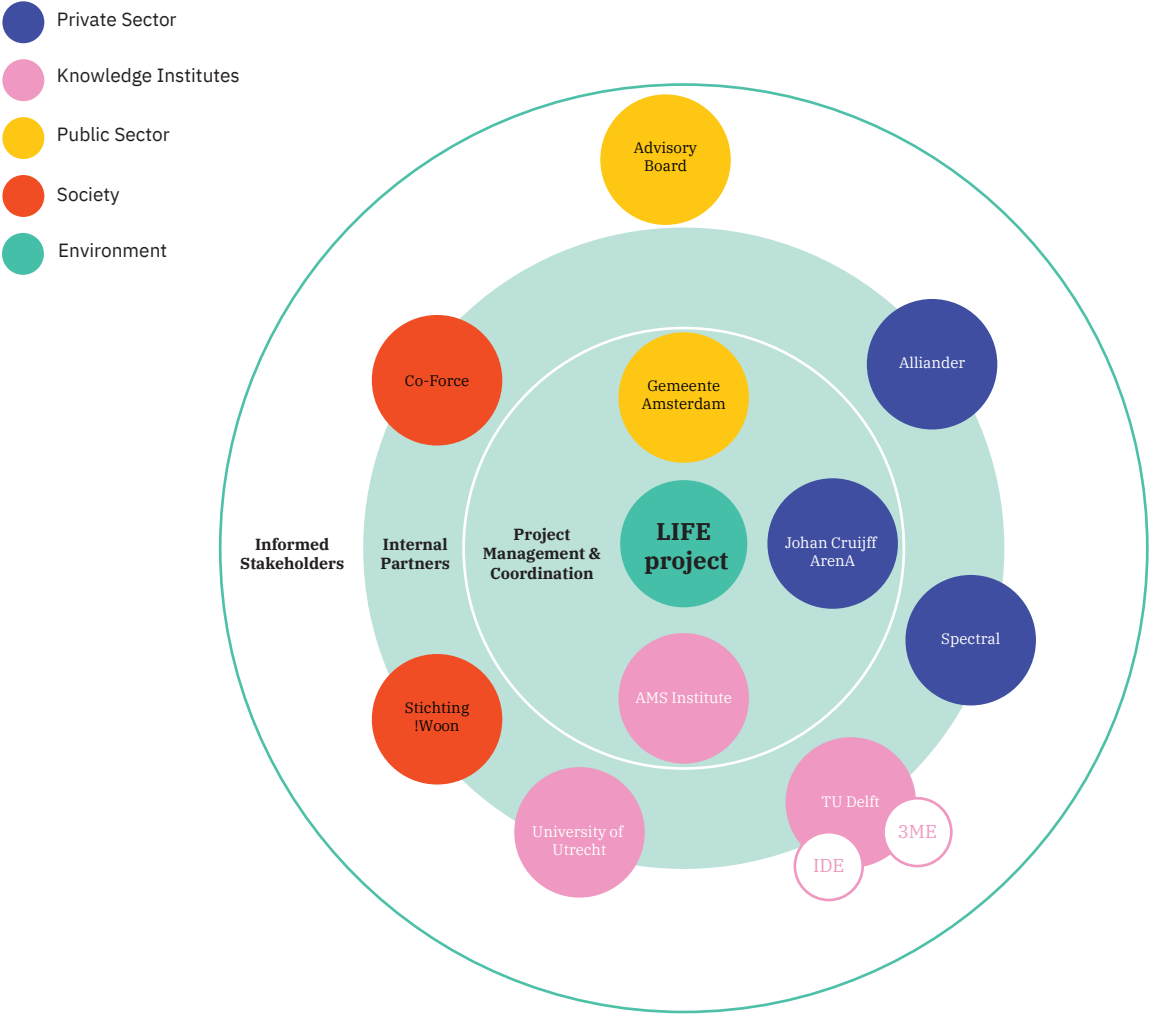


Figure 18: Stakeholder map of the LIFE project

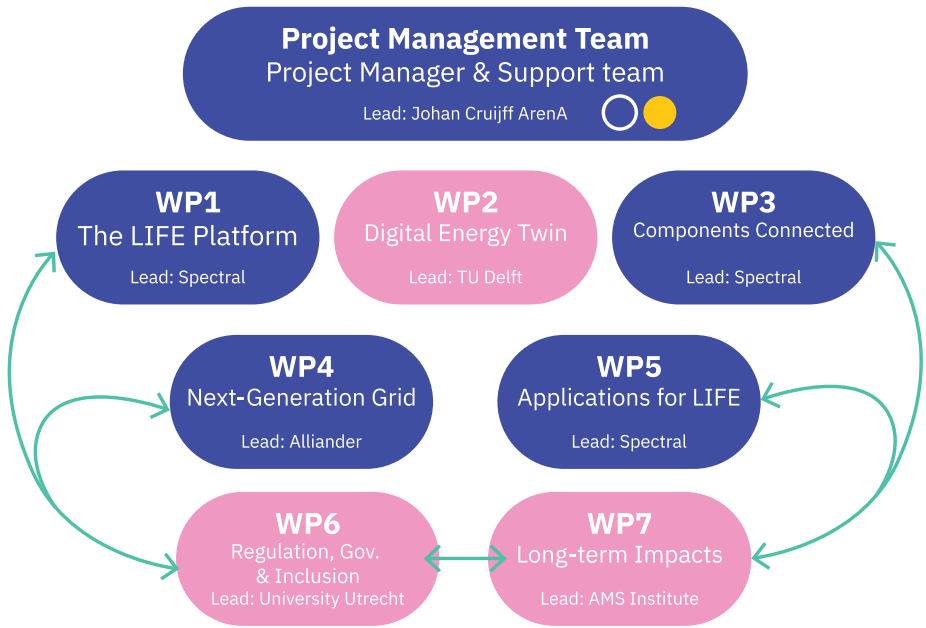


Figure 19: Project packages in the LIFE project

The initiative has been divided between a technical platform and a social platform. The technical infrastructure is developed by Delft University of Technology, Spectral, and Alliander. The social platform is the responsibility of TU Delft’s IDE’s Researchers. Governance, regulations, and inclusion framework are subjects of study of the University of Utrecht researchers. The consortium’s activities are overseen by the Advisory Board comprised of Gemeente Amsterdam representatives.

The development of an inclusive platform is a top priority for the Advisory Board, as it aligns with Amsterdam Zuidoost’s and Amsterdam’s broader initiatives. LIFE’s top priority is therefore to engage with local communi-

ties and stakeholders. Within the group of stakeholders, LAO’s are considered as one of the potential target audience for the platform, as they are bigger organizations with access to energy assets.

The case study question emphasizes value propositions in Amsterdam Zuidoost’s multi-stakeholder ecosystem. To gain information related to the subquestion, who are the stakeholders in the Amsterdam Zuidoost, the following section describes the desk research conducted. The intention was to obtain a better understanding of the LAO’s, as decisive stakeholders in the multi-stakeholder ecosystem of Amsterdam Zuidoost.

3.3 Large Asset Owners Desk Research

The LIFE platform project refers to large organizations as Large Asset owners. The term refers to the ownership of a “energy asset” that is potentially valuable for energy generation, storage, or distribution. Solar panels, heat exchangers, electric vehicle (EV) chargers, and batteries are examples of energy assets.

LIFE project created an energy database, which led them to determine the major asset owners in the area. After reviewing the list, LAO’s could be identified in two groups, Financial Institutions and Entertainment venues (Figure 20). To determine which benefits may be

appealing to them and to develop value propositions to meet their requirements, desk research was conducted. This involved an analysis of company websites, industry reports, and sustainability reports.

The findings were mapped using the value proposition canvas (Osterwalder, A., et al., 2014) to identify potential pains and gains. Since Johan Cruijff ArenA is a member of the LIFE project consortium, an interview with the LIFE project manager (Table 2, Activity log) was conducted to collect data, which was then incorporated into the same canvas.

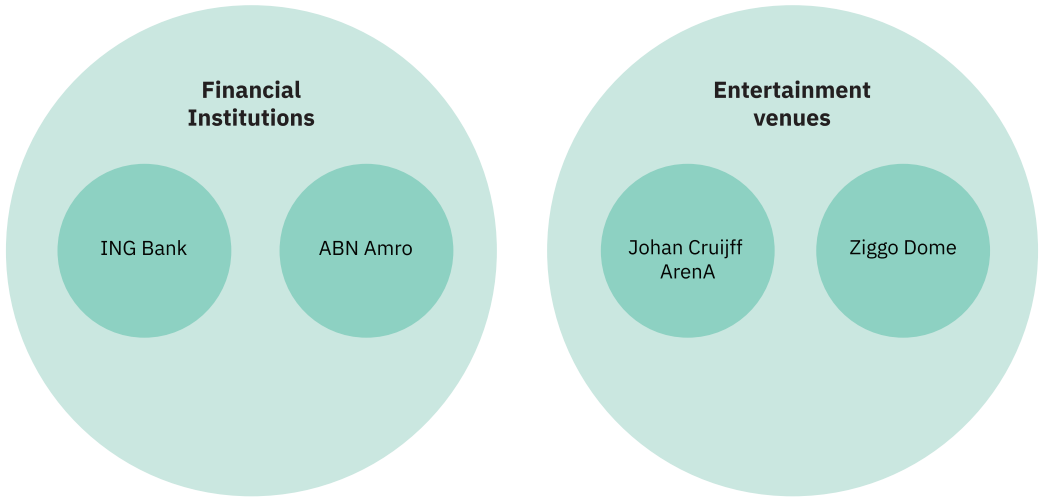


Figure 20: Large Asset Owners as classified by the LIFE project.

Entertainment Venues

Johan Cruijff Arena

Values as guiding principles: Innovation, Sustainability, Quality, Social Responsibility	Energy assets: Battery, Solar Panels
Pains	Customer Jobs
Return of Investment on the battery acquired, batteries are becoming an increasingly popular energy asset, so they must migrate into new energy markets. Looking to improve their green energy supply chain in order to reduce CO2 emissions from suppliers and consumers. ESG reporting, justifying the S of Social Responsibility. In an endeavor to improve the management of residues, they own a biological digester. As co-owners of the battery, the Municipality is requesting them to support with social issues.	Becoming net positive by 2030, working towards acquiring a second battery to have an energy back-up system to provide safety to their customers. Aiming for a first-mover advantage in green events (ArenA, J. C.). <i>‘Show the event industry how you can host green events which might be a money maker, because by 2030 we are not allowed to create any more CO2 emissions.’</i>

Ziggo Dome

Values as guiding principles: -	Energy assets: Heat pump geothermal energy system
Pains	Customer Jobs
Attempting to reduce their CO2 emissions and become climate neutral by 2030. By enhancing their mobility and transport value chain and incinerating their residual waste (Ziggo Dome, 2023).	Promote their consumers to commute with public transportation to their venue, by partnering with Gemeente Amsterdam. Efforts in energy conservation to become an entirely electric “sustainable building.” Vattenfall is a reliable supplier of renewable energy to Ziggo (Ziggo Dome, 2023).

Financial Institutes

ABN Amro

Values as guiding principles: Care, Courage, Collaboration	Energy assets: Solar Panels
Pains	Customer Jobs
Actively have the goal to accelerate their sustainability shift. Working towards sustainable operations and getting their buildings with an energy label A. They want to reduce by 34% their CO2 emissions in 2030. Working towards scaling their social responsibility to other provinces besides Amsterdam. Reducing waste produced by their operations, sharing a Bio-digester (Collaboration with ING, hospitals and Gemeente Amsterdam) (ING, 2023).	Members of the Zuidoost alliance and Master plan to ‘become a real part of the neighborhood’. Major employer in Amsterdam Zuidoost that actively recruits local employers to create employment opportunities. Residents of the area are also eligible for mortgages that provide construction assistance prior to and during the home-buying process. Offer mortgage reductions by demonstrating energy efficiency. Initiatives to support education and training by fostering art and culture through school-based internships. In addition, collaborate with Gemeente Amsterdam and NSR (Nederlandse Schuldhulproude) to promote a debt-free district through sustainable financing and investments. ABN Amro is fostering partnerships to promote social responsibility and energy bill reduction. Currently, they collaborate with Stichting Woon to deploy energy advisers and with Rabobank to offer housing advice through a local initiative for young people (ING, 2023).

ING Bank

Values as guiding principles: Honest, prudent, responsible, Integrity

Energy assets: Data Center, Solar Panels

Pains

Due to European regulations affecting financial institutions they aim to reduce CO2 emission by using renewable electricity. Additionally, they aspire to become carbon neutral in operations, making efforts on green initiative buildings providing green certificates (ABN AMRO Bank, 2022).

Customer Jobs

ING has been accused of assisting the fossil fuel industry. Consequently, this redefined their business strategy to support the promotion of sustainable financing for clients investing in new energy systems (including batteries). They are attempting to encourage consumers to make climate-conscious (energy-wise) decisions. Exploring initiatives to encourage staff energy efficiency. Providing corporations with ESG-related transaction advice. Finally, they are also collaborating with a Belgian energy provider to facilitate the installation of solar panels and transition to energy efficiency (ABN AMRO Bank, 2022).

Interconnected value propositions

Conducting research on each of the actors led to the conclusion that some of them are interconnected either with existing partnerships or collaborations. Some of these actors are currently partners of LIFE, therefore, having an understanding of the actors individually, but also of their connections with other actors in the ecosystem, could help LIFE project explore opportunities for collaboration. Figure 21 depicts an schematic value proposition of Amsterdam Zuidooost stakeholders, as well as their interconnections and interactions with the LIFE project.

Second, despite the fact that each organization sector (financial institutions, entertainment venues) has distinct values as guiding principles, their goals are frequently aligned. This is significant because, depending on the type of organization, they are bound to varying municipal regulations that influences their existing agenda and activities, resulting in prospective opportunities for the LIFE project to address the same industry.

Thirdly, although the groups analyzed as LAO's fall within the Private sector of the Quintuple Helix, which would lead one to believe that they are primarily incentivized to see value as qualities of worth as economic values, the agendas of these actors demonstrate actions to generate social and environmental values. This opens the door to the possibility of investigating alternative values as qualities of worth that could assist LIFE and organizations in capturing value.

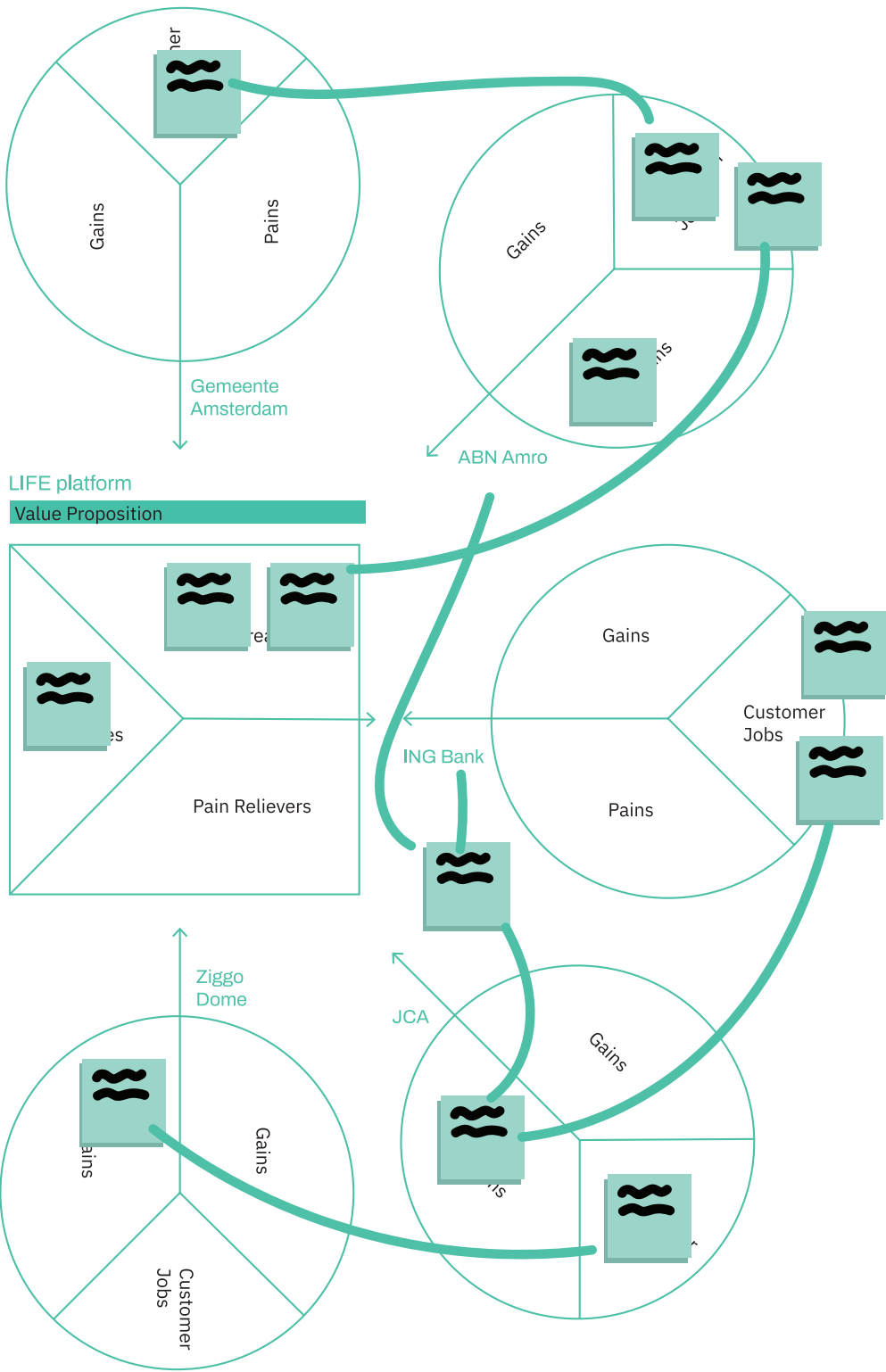


Figure 21: Value collaboration between large asset owners in Amsterdam Zuidooost



3.4 Semi-structured Interviews LIFE project Consortium

The semi-structured interviews with internal LIFE project consortium partners aimed to better understand stakeholders’ opinions on two topics: the existing value proposition of the project, as well as the opportunities for creating value for various stakeholders in the area.

General themes explored during the interviews were understanding of the project’s purpose, current value creation, challenges within the project, and potential value opportunities. Interviews worked as a tool to gather assumptions and knowledge of value creation for various stakeholders for the LIFE platform. Finally, interviews revealed additional information related to parallel energy projects and references to other relevant members within the consortium, guided by the following overarching questions:

—What is the perception of the project consortium stakeholders on the value proposition of the LIFE project?

LIFE’s project’s value proposition
LIFE’s purpose

—How do project consortium stakeholders perceive value opportunities for large asset owners and non-as-
set owners?

Data Collection

Interviews lasted between 45 to 60 minutes. Seven interviews were conducted on site with the exception of one. An interview guide (Appendix D) was developed to guide the topics covered, leaving space for probing, to get in-depth perspectives on how each participant sees the world and their opinions behind it (Patton, M.Q., 2002). The interview guide was structured to follow the path of expression (Sanders & Stappers, 2012), going

from the present (the existing value proposition) via the past (the purpose and foundation of the project) to the future (potential value opportunities). A simplified version of Bocken’s value mapping tool was used to support the interviewer’s note-taking (Bocken, N. et al, 2013) which can be found in (Appendix E). An overview of the participants can be seen in Table 3.

Data Analysis

Data analyses was conducted through and abductive approach to connect themes and concepts with existing literature on value opportunities, value ecosystem and value proposition to increase theoretical validity (Ritchie, J., & Spencer, L., 2002).

Thematic coding allows to identify the most relevant themes, aiming to encapsulate the core meaning, and in-vivo representations of participants’ perspectives, to acquire rich data without reducing it (Saldaña, J. 2013). The data was systematically coded using Atlas.ti software and initial codes emerged through following a deductive approach (Ritchie, J., & Spencer, L., 2002) (Appendix F). Subsequently, statement cards were made, summarizing the researchers understanding of the quote. Initial coding helped uncover patterns and wider themes while clustering statement cards (Sanders & Stappers, 2012). Diverse methods of data collection permitted cross-checking of results (method triangulation), thereby making the data set more generative and enhancing the validity of the results (Ravitch, S. M., et al., 2015). The key findings are illustrated with anonymized quotes from the interviews, based on transcriptions.

Representative Organization	Role	Responsibilities within LIFE project
AMS Institute	LIFE Stakeholder Engagement Coordinator	Stakeholder engagement
AMS Institute	Graduate student intern	Build the georeferenced database of information
Gemeente Amsterdam	LIFE Project Management Team	Overall project coordination
Alliander	Project Manager Alliander	Next-Generation Grid Management System
Spectral	Research Coordinator Spectraal	IT infrastructure unit and assets on the infrastructure
TU Delft, IDE	Assistant Professor, Researcher Design Anthropology	Development of LIFE social platform
University of Utrecht	Academic Researcher	Governance, Regulation of the LIFE platform
Johan Cruijff Arena	LIFE Project Management Team	Overall project coordination

Figure 22: Huis van de toekomst, LIFE project offices.

Table 3: Overview of semi-structured interview participants.

3.4.1 Semi-structured interview Insights

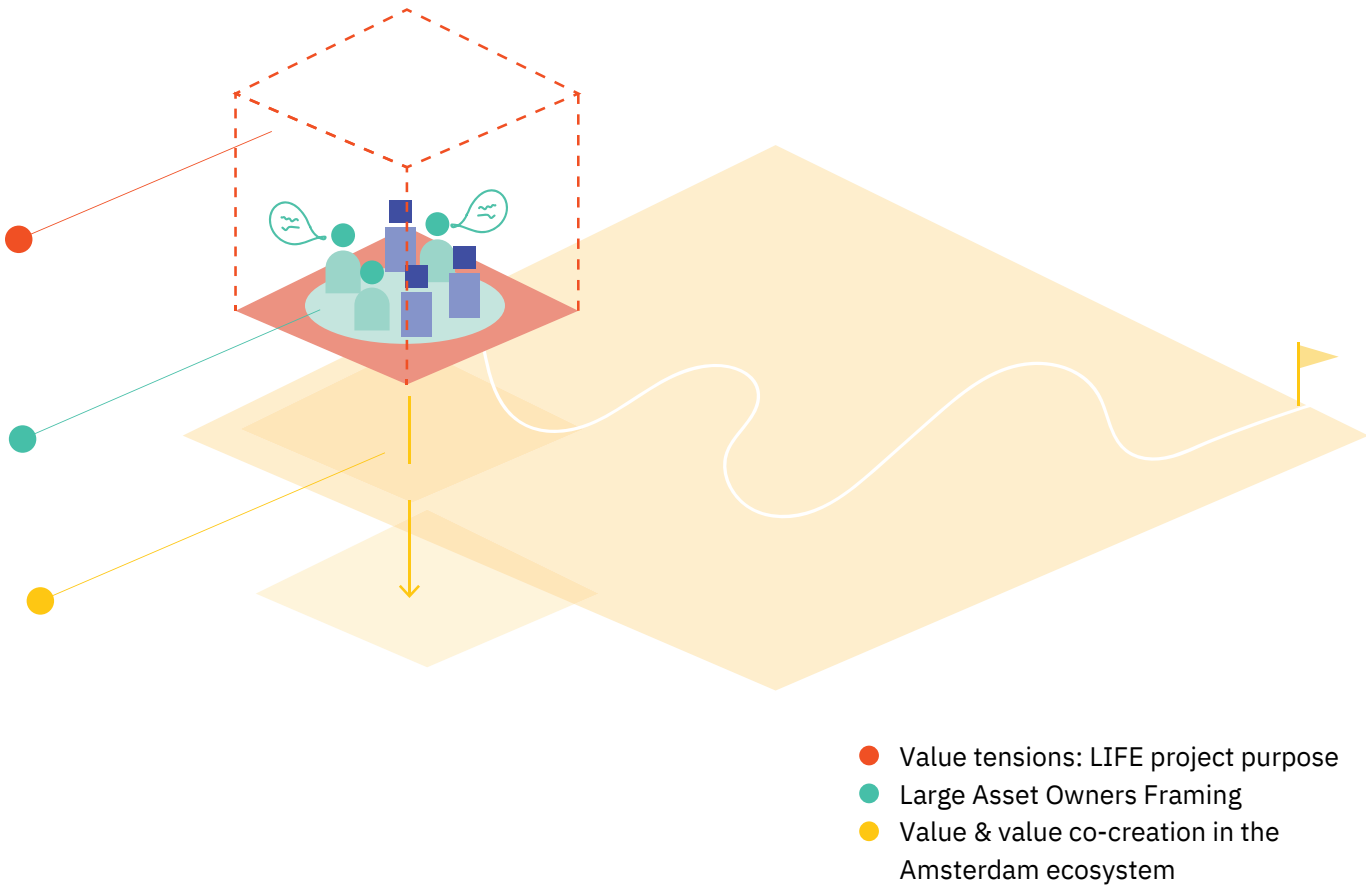


Figure 23: Three level of insights from semi-structured interviews

As depicted in Figure 23, the insights derived from the interviews can be divided into three groups, each paying attention to the LIFE project across different levels. *Value tensions: Life project purpose*, focuses on the internal challenges among consortium members. A project-level analysis of how the LIFE project is established and how these frame its agenda is covered in *Large asset owner framing*. Finally, *Value co-creation in Amsterdam ecosystem*, is approached from a systemic perspective, looking at the LIFE project as an actor in the area, interacting with the various ecosystem stakeholders, and its role within the city’s vision.

By delving into the perspectives of the LIFE project partners in order to answer the question, “What is the perception of the project consortium stakeholders on the value proposition of the LIFE project?”, value tensions, misalignment, and difficulties in decision-making were some of the internal challenges identified.

Value tensions: LIFE project purpose

In the theoretical chapter, it was mentioned that multi-stakeholder collaboration presents challenges in value alignment. Especially with the interaction of different actors possessing their own values (as guiding principles & qualities of worth). The interviews conducted at the LIFE platform consortium provided insight into the members’ perceptions of the project’s purpose and objectives.

To better understand the value proposition of the project, participants elaborated on the purpose and uniqueness of the project. Among the features mentioned were:

- The initiative’s scope, intervention at a district level comprising Amsterdam Zuidooost neighborhood
- The diversity of stakeholders involved, varying from residents to large organizations
- The Johan Cruijff ArenA’s enthusiastic participation.

Consortium partners agreed that the combination of addressing energy congestion and trying to alleviate energy poverty, striving to create an inclusive platform, is one of the project’s distinguishing characteristics. Approaching a technical issue such as energy congestion from a social viewpoint differentiates this project from others. As stated in the following quote:

Internal Value misalignment

As noted in section 3.2, the LIFE consortium consists of a wide range of stakeholders from the public and private sectors, knowledge institutes and non-governmental organizations, each of which brings unique perspectives and challenges to the development of the project. According to literature, it is common for each member of a multi-stakeholder group to have its own values (Den Ouden, 2012). Each stakeholder is driven by a unique set of personal and organizational values as guiding principles for the project. The interviews revealed that when participants discuss values that could be generated for LIFE platform users, there is a mix of guiding principles and value as qualities of worth. As the quotes in the right illustrate:



Figure 24: Value tensions LIFE project purpose

‘This is not just addressing a technical challenge, but also a social challenge, and actually addressing these two together is what makes it unique’

-Knowledge Institute, LIFE project partner

Values as Guiding Principles

Autonomy

‘As a service to residents to give them more autonomy on their electricity usage’.

-Public Sector, LIFE project partner

Security/ Egalitarianism

‘LIFE platform will allow securing fair energy prices for small users.’

-Knowledge Institute, LIFE project partner

Values as qualities of worth

Use Value:Utility

‘Use the network more efficiently. And try to get the solutions within the small area.’

-Private Sector, LIFE project partner

Economic Value: Money

‘Generates most monetary value for assets providing its flexibility’

-Private Sector, LIFE project partner

‘Technical side was very clear, very deterministic, and very formalized, this is the technical challenge, which will happen to the grid and we have to address this. The other idea was that there are a lot of people suffering from energy poverty living in this area, so we just don’t want a very normal energy transition. We also have to look at questions of inclusivity and justice and how can this be fair to people. It should not leave behind people who are more vulnerable. So these values were there, but then these values were quite abstract in a sense, and there was not clear direction on how to go about it.’

-Knowledge Institute, LIFE project partner

‘Each box is isolated, without sharing the other boxes. X works on their platforms, you need to ask permission to access information. Only in the meetings each month progress is seen and information is exchanged. The absence of communication and information sharing prevents the project from progressing properly’

-Knowledge Institute, LIFE project partner

‘Integrating little developments with each other is difficult, there are quite a lot of meetings but I also think others, not efficient. One reason we split the technical and social developments, was because it felt like we were not heading in any direction’

-Private Sector, LIFE project partner

The tension between technical and social purpose

During meetings, project partners are frequently referred to as “the technical partners” and “the social partners”. Each group focuses on a different aspect of the problem, with the technical partners dealing with the technical challenge of energy congestion, software development, with concrete and quantifiable results. The social dimension, on the other hand, addresses more abstract values (dealing with energy poverty, inclusion, and resident participation) through a less linear process and with fewer actionable solutions. This has resulted in value tensions within the project objectives, as illustrated by the supporting quotation:

Communication challenges and silos

Bringing together the perspectives and attitudes of organizations and members with distinct mindsets compelled the project to divide into work packages. This led to a siloed structure for operation in which each “group” concentrates on its own work package without a shared understanding of the direction. Each group has a package supervisor who is responsible for making package-specific decisions. During the interviews, participants discussed certain internal challenges. Members reported a lack of direction and visibility. Some participants expressed frustration with the lack of shared communication channels and infrequent team meetings. Other participants observed that collaboration frequently delayed the pace at which tasks were accomplished. As can be noted by the following quotations:

Decision-making in the project frame

In meetings and workshops, when consortium members discuss project values as qualities of worth to be derived from the project, these are viewed through the lens of the organization to which each stakeholder belongs. As noted in chapter 2, it is typical for certain organizations to pursue “specific values.” This is evident in the interviews, in which the Municipality prioritizes the creation of public value, citing social values such as inclusion, social prosperity, and equality. As a private/public organization, DSO’s perceives value in terms of labor and time savings; implying a utilitarian value argument. Private actors, on the other hand, perceive value primarily from an economic standpoint. The quotes below illustrate some examples:

This initiates discussions when addressing the “values as qualities of worth” that the project must achieve. Thereby, complicating the decision-making process when seeking alignment in specifying the values the LIFE platform can generate. Showing in turn that participants may use the same word, *value*, despite referencing distinct concepts. Thus, making it challenging to determine which ones are most pertinent or essential to the platform. As the following quotes illustrate:

Social Prosperity/ equality

‘Develop a solution that can make energy decisions more inclusive, giving more power to the people, the residents are our first priority, how can we provide value to them?’

-Public Sector, LIFE project partner

Convenience/Durability

‘The point of value is if we don’t have to put cables in the ground, it saves time, saves manpower. Because we have a lack of people who will do that job and perhaps we need them in other places.’

-Private sector, LIFE project partner

Economic Value

‘We are talking about money generated that goes to residents, but it’s not immediately clear that you connect something and that it will create revenue, profit, we need to keep in mind.’

-Private sector, LIFE project partner

‘Is there money being create? there is a fix pie, or are we creating something that actually creates value?’

-Knowledge Institute, LIFE project partner

‘I see technical solution for technical solution, see nothing for benefit for the neighbourhood at all’

-Society, LIFE project partner

‘For us is a change of value, for money vs. an ESG reporting’

-Private sector, LIFE project partner

After analyzing the internal challenges, the question “How do project consortium stakeholders perceive value opportunities for large asset owners and non-asset owners?” was posed. Aided in gaining a comprehension of the project’s background, the parameters and stakeholders with which it was founded, and the formulation of its goals and objectives, a response for the case study question was investigated. Obtaining this information assisted in evaluating the project’s framing and how this defined the research questions, thereby allowing for the exploration of the problem space (Dorst, 2015).

Large Asset Owners Framing

As mentioned above, the goal of LIFE project is to ‘alleviate net congestion for all stakeholders in Amsterdam Zuidooost by proposing a digital area platform and social platform for smart energy management’. The goal of the LIFE project is defined from a technical point of view, however, the issue is further defined when trying to benefit all the stakeholders. Within the project, the term large asset owners is used to refer to different companies or organizations in the area.

The Cambridge Dictionary defines an asset as something of value that is possessed by a person, business, or organization, such as a possession or property. The project’s technocratic structure influences the project’s agenda, objectives, and terminology. As illustrated by the following quotation, the project is designed with the assumption that asset owners will initiate the project because, as businesses, they have more capital to assume greater risk.

Non-asset owners

This allows residents or participants without assets to be perceived as having no value to the project, or at least not in the short term, until they acquire enough assets to be integrated into the platform. According to one of the project researchers, this project framework promotes the design of a platform that favors those with assets.

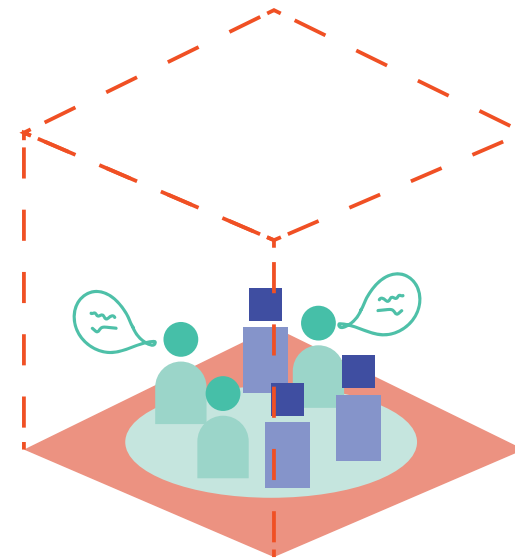


Figure 25: Large Asset Owner Framing

‘I hope LAO can be convinced to kickstart this energy project in neighborhoods, where the smaller asset owners could join’.

-Private sector, LIFE project partner

‘I think it’s one of the few, in which large asset owners and non asset owners are involved in one single project’.

-Private sector, LIFE project partner

‘We’re designing now this local energy system of the future in a way without engaging with them (referring to residents). They’re left behind. Now, we’re designing this system that’s really great for people who have assets’.

-Knowledge Institute LIFE project partner

‘The cost of infrastructure, Y cannot get a business case with residents right now, but perhaps in 10 years they can’

-Private sector, LIFE project partner

‘Energy transition requires a radical jump, and that radical jump comes from looking into energy as, not just as a material, as a commodity, but energy through which social relations can form. Energy through which people can live life. And that requires more creative jumps, which we are trying to bring in. But often people, when we talk about this, people say, this is nice. But the moment we start concretely talking about what should this do, we keep coming back to those calculations and very rational way of thinking about energy and energy transition’.

-Knowledge Institute, LIFE project partner

This entails a risk because, when assets are used as a unit of measurement, the absence of assets implies that residents are not considered a priority in project decision-making until they acquire assets or develop a “business case”. As shown in the quote on the left:

The following emphasizes the need for project partners to look beyond the technical perspective of ‘energy assets’ and consider social value as qualities of worth. Since the objective of the project is not only to resolve a technical issue, but to do so in a way that promotes acceptability and social inclusion in the area.

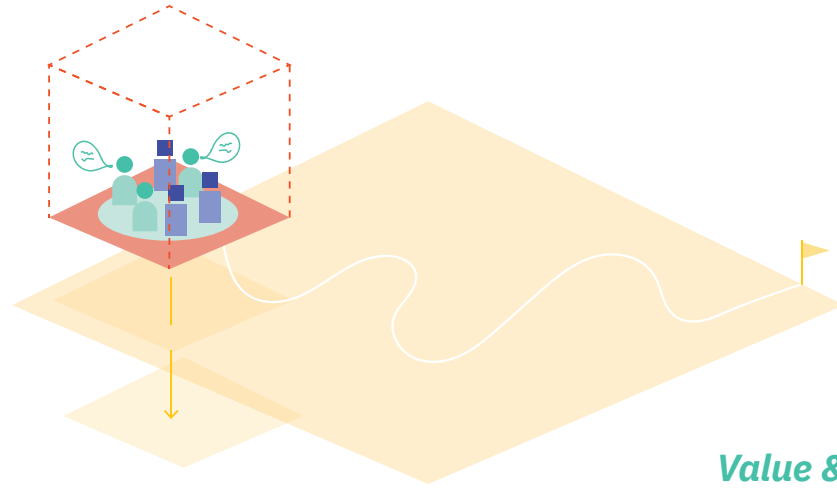


Figure 26: Value co-creation in Amsterdam ecosystem

Value & value co-creation in the Amsterdam ecosystem

The theoretical context emphasizes service designers adopting a more systemic perspective and zooming in and out the problem. After gaining a comprehension of the project's internal purpose and challenges, the focus shifted to comprehending value co-creation in a multi-stakeholder ecosystem and value opportunities in the Amsterdam Zuidoost ecosystem's complexity see Figure 26.

Developing an ecosystem value proposition

As this project seeks to cover an area involving several stakeholders, it is essential to understand the ecosystem and the needs of the involved actors in order to develop an ecosystem value proposition. As stated by a member of the Advisory Board:

'We need a value proposition for the whole area'

-Advisory Board, LIFE project

This involves examining knowledge-gaining opportunities and connections, as well as determining which LIFE network structures can help them leverage the ecosystem. Due to the limited amount of time allocated to the undertaking, maintaining close contact with other 'experts' could be beneficial. The LIFE project is part of a hub of Innovation, research and development, as part of EnergyLab Zuidoost and government-supported grantees in the development 'flexible energy systems'. Spectral, a project partner (who has created other energy exchange systems for companies and residents, among others) could be sources of information. In addition to expertise, awareness of the neighborhood stakeholders could be an opportunity to establish partnerships or closer collaboration with residents, as highlighted in the following quotes:

'I think we are not well enough connected to the parallel projects, other projects that are, For example, the X projects the Y subsidy. But we are in touch with the other projects, but not on a regular basis. It's just a really like incidental. And we could learn so much more from them. So I think that will be a really big opportunity that we are missing right now because of lack of time.'

-Public sector, LIFE project partner

'What is the need for social organizations in the neighborhood, they are already there, maybe there is a need to connect to them, then do we need to have a development of a social platform?'

-Private sector, LIFE project partner

System-level adaptations

The introduction of new technology, such as an energy platform, requires system-level modifications. To enable energy exchanges between parties, as they are presently governed by DSO's, regulatory changes will be required. In addition, if LIFE were to facilitate energy exchanges between parties, its role within existing policies would need to be defined. Identifying the multiple regulations in which the LIFE project would need to drive changes at the policy level and which ecosystem actors could be allies to facilitate these transformation is important at an early stage of the project so as not to impede project implementation.

Existing regulations, such as the Energy Law, restrict energy connections. However, DSO's collaborate with the local government. This results in debates that can lead to changes in local policy, with the potential to affect national laws. The following represents an opportunity for the LIFE project as both members from the municipality and DSO are part of the team as collaborators. However, these relationships and value exchanges must be outlined within the project.

'The way some parts of our system are designed would mean that we wouldn't be able to put LIFE in practice right now, because things are not allowed (referring to energy sharing). I think it would be a crucial part of the energy transition to succeed. The regulation should be changed because it should fit modern times, but of course, it's quite complicated to do that'.

-Public sector, LIFE project partner

'Government stirring principle, there is no more first come first served. DSO's made some guidelines, including what are the things the public needed: library, child's day care, schools, local groceries store, public functions.'

-Gemeente Rotterdam, Advisor

An ecosystem energy-vision

Understanding the function of ecosystem actors and their interrelationships can help the LIFE project comprehend its position within the ecosystem. The city's energy planning is visionary and infrastructure-oriented. The Municipality's efforts and regulations are consistent with the region's long-term energy planning vision. One of the initiatives aligned with this vision is the LIFE project. Nevertheless, while the Municipality roles are being redefined, the Municipality's infrastructure development activities are disconnected from the project's overall direction.

To address the challenges of the energy transition, guidelines have been established at the United Nations, EU and national levels. Municipalities have the ability to define the type of regulations and objectives for their own jurisdiction, thereby limiting and regulating the behavior of stakeholders within the Municipality. This can be seen in the following quotation, which describes how the new reporting regulations that apply to larger corporations and financial institutions force businesses to alter their current practices, as the quote in the right illustrates:

'We are an intermediary that looks at the bigger picture, gives recommendations to the neighborhood, for energy planning, the planning has to be 7-15 years ahead. The City in cooperation with DSO's, has to do net planning, which isn't in the NL right now'

-Gemeente Rotterdam, Advisor

'It is connected to the vision of Amsterdam ZuidOost 2040 I believe. It's a policy report on what we want to do as the Gemeente in this area. So LIFE fits in there because we want to look into the flexible systems if it's possible here if we can offer value to citizens.'

-Public sector, LIFE project partner

'The ambition for Gemeente and the City of Amsterdam is much higher than the laws or the regulations that the national government says. So we are trying to show the event industry how you can host green events because by 2030 we are not allowed to create any more CO2 emissions.'

-Private sector, LIFE project partner

3.5 Co-creation sessions

3.5.1 Brainstorming value opportunities for Large Asset Owners

To develop ideas for the first event involving large asset owners, the LIFE communications team—Stakeholder Engagement Coordinator, Gemeente Amsterdam Project Management Team, and AMS Institute Graduate Intern—organized the session. As the facilitator, the **goal** for the session was the idea generation of potential value opportunities for large asset owners in the LIFE platform project. Attempting for the first time to cease referring to them as “large asset owners” and categorizing them into three target groups.

A one-hour-and-a-half session was conducted in Huis van de Toekomst, Amsterdam. The session brought together participants from the project consortium and marketing representatives from external partners. An overview of the participants can be seen in Table 4:

Representative Organization	Role
AMS Institute	LIFE Stakeholder Engagement Coordinator
Gemeente Amsterdam	LIFE Project Management Team
Johan Cruijff ArenA	LIFE Project Management Team, JCA, Innovation and Strategy Consultant
AMS Institute	Graduate Intern, Stakeholder Communication team
Johan Cruijff ArenA	JCA, Marketing Lead
Spectraal	Spectraal, Marketing Lead

Table 4: Overview of participants

Structure of the session

The workshop consisted of three main activities: Brainstorming, Clustering and Elevator Pitch (see Appendix G for the session plan). The workshop focused on the second diamond of creative-problem-solving Idea Finding. To promote divergent thinking, ideation exercises were used to help participants generate fluency of ideas (Heijne, K. and van de Meer, H., 2019). For idea generation, participants were divided into two groups, with each group focusing on one of three target groups: large entertainment venues, financial institutions, and educational institutions. To encourage freewheeling and building upon one another’s ideas, participants would rotate through the three target users and continue brainstorming, discussing, hitchhiking, and free-wheeling on one another’s ideas.

After the phase of ideation, participants were asked to converge through a Dot Voting exercise, screening and selecting promising options based on ideas that were on-target, relevant, clearly workable, and intriguing. To develop a shared comprehension of the selected options, participants from both teams were asked to prepare a three-minute Elevator Pitch for their proposal (Heijne, K. and van de Meer, H., 2019). This exercise assisted the participants in condensing their message and then presenting it to the other group as if to their intended audience.

Session insights

From the joint session involving the LIFE communication project partners and Marketing representatives from partner organizations, the following conclusions can be drawn. Firstly, participants’ technical perception of the project makes it difficult for them to communicate the benefits to externals. Second, understanding the different perspectives of value from potential users, could aid in aligning the project’s benefits with the goals of potential collaborating organizations. These are explained in greater detail below.

Leaving behind the technical frame

The LIFE project partners are accustomed to using technical terms, such as “net congestion,” to explain their project’s goals. However, they realized that these terms might not resonate with external members, especially those from non-technical backgrounds. Additionally, they encountered challenges in conveying the importance of addressing future issues, as these might not be perceived as immediately relevant. As illustrated by the quote in the right:

‘I just thing that for now, it will be a different thing to sell, for the company the net is still fine. I am in the net and why should I worry if that is still not happening?’
-Marketing representative

Identifying the Value Proposition

The session was a unique chance for LIFE to attempt to explain the project’s value proposition to external members, the majority of whom are marketing professionals who are accustomed to asking, “How can we sell LIFE to them?” when referring to the target user. The discussion led to the realization that potential collaborators, such as LAOs (Large Asset Owners), are for example, interested in reducing their operational costs. This understanding allowed the project team to position LIFE as a solution that can contribute to this goal. As signaled in the following quote:

‘This is something that goes on with all of the asset owners, how can they reduce the cost of operations?’
-LIFE project partner

Different perspectives on value

While the LIFE project primarily focused on developing the technical solution, marketing participants highlighted that organizations often prioritize two types of value: reputation (non-monetary value) and financial gains (monetary value).

‘Organizations care about three things, that is reputation, the other one is money and the third one is get better reputation or more money’.
-Marketing representative

Values as qualities of worth for LAO’s

Marketing participants emphasized that organizations with specific goals, such as sustainability objectives, could be more inclined to see value in collaborating with the LIFE project. By helping these organizations achieve their goals, LIFE could create value as qualities of worth, making it attractive for them to engage in the project.

*I have a sustainability goal or aim to be net positive, I know they are also looking to get to certain steps, so any steps that you take to that goal, **that is worth something**’.*
-Marketing representative



Figure 27: Brainstorming Entertainment venues

Tailoring Approaches for Target Users

During the session, participants found it beneficial to focus on the target user group's interests. This approach allowed them to identify various attractive factors, such as being appealing to new students or becoming an attractive venue for artists. Crafting an elevator pitch based on these insights helped participants communicate effectively with their target audience (Appendix H).

After the session, the generated ideas were clustered using Bos de Vos's divergent value framework as a guide to identifying various types of value (as the guiding principle or qualities of worth) (Bos-de Vos, 2020). Values as qualities of worth occupied the fourth largest group of values, but only Educational Institutions were perceived to be interested in acquiring Cultural values such as autonomy or egalitarianism (Appendix I).

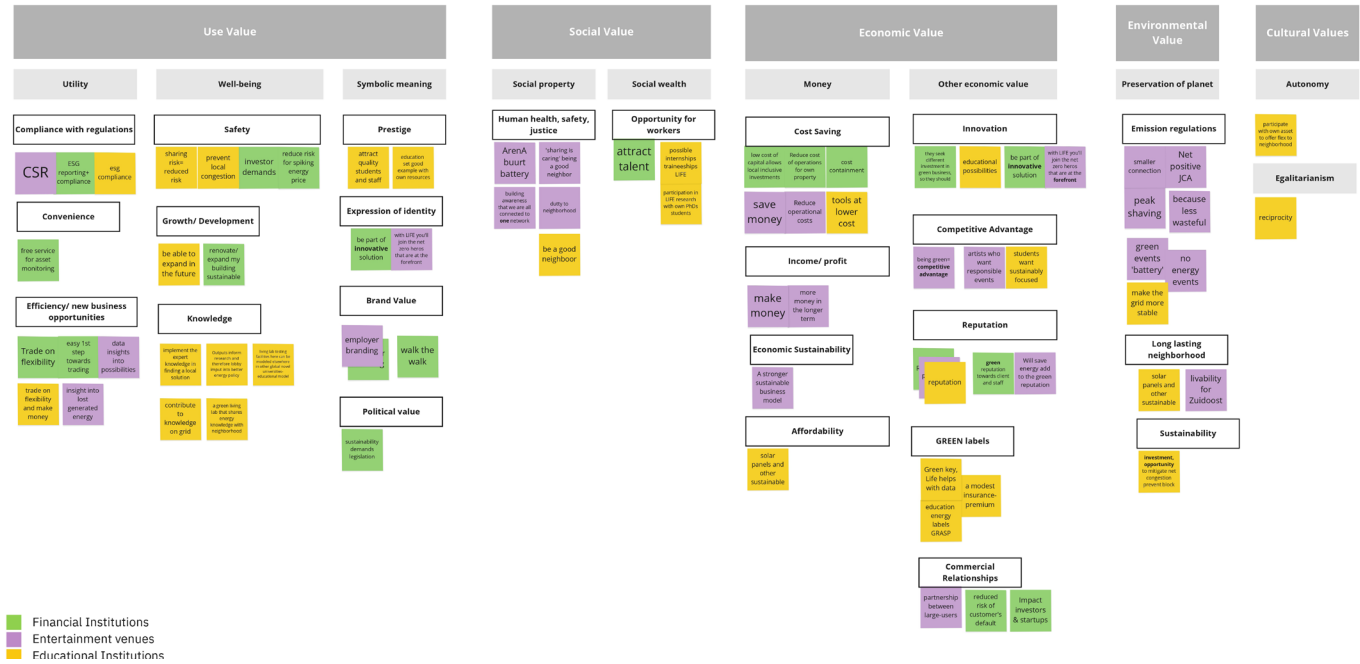


Figure 29: Clustering of ideas generated with the Bos-de Vos framework (2020)

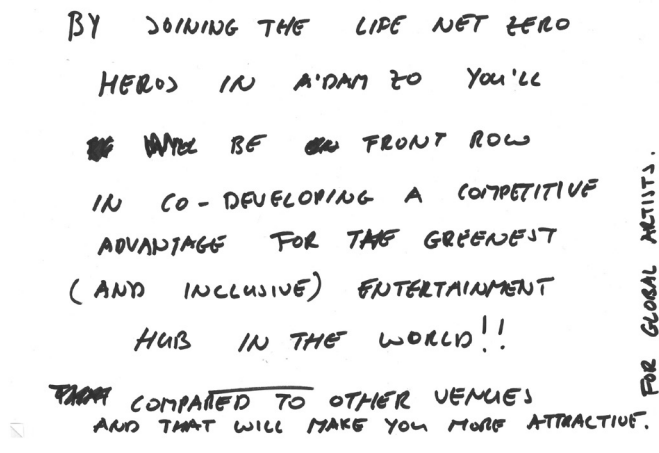


Figure 28: Elevator pitch for entertainment venues

To engage a broader audience successfully, the LIFE project needs to recognize the importance of explaining the project's concepts and benefits in non-technical language. Additionally, understanding the diverse perspectives on value as qualities of worth is essential for effectively addressing the interests of potential partners. By aligning the project's benefits with the aims of collaborating organizations, the LIFE project could position itself as a valuable collaborator in achieving shared objectives for external partners. For the LIFE project to properly convey the project's value proposition to a diverse group of stakeholders, it is essential to empathize and consider the actors they are addressing.

3.5.2. Mapping Value Opportunity for Large Asset Owners

After analyzing the semi-structured interviews in section 3.4, the co-creation session was developed. The interviews analysis had reframed the concept of LAOs and exposed the internal challenges within the consortium. The **goal** of the session was to discuss and agree on the purpose of the LIFE project. Based on the learnings from the previous session and the desk research on LAOs (section 3.3) the session aimed to assess the value opportunities for LAOs. Targeting those that were feasible and aligned with their purpose. In addition, the workshop pointed out the difficulties, possibilities and uncertainties of the project.

A one-hour session was conducted in Huis van de Toekomst, Amsterdam. The session included seven participants from the project consortium. An overview of the participants can be seen in Table 5:

Representative Organization	Role
AMS Institute	LIFE Stakeholder Engagement Coordinator
Gemeente Amsterdam	LIFE Project Management Team
Alliander	Project Manager Alliander
Spectral	Research Coordinator Spectraal
TU Delft, IDE	IDE, Academic Researcher
University of Utrecht	Academic Researcher
Johan Cruijff ArenA	LIFE Project Management Team

Table 5: Overview of participants

Tools & Canvases

Four canvases were located on the wall: Purpose canvas in the center of the room, 2 feasibility/impact matrix on each side, agenda of the session on the left wall (Figure 30).

Structure of the session

The workshop included two activities (see Appendix J for the session plan). To discuss LIFE platform purpose with consortium members, semi-structured interview extracts were printed (Appendix K). Then, each participant chose a quotation and placed it on the canvas, considering its distance from the center of the canvas. This was followed by a brief discussion to agree on LIFE's purpose.

Based on the ideas generated in the preceding co-creation session (Section 3.5.2), data from semi-structu-

tured interviews and desk research (Section 3.3) 'value opportunity cards' were created. The research group was split in half and given value opportunity cards to facilitate the following reverging activities. Sequencing was used to spontaneously cluster ideas along two axes using an impact feasibility matrix approach to encourage convergent thinking (Heijne, K. and van de Meer, H., 2019). Participants designated matrix axes names, in which they plotted the cards to assist discussion and value opportunities ranking. When putting cards in the matrix, participants were encouraged to consider the project's purpose, discussing and making decisions within a limited number of alternatives.

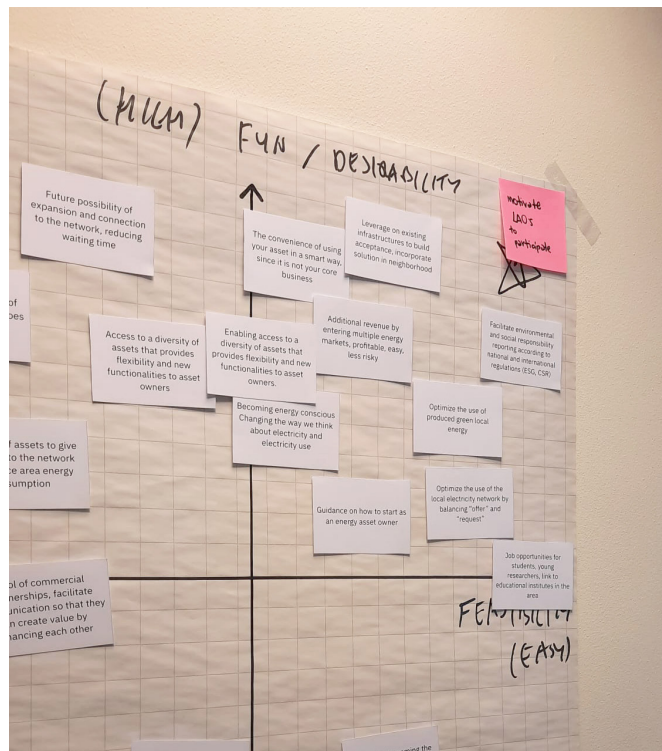
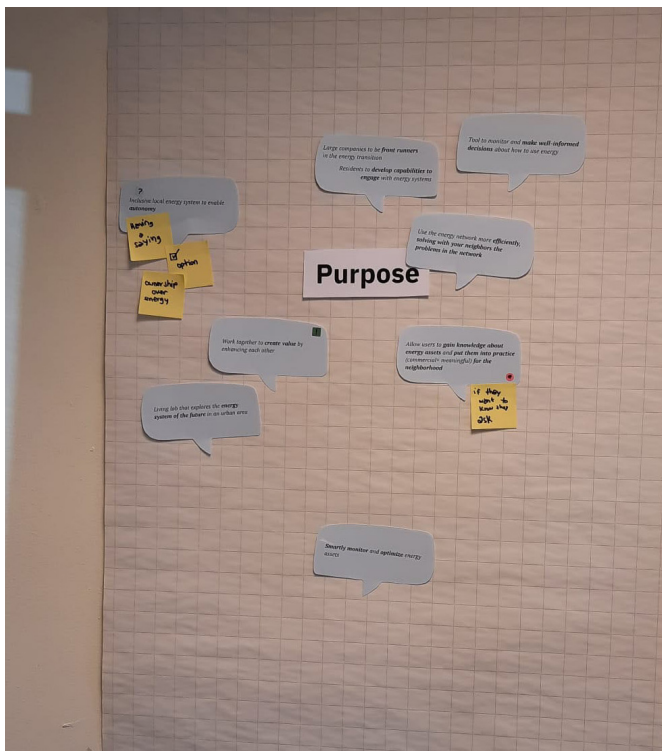


Figure 30: Purpose canvas, Feasibility matrix canvas.



'Well, but it matches, you said the purpose of it (the LIFE project) was focused on enabling autonomy' 'It's funny, it matches the organizations'.
-Private sector, LIFE project partner

'But if that's the real purpose of what we are doing, that's very much in the eye of the beholder'.
-Knowledge Institute, LIFE project partner

Session insights

From the session in which the semi-structured interview responses regarding the purpose of the project were evaluated, the following conclusions can be drawn (Appendix M). Participants presume it is normal for each stakeholder to have a unique "LIFE purpose." The discussion about values becomes extremely broad and abstract. It is assumed that LAO are only interested in economic value as qualities of worth. These are explained in greater detail below.

Purpose of the project is aligned to stakeholders values

Obtaining LIFE project purpose alignment proved to be more difficult and time-consuming than anticipated. -"Use the energy network more efficiently by resolving network problems with your neighbors"- was selected as the phrase closest to the project's purpose. Participants acknowledged that a number of the purpose examples fit with the goal of each organization within the project.

The participants believe that the project's purpose is subjective to each of the project's stakeholders. One participant was of the opinion that the purpose of the project corresponds to the notion of what constitutes a successful project, and that this is dependent on the perspective of each party. As evidenced by the quotation on the left:

Values as guidelines are too abstract

Statements containing the terms "inclusive", "autonomy", and "create value", words that lean towards values as guiding principles and are further from the objectives as stated in the project proposal, were deemed too abstract by participants with a more technical background.

Determining the "values as qualities of worth" that the project can provide becomes ambiguous as the team is unsure of whether future financial success will make it feasible. Since the participants doubted their possibility to deliver, value opportunities are explored with this idea in mind.

Asset owners are mostly economically driven

The axes of the feasibility matrix were defined from the 'large asset owners' perspective. The workshop matrix demonstrated that both teams assumed Large Asset Owners are primarily driven by economic criteria and concerned with capturing economic value.

During the workshop it can be observed that the term "Large Asset Owners" has gained traction within the consortium and evokes a restricted image of what could be of value to this party. Participants seem to think platform users are either residents or large asset owners. Finally, the opportunity of potential partnerships and the development of a more holistic ecosystem do not seem to be considered of great impact to participants when an "asset owner" framing is adopted.

'We are having these monitoring, let's say assets monitoring capabilities (reading purpose phrases from the canvas on the wall); then you really get the strong data and then it becomes a little bit more, how do you call it too abstract.'

-Knowledge Institute, LIFE project partner



Figure 31: Participants placing value opportunity cards in the feasibility matrix.

3.6 Findings

Empirical research was conducted within the LIFE project Case Study to answer the research question, How can we develop value propositions that benefit the multi-stakeholder ecosystem of Amsterdam Zuidoost? Based on the insights detailed in the previous section, the following main problems could be identified and categorized in two themes:

Internal LIFE challenges

1. The stakeholder's perspectives on the project's purpose and the values as guiding principles within are not aligned. Stakeholders have their own values and lack a shared purpose for the project and the ecosystem. This lack of alignment between purpose and values hinders project direction.
2. Multilevel interaction between stakeholders within the consortium raises challenges of multi-stakeholder dynamics. The difficulties are manifested by a lack of communication and a compartmentalized approach to work, which impedes decision-making and the project's direction in relation to its objectives and goals.
3. There is a lack of explicit and clear conversation about values, both at the level of guiding principles (the values that guide the project) and qualities of worth (the values that each stakeholder captures). The abstraction of values complicates the conversation, as there are no methods or instruments available to facilitate it.

LIFE at a project and ecosystem level

4. As discussed in the theoretical chapter, the interaction between stakeholders and design determines whether the design promotes or inhibits particular values. (Friedman & Hendry, 2019) The project's technical framework places asset owners at its center. The following avoids an ecosystem perspective and restricts value exchanges to what may be advantageous to the platform in terms of 'energy assets' to delay grid congestion.
5. To establish a value ecosystem proposition, it is necessary to consider the value exchanges of all ecosystem actors. This can lead to the identification of instances when system modification is required at various scales, demanding collaboration and support from other actors.
6. Value capture motivates actors to join an ecosystem, highlighting the significance of understanding the position of each actor. Understanding how it relates to others and the type of value that may encourage these actors to join the ecosystem is essential.
7. Understanding the LIFE ecosystem requires taking into account trends, regulatory changes, and the influence that certain actors have on others. According to

theoretical research, the introduction of new actors and their interactions within the ecosystem can impact the adoption of technology. For the LIFE project to see potential opportunities to co-create value, not only with "big and small companies," but also with other ecosystem actors, it is crucial to have a clear understanding of the ecosystem and its position within it.

Value Alignment and Stakeholder Dynamics

The first two problems are closely linked to alignment, particularly concerning stakeholder dynamics, which stem from value alignment. The importance of value alignment becomes evident, as core values guide actions and the desired qualities of worth. Ensuring alignment among actors' values is crucial to realizing the project's purpose. This is consistent with the theoretical context, in which stakeholders confront complex challenges and new forms of collaboration where it is necessary to develop new capabilities to manage value abstraction and intertwined cooperation.

Lack of Tools for Multi-stakeholder Ecosystems

The third point is most pertinent to the explored notions of value in the theoretical context. There is a lack of tools available to examine value co-creation in a multi-stakeholder ecosystem. As it is necessary to comprehend and develop value ecosystem propositions in order to benefit the multi-stakeholder ecosystem. The case study perspective highlights a discrepancy between the literature and the project's perceived values. Existing tools and methods for value modeling do not facilitate users to capture and describe value exchanges between different stakeholders. Therefore, the LIFE project may benefit from a new lens through which to view the project and make tangible this potential value exchanges.

Reconsidering Language and Perceptions

The fourth issue relates to the project's use of language. Utilizing the term 'large asset owner' emphasizes their ownership of energy assets. This term restricts the vision of how these organizations can contribute value as qualities of worth to the project by emphasizing their possessions. When this terminology is used to refer to the users and target group for the LIFE platform, the focus on 'assets' classifies the perception of users as asset owners or non-asset owners. While this issue's scope is too broad for this project, it will be taken into account during the development of the value ecosystem tool in Section 4. Adopting a value for ecosystem perspective will allow for a broader understanding of various users' contributions and types of values. Aiming to broaden the 'types of values as qualities of worth being

discussed. Additionally, the term "large asset owner" will be avoided so as to avoid reinforcing this perception of value.

Understanding Value Exchanges

From the fifth and sixth points, it can be concluded that LIFE project could benefit from a greater understanding of value exchanges between actors. Implementing methods or tools to make these exchanges evident will enhance the project's success. Additionally, recognizing and clarifying the different types of values as qualities of worth exchanged will broaden participants' perspectives beyond mere economic transactions to encompass utilitarian, social, and environmental value streams.

The seventh item, while insightful, will not be the primary focus of this research. An in-depth examination of trends, policies, and system mapping would be required, which lies beyond the scope of this study. Nevertheless, the interviews and section 3.3 provide an illustration of the insights that this form of analysis could deliver. Instead, this research will primarily emphasize value ecosystem propositions and value exchanges, aligning with the stated research question.

4. Design of a value modeling tool

This section describes the method and process of the iterative tool development. In addition, it describes the components and setting to use the tool. Finally, it presents the results of the validation session applying the tool to the LIFE project.

4.1 Method

In the development of the tool, design activities played a central role to find an answer to the research question:

How can methods and tools for value modeling in service design support collaborative networks in a multi-stakeholder ecosystem?

An ecosystem perspective to value modeling, and applicability in a multi-stakeholder context was one of the main criteria. Design activities were primarily supported by design science research and research through design.

Design science research (DSR) was used to structure the development of a tool that builds on existing theory and knowledge to construct a solution to a specific problem (Velter, M.G.E., et al., 2022). The six phases of the DSR process are depicted in Figure 32: problem definition, objectives of tool & method, design and de-

velopment, demonstration, and evaluation.

The development and demonstration process followed a **research-through-design** methodology in which design activities were performed during the knowledge generation process (Stappers & Giaccardi, 2017). In this method, design activities are materialized through the creation of rapid prototypes that contribute to the formation of knowledge. The iterations, modifications, and improvements of the tool were based on introspective discussions, expert feedback, and collaborative sessions. Sessions of co-creation and evaluation forms generated new ideas and validated particular aspects of the results.

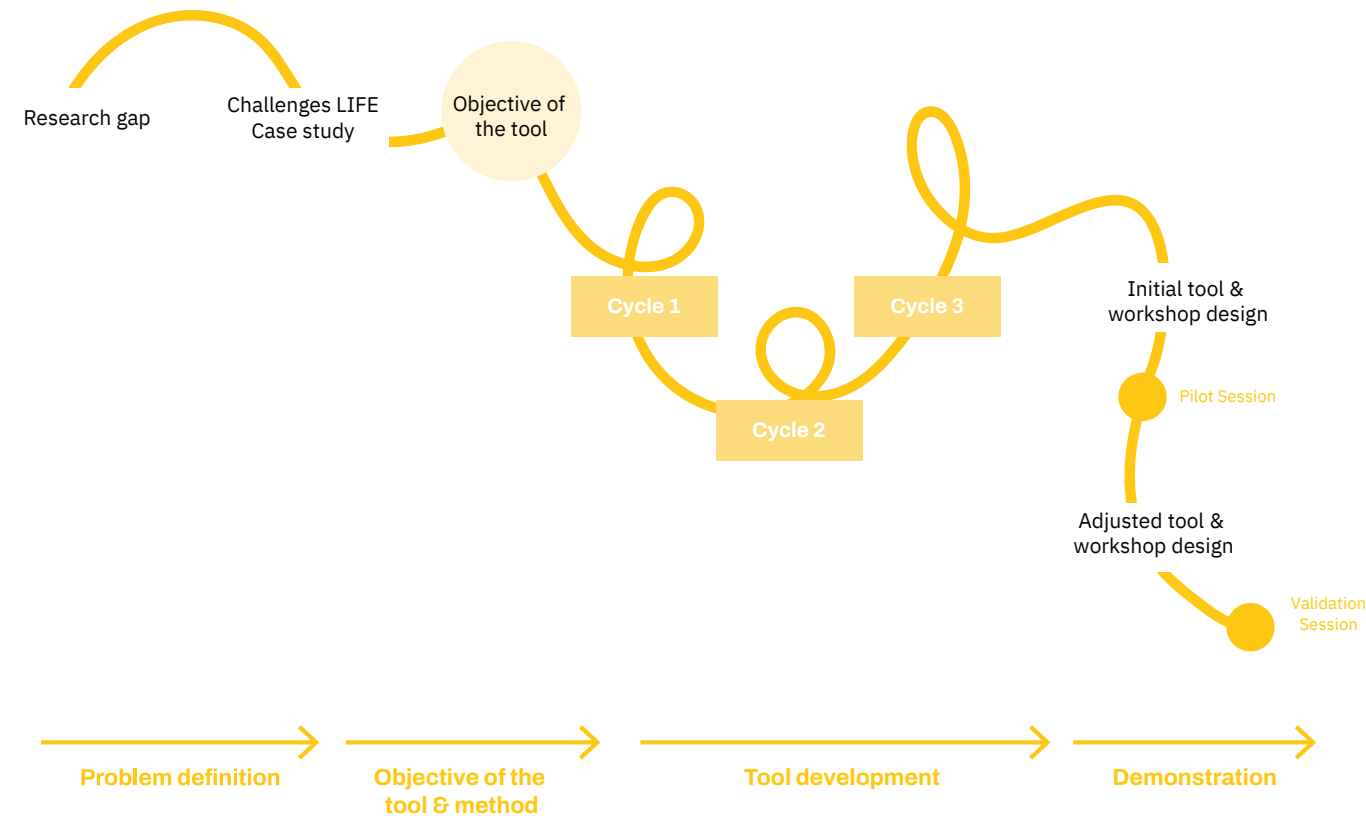


Figure 32: Tool development process, adapted from Design Science Research (Velter, M.G.E., et al, 2022, Peffers K, et al. 2007)

4.2 Tool development

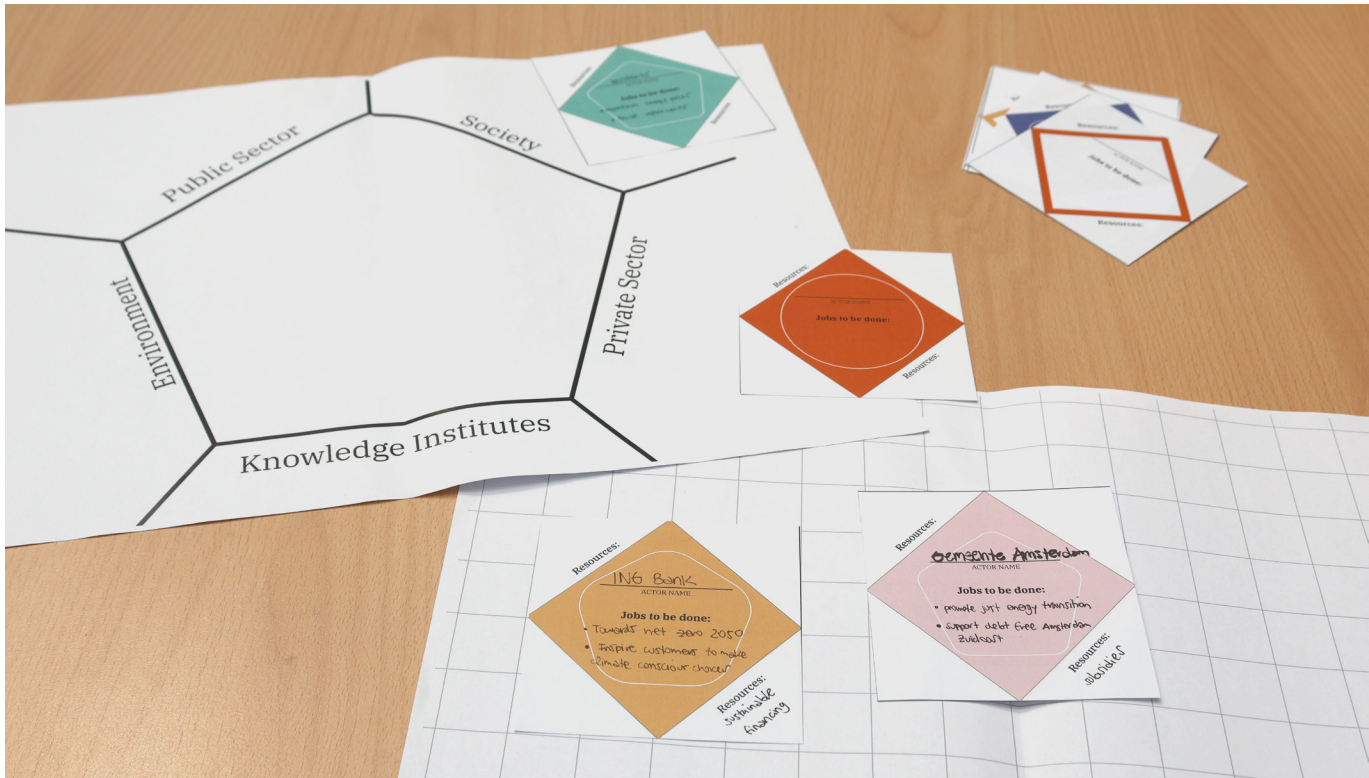


Figure 33: Cycle 1, Tool prototype.

After reflecting on the problem definition as a result of the theoretical background and the findings of the case study, the objectives of the tool were formulated.

Objective: Develop a tool that facilitates ecosystem modeling to support collaborative networks in exploring stakeholder interconnections, enabling articulation of value exchanges.

Cycle 1

On the basis of these objectives, an iterative approach was adopted in which existing value modeling tools were adapted to shape the tool's functionality. The first version of the tool included: a pentagon canvas, based on the Quintuple Helix (Carayannis, E. G., et al., 2012), to depict segments in the ecosystem; actor cards, representing each of the actors jobs to be done (Osterwalder & Pigneur, 2010), what are they trying to achieve within the ecosystem and resources (Talmir, M., et al., 2020). A first prototype of the tool and facilitation guide was developed and discussed with the supervisory team and the LIFE project mentor (Appendix N). It was evident from the team's feedback that the tool's proce-

cedure and terminology were not intuitive. The shapes of the components and the relationship between the stages were not obvious. It was unclear what categories of components could be joined to other components, the color coding, and the role of "value exchanges" within the tool.

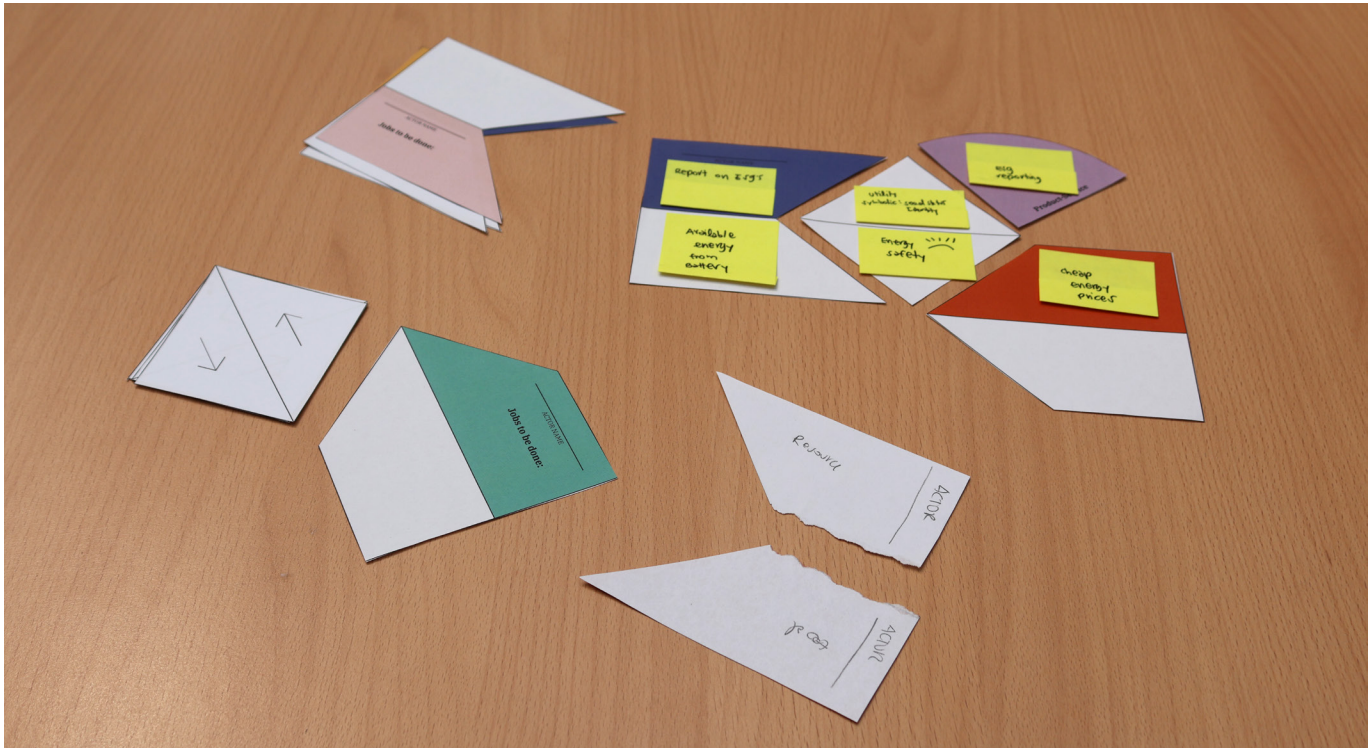
On this basis, it was determined to search for shapes that would clearly assemble with one another, including the 'value exchanges' as a physical element in the model and the direction in which the actor captured value. In addition, the color code was considered, using colors to designate actors and shades of gray to signal value exchanges.

Cycle 2

Following these insights, the tool was modified to create a clearer distinction between the function of value exchanges within the ecosystem, making it evident that value exchanges are required for two actors to connect. Figure 34 depicts the following prototype in which actors are connected via a value exchange diamond shape. Reflecting on the role of LIFE project as a bridge or facilitator between actors. In this model, LIFE is represented by a distinct shape (a forth of a circle), to add a product-service offering that functions as an intermediary between actors. Actor cards contained a job-to-be-done and a resource, and were assigned a color to indicate an ecosystem sector. On the second prototype, feedback was gathered from the supervisory team, a value design researcher, and LIFE graduate students see Appendix O.

The feedback made it apparent that the role of the LIFE card was not explicit, prompting an examination of LIFE's role in value exchange and the possibility of LIFE capturing value. Having a connection between an actor's tasks and available resources implied that a two-way exchange was required, making it less flexible that an actor's objective would need to be aligned with the resources available and the actor with whom they exchanged. In addition, the shape of the actors restricted the connection between more than two cards.

Figure 34: Cycle 2, value exchange card, diamond, LIFE card in purple.



As part of the tool's objective to model service ecosystems, geometries were examined in greater detail. In terms of language, the jobs-to-be-done' prompt made close reference to the value proposition canvas in terms of an actor's 'pains/gains' and a specific purpose of the tool. Therefore, it was determined to replace it with the term 'goals', which encompasses what an actor is attempting to accomplish within the ecosystem. In order to clarify the function of naming the value exchanges within the tool, a closer examination was performed.



Figure 35: Prototype of cycle 3. LIFE card in purple, actor cards represented with triangles, value compass and value dice in grayscale. Purpose Helix is placed beneath value compass and value dice.

Cycle 3

A third tool was prototyped (see figure 32) including the following cards: a purpose pentagon, actor cards (resource card/ goal card), wild card, value compass and value dice.

A three-hour session was incorporated into the tool's application method. Based on the consortium's current project stage and the results of previous co-creation sessions with them, it was necessary to determine which aspects of the tool were the most beneficial. The decision to select specific aspects of the tool was based on the consortium's current project stage and insights gained from previous co-creation sessions. In particular, the phases that emphasized fostering connections between actors and reflecting on value were prioritized.

Since the consortium already possessed a well-defined list of stakeholders and had conducted previous workshops to gather insights on LAOs, the focus was now on exploring how these actors could potentially interact and clarify their value exchanges. The co-creation session plan was developed, taking into account feedback from the supervisory team. Necessary adjustments were made to the tool based on their suggestions and reflections (see Appendix P for details).

Pilot Session

A two-hour session was piloted with five design students at IDE faculty (see Appendix Q for session plan). The session was recorded and transcribed. Using recordings, note-taking, a brief discussion, and evaluation forms (Appendix T), the session was evaluated. An outline of the participants can be seen below.

Master Track	Number	Involvement in the LIFE project
Strategic Product Design	3	(1) LIFE graduate student, researching business models.
Design for Interaction	2	(1) LIFE graduate student, researching citizen involvement in VVE's

Table 6: Overview of participants



Figure 36: Participants discussing constellation value reflection.

The session was piloted using LIFE project as a case study, as well as the actor cards that would be shown to the consortium members. Several conclusions could be drawn from the session:

Actors roles

First, when participants lack a context of the actors’ role, it is difficult for them to comprehend specific stakeholders and to consider what values and qualities of worth they would like to obtain. For participants that were not knowledgeable to the LIFE project product/service offering, their focused became in creating connections from the existing cards.

The tool connections

Second, participants were quick to establish connections between the objectives and resources of various actors. The tool allowed them to search for potential connections between actors.

Naming values

Thirdly, the designation of values by the participants sparked discussion. They needed to use the value compass and refer back to it when naming values. Participants suggested including a personal value compass so that everyone can readily refer to it. Post-it notes were utilized for capturing values on the actor cards, but this made it challenging to see which values were being integrated or not. In the subsequent iteration, values were color-coded and value stickers were added to make the process easier.

The value reflection phase assisted participants in transitioning from value exchange to the designation or categorization of values. In addition, participants noted that the value dice served to force-fit values, which may

‘The complexity of multiple goals connected was really nice to see, also the easiness with which everyone made these connections’.

‘The tool showed me that stakeholders are multifaceted & that different values can be used as a lens’

Step	Keep	Kill	Build
Establish the principles	Add colors to the values	Values as guiding principles seem to connect to knowledge institutes sector.	
Casting the actors		-The beginning is overwhelming, perhaps add a ‘rule’ to help getting it started	-1 actor per participant to familiarize with goals -Specify for Environment. Are the actors, flora & fauna, water, planet city?
Actors goals & resources			
Create constellations			-Multiple actors resources to achieve a goal.
Naming values	Great to provoke discussions	Not really intuitive to write on the white section	-Add color coding to values to lower their density -Provide a value compass per participant

Table 7: Keep-Kill-Build Feedback summary

facilitate a balanced distribution of value exchanges among actors.

The evaluation form included a keep/kill/build chart that requested participant feedback on the various method steps, see Table 7. The tool was modified based on quantitative and qualitative (Table 7) feedback (Appendix U).

After adjusting the tool, the LIFE project validation session was scheduled. In addition, the pilot session revealed that a two-hour session was much shorter than anticipated, so the validation of the tool & method focused on its core. The results of the validation session can be found in Section 4.4.



Figure 37: Participants exploring actor cards.

4.3 Value ecosystem canvas

The value ecosystem canvas starts with a project-centric perspective and then expands to a broader ecosystem level of value. It takes a multi-stakeholder approach to value creation, involving actors from various sectors within the ecosystem. The canvas serves as a modeling tool that allows users to establish potential connections between these actors and articulate value exchanges. The tool is built upon the Bos-de Vos framework, which incorporates both values as guiding principles and qualities of worth (Bos-de Vos, 2020).

The value ecosystem canvas comprises two essential parts that function as action guides and facilitators, accompanied by two categories of modeling cards. These facilitators are the purpose helix and the value compass:

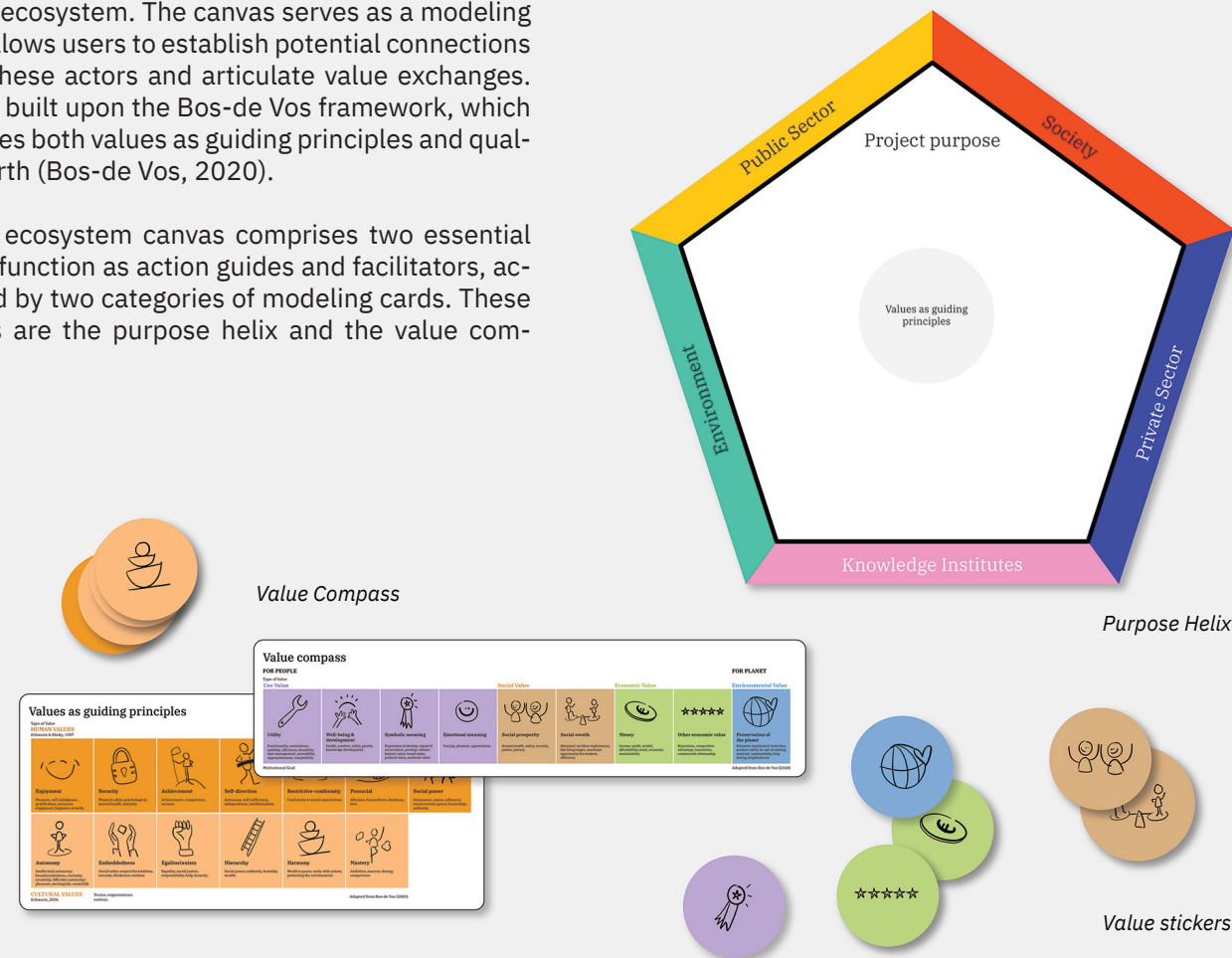


Figure 38: Value ecosystem canvas

Purpose Helix

This part of the canvas helps identify and establish the project’s purpose. It provides guidance in defining the project’s primary reason for existence, laying the foundation for the subsequent value co-creation method. In the center of the pentagon, a circle includes the values as guiding principles. Using the *Values as guiding principles compass*, it guides participants to reflect the project’s purpose in terms of the values guiding the project’s actions. The exterior of the purpose helix consists of the five relevant sectors involved in innovation, growth, and social well-being: society, public sector, private sector, knowledge institutes, and environment based on the Quintuple Helix of Carayannis, E. G., et al., (2012).

Value compass/ value dice

The values as guiding principles compass aids the collaborative network in defining the values that are most relevant to their project’s purpose when completing the Purpose Helix. The value compass assists users in mapping and distinguishing the captured values as qualities of worth by various ecosystem actors.

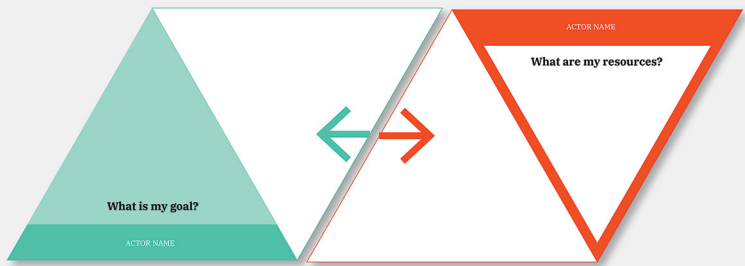
The value dice contains the same categorizations as the value compass, but is designed to facilitate participant reflection on the ecosystem’s values. Assisting them in the incorporation of previously unaddressed values.

Value stickers

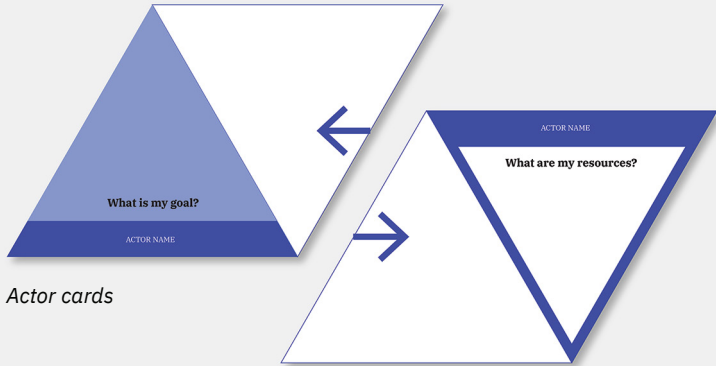
The purpose of the value stickers is to assist participants label the values exchanged between actors.

Constellation

A constellation is created when two distinct actor cards connect, either through a simple connection, when one actor’s objectives are met by another’s resources, or by employing the wild card as a bridge between two actor cards. Multiple cards can be included in constellations, incorporating multiple goals and resources.



Constellation



Actor cards



Wild card

There are two types of modeling cards in the value ecosystem canvas, actor cards and wild card:

Actor card

The actor cards define and summarize the function that each actor plays in the ecosystem or could play (based on assumptions, desk research, or information provided by the actor). It comprises details about the actor’s goals or resources. Each card has a value exchange triangle with a directional arrow. Using the value stickers, the triangle must be completed with the captured value for the actor.

Actor’s Goal card

An actor’s desired accomplishments define a goal. This could be business goals or items an actor is attempting

to accomplish, such as reducing energy consumption in operations.

Actors’s Resource card

‘Resources are at the disposal of the actor to be used for value creation’ (Talmar, M., et al., 2020). This may include physical resources, such as solar panels or electric vehicle (EV) outlets, or competencies, such as software expertise, that an actor possesses or has access to.

Wild card

It is possible for the wild card to facilitate the connection between two actor cards. The wild card is a mechanism that introduces additional activities, products, or services that convert the resources of one actor into the accomplishment of the goal of another actor.

Value ecosystem canvas method

The tool's application is split into two workshops. The first one *purpose & actors in the ecosystem*, establishes the unit of analysis, the ecosystem stakeholders, and the values as the guiding principles for the endeavor. The second *Value constellations* examines connections between ecosystem actors, identifying potential value exchanges and assisting participants in designating them, see Appendix V for facilitation guide.

Purpose & actors in the ecosystem

1. Setting the scene

The first phase of the process is Setting the scene. A brief introduction to the tool is provided, along with an example of a fully-populated canvas. In order to illustrate the terminology of purpose, resources, objectives, and value exchanges, examples are provided.

2. Establish the principles

Subsequently, in establish the principles, participants will define the unit of analysis, which may be a product, a service, or a project offered by the collaborative network. Using the *purpose helix*, participants will agree on the purpose of the unit of analysis and using the *value as guiding principles compass*, establish the values guiding their actions within the ecosystem.

3. Casting the actors

Then, *Casting the actors* the five segments of the helix are populated through facilitated brainstorming. Taking into consideration the actors who may play a role in achieving the collaborative network's purpose. This could include potential customers, competitors, suppliers, or other businesses with distinct responsibilities but potentially similar objectives. A color will be allocated to the chosen actors based on the sector to which they belong; each actor will be assigned actor cards.

4. Actors goals & resources

The next phase will depend on the configuration of the workshop and the stage of the project, as well as whether or not the actors will be present at the session. When the tool is used in an *exploratory phase*, website and report analysis can be used to fill in the actor cards with the objectives and resources of potential actors. When actors will be *present at the workshop*, questions are sent in advance so that they can complete their *actor cards*. Actors may have multiple objectives and resources, but only those that are most relevant to the project's purpose should be included on their cards.



Figure 39: Establish the principles



Figure 40: Casting the actors



Figure 41: Actors goals & resources

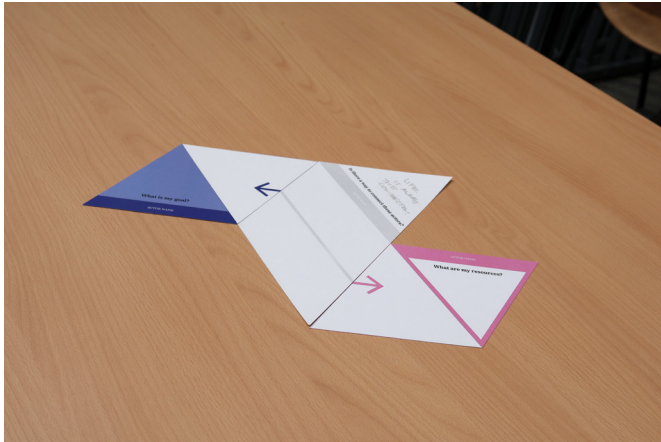


Figure 42: Create constellations

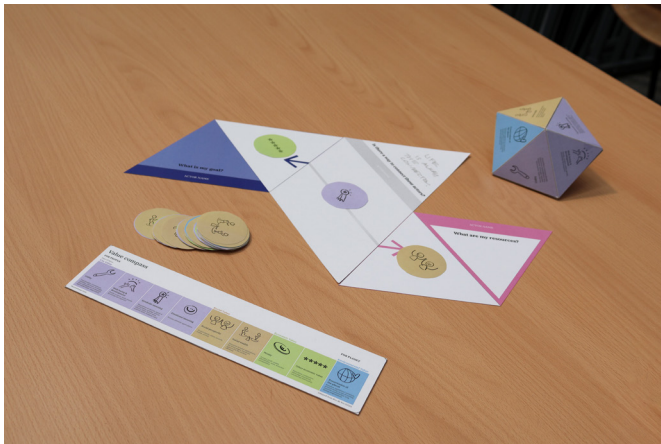
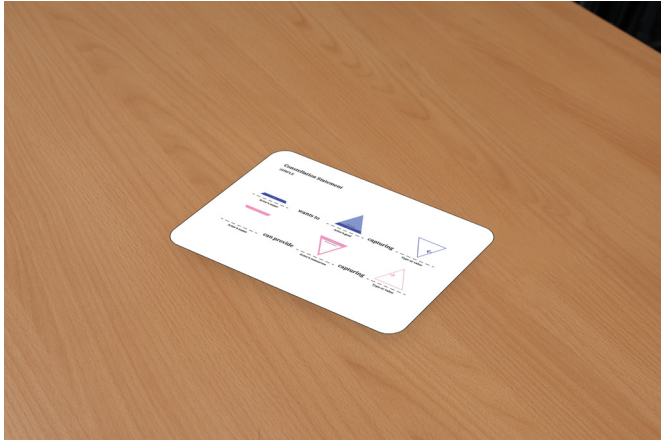


Figure 43: Naming values



Value constellations

5. Create constellations

Using the completed *actor cards* from the previous stage as a guide, the next step is to create constellations. Participants examine the *actor's goals and resources cards* and look for potential points of connection. The objective is to identify actors who could achieve their goals with another's resources. To complete this exercise, the *wild card* is introduced. The *wild card* assists participants in determining whether there is a potential connection between the actors through the introduction of an activity, capability, product, or service. Actors that are presently absent from the ecosystem may be introduced.

6. Naming values

Once potential constellations have been identified, *Naming values* equips participants with a value compass so they can identify the values being exchanged between actors. If an actor provides X to another actor, what values do they receive in exchange? Participants label the type of value being captured by each actor using the *value stickers*. This phase introduces the *value dice* as a fun method to determine whether or not there is an opportunity to promote undiscovered value within the ecosystem.

7. Explore constellations

Participants are then asked to summarize in a *constellation statement* the constellations created, including actors, goals, resources, and values exchanged. Then, they are asked to look back and reflect on the purpose helix and guiding values. Considering which constellations are more or less aligned with the *purpose helix*. Constellations that are more in line with the purpose helix are prioritized. The workshop ends with participants defining the first activities or interventions that they could take to explore the constellations further, leading to the potential involvement of an additional stakeholder or value exchange in the project.

4.4 Validation of the tool in the LIFE project

A two-hour session was conducted in Huis van de Toekomst, Amsterdam. The goal of the session was to evaluate and test the value ecosystem canvas with consortium members. Three participants from the project consortium attended the session. A summary of the participants is provided in Table 7:

Representative Organization	Role
Gemeente Amsterdam	LIFE Project Management Team
Johan Cruijff Arena	LIFE Project Management Team, JCA, Innovation and Strategy Consultant
TU Delft	IDE, Academic Researcher

Table 7: Overview of participants

Tools & Canvases

During the session, the following materials were utilized: Purpose Helix, Actor cards, value compass (one per participant), value dice, and value stickers.

Structure of the session

The focus of the workshop was on *Creating Constellations* and *Naming values* (see Appendix V for the session outline). Based on the second co-creation session (Section 3.6.2), the LIFE project’s objective was placed at the center of the Purpose Helix. A short discussion was facilitated with participants to determine the values that would serve as the project’s guiding principles. Participants proceeded to another table where the value ecosystem canvas cards were laid out after an explanation of the tool’s methodology. Participants were asked to represent their organization’s actors (Gemeente Amsterdam and Johan Cruijff Arena) as well as other ecosystem actors. Participants collaborated to construct the constellations. Then, they engaged in a process of *naming values* using the value compass and value dice. Finally, participants completed the evaluation form (Appendix Y) and provided feedback on the tool’s benefits to practice.



Figure 44: Participants discussing value exchanges.

Tool Evaluation

On the basis of the evaluation forms and participant comments during the session’s feedback section, the following conclusions can be derived about the session (Appendix Y, Z).

General evaluation of usability

Participants completed evaluation forms containing quantitative questions regarding the tool’s usability. A seven-point Likert scale was employed (Figure 43).

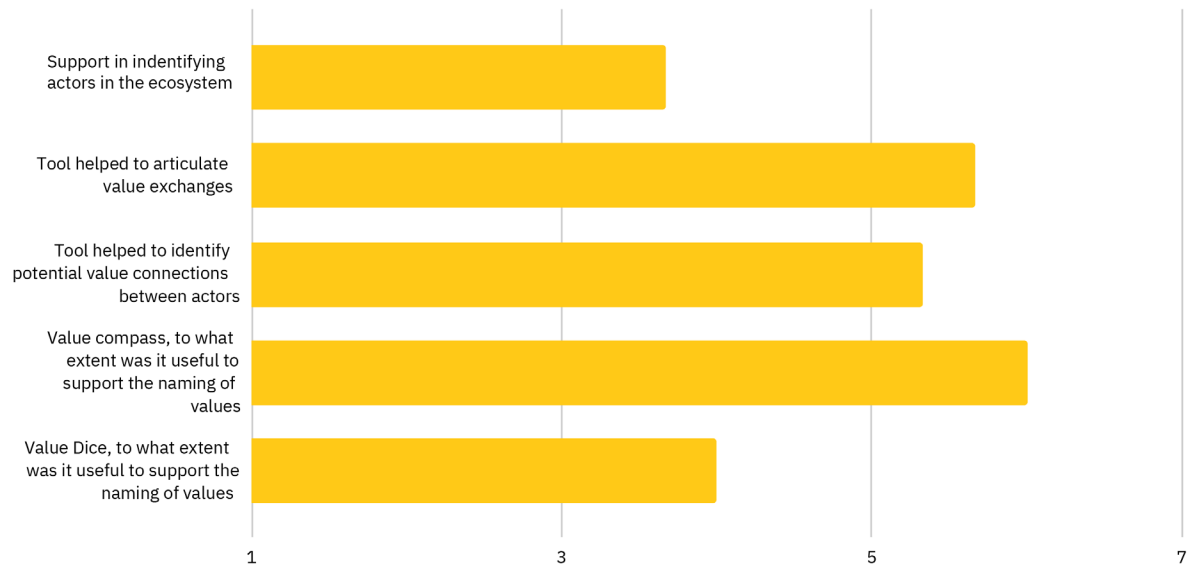


Figure 45: Usability bar chart evaluation results

The statements evaluated:

- Identification of actors in the ecosystem
- Value exchange articulation
- Aid in identifying value connections between actors
- Value compass as a support to name values
- Value dice as a support of the tool

Regarding **actor identification**, participants utilized only the cards supplied by the facilitator and did not add additional cards or stakeholders. Existing cards were sufficient for the allotted time, and actor cards featured the session participants, so this category received a relatively low ranking.

The **value compass** was rated highly for being useful in articulating value exchanges. Participants frequently referred back to it, and values from almost every category were incorporated into the constellations.

The **value dice** were deemed useful for reflecting on the less apparent value exchange categories. As a form of force-fitting, participants discussed values that had not yet been incorporated into the constellation. Due to the fact that most of the values were already included, one participant viewed the dice as primarily adding an entertaining element, which is reflected in the lower score.

The qualitative questions on the evaluation asked participants to reflect on the integration of the tool into the consortium’s workflow, the difficulties in employing the tool in professional practice, and the tool’s potential to enhance their current approach.

Explore potential links between actors

For consortium members, the strength of the tool was in establishing connections between actors and expanding those connections. It also served as a source of inspiration, as they were able to visualize options they had not previously considered.

Tool integration in project workflow

Participants found it pertinent to integrate the tool in the early phases of project scoping, after conducting a comprehensive stakeholder analysis, it would have been helpful to explore connections. Additionally, at an intermediate stage, it may be beneficial to gain a fresh perspective on the undertaking by escaping “tunnel vision.”

Tool enhancing the consortium way of working

The visual aspect of the tool enabled participants to be specific and facilitated their understanding of the connections. The color coding aided participants in “seeing the connections” by illustrating how different segments of the helix were interconnected. It was also described as refreshing and dynamic because it encouraged participants to think outside the box and discover new connections. The design was also described as a playful, less serious approach to examining complicated topics. Permitting exploration of value exchanges, transitioning from an abstract definition of values to a more concrete one.

A tool to navigate through complexity

The tool enables users to represent complexity by recognizing the various actors involved and their potential connections. Participants were able to connect various actors through the constellations, allowing them to discuss the bigger picture.

Foreseen challenges using the tool

According to participants, one of the tool’s drawbacks is that defining actor cards demands considerable effort and time. The instrument depends on identifying the goals and resources of stakeholders, which can be complex. Participants found it essential to translate the outcomes of the session into actionable steps. They aimed to obtain concrete results and actionable measures to progress further.

‘It can create unforeseen links between actors’
-LIFE project partner

‘I wish we had done that very soon, in that way we could scope the project earlier’
-LIFE project partner

‘It’s a fun way to think about value exchange and make it concrete’
-LIFE project partner

‘LIFE is quite complex trying to tie technical challenges with social challenges, this could be a tool to put that together in a way.’
-LIFE project partner

Knowledge about actors/projects

Representing specific actors in the absence of participant knowledge can be challenging. Comprehension of each actor can facilitate the formation of connections. In addition, participants' familiarity with the LIFE project helped them determine which objectives/resources could be met by their value proposition.

Value for the participants

Some of the participants were surprised by the goals of other actors, which could lead to creating opportunities for them.

A limited group size facilitated discussions and agreements among participants. Participants suggested focusing on a smaller group of stakeholders each time in order to manage the complexity and explore the connections in greater depth.

Insights from session

The following conclusions can be derived from the session's outcomes.

LIFE project perspective

From the perspective of the LIFE project, all of the created constellations incorporated the project as a wildcard. This method allowed participants to visualize the relationships between particular resources and objectives, as well as how they related to the overall project.

The constellations presented in the sessions were based on propositions discussed in previous meetings. This exercise allowed participants to establish clear connections between different actors and include additional actors that were not considered before. The tool provided support in identifying how their propositions could potentially link to other actors within the ecosystem. It offered insights into the broader network of relationships and opportunities for collaboration.

Scope and purpose of the LIFE project

Regarding the scope and purpose of the LIFE project, some constellations leaned towards a more social direction, particularly in relation to education. Participants discussed whether certain constellations fell within or outside the project's scope, leading to the dismissal of some ideas.

To evaluate such decisions effectively, it is suggested to identify not only the project's purpose but also its goals within the purpose helix. This allows for a more divergent exploration and then a convergence towards ideas closely aligned with the LIFE project.

'For me, it was easy to represent X, from Y I have a vague idea of what they do, but I wouldn't know what are their strengths'

-LIFE project partner

'From X perspective it was helpful to see how other actors can benefit/contribute to our goals/resources'

-LIFE project partner

Extract 1:

Participant A: *Because these are all the big companies, there should be money at least*

Participant B: *but if it happens through LIFE?*

Participant B: *Because for example, we, if we have, surplus energy, we have like huge peaks every two weeks with events. So during the week we can easily share energy with them.*

Participant B: *We don't need money for it*

Extract 2:

'Reputation, innovation. Is that important to Z? Well they are basically funded by the B, so maybe reputation is not, it's not vital to their existence'.

Extract 3:

Participant A: *Is not going back to the Gemeente I guess?*

Participant C: *Not in the form of money probably, but of course economic value in the neighborhood price. That is good for the Gemeente. More people working, more people, being healthy.*

Extract 4:

Participant A: *If Venserpolder could be more like, now seen as kind of this neighborhood with a lot of problems and challenges, but imagine it could be more thriving and positive*

Participant B: *Then it would be more reputation, status*

Participant A: *I think this one is more about companies. Cause it's also a competitive advantage. This is just for residents*

Participant C: *the reputation is not... The reputation of the neighborhood. You mean that oh, I see the overlap*

Values as qualities of worth becoming explicit

Participants actively engaged in the role of actors, creating constellations based on their interests and perspectives on the project. Through this process, the values driving actors' actions and decisions became explicit, as illustrated in Extract 1.

Participants' knowledge about their organization's resources and goals provided clarity on viable constellations and those more likely to be successful.

Additionally, participants' understanding of other actors allowed them to infer their values, promoting value exchange discussions, as mentioned in Extract 2.

The tool facilitated conversations that revealed actors' interests in specific resources to achieve their goals. Incorporating participants from different organizations into the cards proved valuable in making values more apparent. Participants openly shared the 'values' they were interested or not interested in acquiring. This approach was insightful as it enabled value exchange conversations to become explicit, as Extract 3 illustrates.

Value ambiguity & overlap

However, there were challenges with value ambiguity and overlap. Some value category descriptions implied specific users, leading to confusion among participants, particularly when there was overlap between social and company-focused values, as seen in Extract 4.

Ecosystem modeling, impact in the system

Participants were aware that certain connections depicted in the constellations could potentially trigger specific regulations or policy changes. This awareness highlights how reflecting on the relationships with various stakeholders prompted participants to consider the broader impact of their product or service on different levels of the ecosystem.

5. Conclusion

This chapter presents the thesis results in relation to the research query. In addition, the limitations of this study and suggestions for future research are discussed. Finally, recommendations for design practice are presented.

5.1 Closing

The research question — ***How can methods and tools for value modeling in service design support collaborative networks in a multi-stakeholder ecosystem?*** was addressed by developing a value ecosystem tool. This tool enables collaborative networks to iterate, visualize value exchanges, and understand their projects within the ecosystem. By offering a systematic, explorative method and mediating interactions between stakeholders, the tool facilitates clear communication and value exchange conversations.

Practical Relevance

In conclusion, given that the LIFE project aims to deliver a product-service that requires a comprehensive understanding of the complex system they intend to integrate. Additionally, they must consider the diverse interests of stakeholders involved. Therefore, the significance of comprehending each actor's goals and values becomes crucial to ensuring successful collaboration.

Addressing the case study question —***How can we develop value propositions that benefit the multi-stakeholder ecosystem of Amsterdam Zuidoost?*** The theoretical research conducted has shown that individual value propositions alone are not sufficient to implement innovation at a systemic level. Instead, an ecosystem perspective is vital, requiring exploration of how the project's innovation connects to and interacts with the broader ecosystem.

The Value ecosystem tool was designed based on the LIFE project consortium as a collaborative network. After the validation session, the features of the tool can be summarized in the following way.

A systematic structure, the value ecosystem tool provides the project consortium with a process and method, offering a well-defined set of steps toward ecosystem exploration and specific actions. An explorative tool provides the consortium with freedom to model iteratively potential connections and exchanges. By using the tool, consortium members can approach the project with a fresh mindset, enabling them to freely model connections and exchanges.

Furthermore, the tool enables explicit values exchanges. The tool's value compass classification feature serves as a mediator for interactions between stakeholders. It facilitates conversations about which exchanged values are included or excluded, emphasizing the qualities of worth that each actor aims to capture. As a result, value exchange conversations among stakeholders are brought to the forefront, promoting clear communication and shared understanding.

Anticipating aligned values can foster collaboration and synergy among stakeholders. By using the tool with potential partners or external stakeholders, value conversations will allow the actors to make this conversation explicit. This understanding would enable the development of value propositions that benefit multiple actors within the ecosystem.

Moreover, internal value alignment in the project purpose and values can help the LIFE project to clarify and achieve its objectives and goals, ultimately releasing value tensions and ensuring decisions benefit all parties while staying true to the project's core purpose.

As the LIFE project endeavors to achieve an ecosystem value proposition, the value ecosystem canvas plays a vital role in dealing with the complexities of both the ecosystem and the intricate world of value exchanges. By using the tool, the consortium gains the ability to explore various configurations, gaining a deeper understanding of the ecosystem's dynamics (McNamara et al., 2008; Chesbrough, 2010).

The value ecosystem canvas serves as an initial step in modeling an ecosystem value proposition for the LIFE consortium. Through this process, the consortium gains a deeper understanding of the value creation that the LIFE project can generate within the ecosystem and the value that others can capture.

By using the tool, the LIFE consortium gains valuable insights into the potential value exchanges within the ecosystem, promoting effective collaboration among stakeholders. This collaborative approach ensures that all actors can actively participate in the value co-creation process, contributing to their pursuit of an inclusive energy transition.

Academic Relevance

The academic relevance of this thesis lies in answering the research question of ***How can methods and tools for value modeling in service design support collaborative networks in a multi-stakeholder ecosystem?***

The value ecosystem canvas, built on the value for the ecosystem approach, addresses the identified gap concerning ecosystem value opportunities in multi-stakeholder ecosystems. By actively exploring value opportunities and interconnections among stakeholders, the tool enhances the understanding of actors' value exchanges, thus making a contribution to this area of study.

A key strength of the value ecosystem canvas lies in its value-centred approach. Leveraging the Bos-de Vos framework, the tool uncovers a diverse range of values that can be exchanged within the ecosystem. This sparks discussions about the significance of these values for each actor, helping bridge the gap between abstract values and concrete requirements (Vink, J., 2021). Moreover, the tool considers the complexities arising from multiple stakeholders and their distinct perspectives on value, emphasizing guiding principles and qualities of worth (Bos de Vos, 2020). This perspective enhances the understanding of ecosystem dynamics and fosters a more comprehensive view of value co-creation (Den Ouden, E. 2012).

Drawing upon insights from various scholars like Adner (2012), Hanaah and Eisenhardt (2017), and Talmar, M. et al. (2020), the tool aids in visualizing intertwined value exchanges between different organizations and actors, addressing the intricacies of complex value proposition making. Its flexibility and iterative nature are well-suited to the evolving dynamics of ecosystems, helping stakeholders to understand the intertwined value propositions (Weiller, C., & Neely, A., 2013). With a focus on modeling shifting interactions, the value ecosystem tool aligns with the work of Chandler et al. (2019) and prepares project consortiums to approach shifting interactions and unpredictable scenarios (Gunderson and Holling, 2002).

As part of the evolution of service design practice, the value ecosystem tool is an intervention to support collaborative networks to promote value alignment and cooperation among actors within the complex multi-stakeholder ecosystem (Sangiorgi, 2009). It empowers stakeholders to take an active role in shaping the ecosystem and making a first step in engaging in the process of service ecosystem design (Vink, J., 2021).

5.2 Limitations

In the following section, the limitations of this thesis will be discussed, separating between theoretical background, empirical research, and the value ecosystem tool.

Limitations in theoretical background

Due to the time constraints and emergent research of service ecosystem design, the literature consulted was limited, which impacted the complexity of the understanding of the field. The primary focus was on the business management-oriented conversation of value capture and value propositions while trying to maintain a design perspective.

Regarding value understanding, existing frameworks from the literature were used as a reference. However, during testing, it became evident that some values were relatable to the context, while others were not. To improve this, a more thorough analysis of the values as “qualities of worth” that would be relevant for different actors involved in the ecosystem could have been beneficial. Providing concrete examples to clarify these values for participants who may not have prior experience with values would have been advantageous.

Taking inspiration from Den Ouden’s levels of value and Bos-de Vos value framework, there was a distinction between values applicable to “people” or the “planet.” However, within the category of “people,” the five segments from the quintuple helix were considered, including organizations, NGOs, or groups of neighbors. It would have been useful to further analyze which specific categories within the quintuple helix would be most relevant for this exercise and conduct a value analysis to ensure inclusivity and comprehensiveness. Furthermore, the environmental values considered were limited in scope. A more extensive exploration of environmental values, categorizing and analyzing their relevance, might have been incorporated. Expanding the range of environmental values could have led to a more comprehensive understanding of their impact on the service ecosystem design.

Limitations in empirical research

The thesis primarily relies on a single case study, which provided insights into the design of the tool. However, the limited scope of the case study poses some limitations. To enhance the generalizability of the findings and gain a deeper understanding of existing tools’ usage in service design and value modeling, a larger sample of case studies could have been included. This broader perspective would have allowed for better generaliza-

tion of the results and an understanding of how the tool’s design could be applied in different collaborative networks or contexts.

Furthermore, the thesis focused solely on the perspectives of the project consortium members. To enrich the understanding of the project and gather more comprehensive feedback, involving external actors from Amsterdam Zuidoost would have been beneficial. Grasping the benefits they seek to achieve from the project would have provided additional insights to enrich the outcome.

Another limitation lies in the sources of empirical data. The majority of the data came from the private sector, public sector, and knowledge institutes. While these perspectives are important, the lack of strong representation from the Society and Environment dimensions hinders a more holistic development of the outcome. Including more diverse perspectives would have resulted in a more well-rounded and comprehensive tool.

Although collaborative efforts were made during field research and reflections with other graduate students, the project was ultimately conducted individually. This absence of other designers analyzing the information limits researcher triangulation. Having multiple designers involved in the analysis could have strengthened the reliability of the findings and added more depth to the interpretations.

Limitations of the tool

The development of the tool was based on the Bos-de Vos framework, which categorizes values into guiding principles and qualities of worth. However, the tool predominantly focuses on qualities of worth, with guiding principles only serving the purpose of establishing the project’s intent. This approach makes the tool more transactional in nature, as it prioritizes value exchanges. While this was done to avoid abstraction, it limits the tool’s holistic perspective, especially when analyzing sectors such as residents and neighborhoods, where guiding principles could offer valuable insights for the LIFE project.

To improve the implementation and integration of the tool, a deeper analysis of existing tools used for value modeling would have been beneficial. Understanding the internal workflow of such tools could have helped in incorporating best practices and facilitating the tool’s usage in the consortium members’ work processes. The tool’s design also faced challenges when applying literature findings to practice, leading to ambiguity and a lack of clarity in the included values. A more compre-

hensive and precise framing of values could have enhanced both the design and practical application of the tool.

Furthermore, the tool was designed to be used with a facilitator, typically a designer. However, for future use, it is crucial to define whether a designer will be required in the team to facilitate its use or if the tool can be employed effectively by existing consortium members without external assistance.

General Limitations

Developing tools and methods is a step toward facilitating capabilities for actors. However, it is crucial to recognize that understanding actors and values involves multiple variables beyond the tool itself. This project represents a small intervention in the development of a product service within a living lab. While it is a promising first step in complex value proposition modeling, a single intervention without follow-up may not be sufficient to achieve meaningful outcomes. To create alignment among the project partners, extensive and continuous use of the tool at critical moments of the project is necessary. This ongoing utilization of the tool would facilitate value conversations and help reach agreements among the diverse stakeholders involved.

Resistance and established power relations within the project can pose challenges in integrating tools aimed at reframing the project. Some actors may have more influence over decision-making, which can hinder the adoption of new tools or approaches that challenge the existing agenda. Overcoming these challenges would require careful exploration of power dynamics and active engagement with all stakeholders.

The role of design and design practices within the project adds another layer of complexity. While designers are researchers within the project, they may be perceived as exploring or experimenting rather than contributing concrete outputs. Their outputs, such as inspiration and fresh perspectives, might not be fully integrated into the project's decision-making process. To successfully implement the tool, a higher level of maturity of design within the project would be beneficial. Having a champion who advocates for the integration of design practices as a standard way of working within the project could make the difference.

5.3 Recommendations

Suggestions for future research

Value Categorization for a Holistic Approach to Values

Future research should start with an extensive and diverse literature review, focusing on value co-creation and value opportunities in multi-stakeholder ecosystems. Additionally, conducting a deeper analysis of specific value categories and their relevance within different segments of the quintuple helix can enhance the understanding of how values fit into different contexts. To develop a more holistic approach to values, researchers should broaden the scope to include a wider range of social and environmental values. Examining the fit of values within the different segments of the quintuple helix can provide valuable insights into tailoring value propositions for specific actors.

Navigating from Exploration to Action

Future research can explore the development of tools that facilitate the transition from an explorative phase to a more action-based approach in service ecosystem design. This would enrich the practical application of the value ecosystem tool and contribute to a deeper understanding of value co-creation opportunities.

Understanding Power Dynamics

Current institutional and power structures play a significant role in shaping the ecosystem. As briefly discussed in the theoretical background by Talmar, M., Weiller, C., & Neely, A., the adoption of technology and value propositions can be influenced by actors' roles, leading to reducing competitiveness or even steering an industry. This aspect was also explored in the initial iterations of the tool (Cycle 1). However, there was a potential risk of unintentionally reinforcing existing power structures when modeling collaborative constellations. To address this concern, future research should consider adopting a "power lens" to gain a deeper understanding of the existing power relations within the ecosystem. By incorporating this additional layer of analysis, it becomes possible to create a more relational understanding of the ecosystem, aligning it with the values being explored.

Understanding power dynamics in the ecosystem is essential as it can influence decision-making, value exchanges, and the overall co-creation process. By acknowledging and addressing power imbalances, the value ecosystem tool can be refined to foster more equitable and inclusive collaborations among actors in the ecosystem. This approach could lead to the development of more effective strategies for value co-creation

and enhance the overall outcomes of service ecosystem design initiatives.

Educational Possibility of the Tool

The value ecosystem tool could serve as an educational resource for design professionals and students. This tool can offer a more systemic and interconnected perspective on value exchanges than existing value modeling tools, which tend to be economic in character. Future research can investigate how design students can benefit from using the tool in their practice and how it complements the evolving service design trends.

Recommendations for the LIFE project

LIFE internal

To effectively guide the project, it is crucial to align and clarify its values as guiding principles. Among these values, inclusion and energy security have been identified as vital aspects. However, it is essential to understand how these values translate into actionable steps and shape the project’s agenda. By using them as a compass, the project can be steered to be aligned to this direction.

Values as qualities of worth can come forward with the use of the tool and existing case studies. One way to ensure the implementation of these values is to establish a standard procedure or method for every new partner joining the evolving LIFE project consortium. This will provide clarity regarding their objectives and role within the project. Furthermore, it is equally important to clearly communicate the expectations of their role from the perspective of LIFE project. This includes understanding not only the project’s objectives and goals but also comprehending the underlying values that drive decision-making.

By making these values as qualities of worth explicit and incorporating them into the procedures for onboarding new partners, a shared understanding and commitment to the project’s core values can be fostered. This can assist to preserve cohesion and ensure that all participants are working toward a common vision. In addition, frequently revisiting and reinforcing these guiding principles throughout the project’s evolution will ensure that they remain at the forefront of decision-making processes.

LIFE as a project

To assess the current state of the LIFE project within its ecosystem, we need to identify the available resources and understand the interdependencies that the project relies on. Leveraging the existing actors or network associated with the LIFE project is crucial to gain valuable knowledge and expertise.

Taking an ecosystem-level approach can aid in determining how existing actors can contribute to LIFE’s purpose. By understanding the connections between the existing partners and desired asset owners, consortium members can effectively tap into their knowledge and explore potential collaborations. It is also essential to delve into what drives these partners, as it could provide valuable insights and opportunities for cooperation.

The ecosystem perspective can assist the LIFE project in visualizing which actors are benefiting from the current constellations and whether or not this is consistent with the project’s aims and principles.

Reflecting on the quintuple helix, LIFE could benefit from incorporating perspectives from Society and Environment in order to ensure that the value the platform contributes to Amsterdam Zuidoost is comprised of relevant, equitable components.

Furthermore, the role of external stakeholders is evolving, influenced by changing regulations and shifting national and local agendas. This, in turn, impacts the behavior of the private sector and raises societal awareness. By comprehending these changes and their effects on the actors involved, LIFE project can determine how the value proposition can align with and complement these developments.

To showcase the potential of the project, creating a prototype becomes crucial. This prototype should be presentable to others, allowing stakeholders to grasp the essence of the LIFE project and its value proposition.

LIFE vision

LIFE has a clear initial goal and objective for its project; however, it is crucial to recognize that these goals may need to be updated and adapted as the project progresses. To fully understand how the technical and social aspects come together in the LIFE platform service, it is essential to analyze their integration and interplay. Looking towards the future, the LIFE service envisions a transformative impact in the energy sector. To achieve this vision, a well-defined strategic agenda needs to be established, with a clear focus on setting objectives and goals that reflect the desired future state. It is vital to avoid oversimplifying complex challenges, such as “preventing energy congestion,” and instead work towards co-creating a comprehensive roadmap that involves all members of the consortium.

The LIFE project operates as a part of EnergyLab Zuidoost, contributing to the acceleration of the energy transition. As the project aligns with efforts to devise an energy plan for the city’s future, it can leverage and benefit from the infrastructure development envisioned in the plan. By doing so, the project can position itself to be future-proof and proactively strategize on engaging users in the long run. Collaborating with the energy plan not only ensures alignment with broader city objectives but also opens opportunities for mutual synergies and enhanced outcomes.

In conclusion, LIFE’s goals and objectives should remain adaptable to accommodate the evolving nature of the project. Understanding the convergence of technical and social elements is crucial for the success of the LIFE platform service. To attain its visionary goals, a strategic agenda must be carefully defined, incorporating input from all consortium members through a shared co-creation process.

Design recommendations

This thesis followed a strategic design approach, resulting in conceptual outcomes. Future research is divided into two sections, with the first focusing on an academic approach to the continuation of service ecosystem de-

sign and designing for values tools. The findings from the empirical section of the project are then applied to the case study to formulate recommendations.

Topic	Trigger questions	Design directions
Service Design Methods	How can service design methodologies be adapted or developed for implementation in collaborative networks?	Analysis of the LIFE project workflow, scanning opportunities for service design methods to go from exploration to implementation
	What role do existing design interventions play in developing LIFE project partners' capabilities?	Conduct research with project partners to investigate the role of building project partner capabilities through design interventions in the project
Holistic Value approach	How can a holistic value approach be incorporated into the tool?	Analysis of theoretical 'value' frameworks, from a management perspective to a human-centered one
	How can values that are pertinent to each segment of the Helix be classified and specified?	Using a theoretical 'value' analysis, validate with five sectors in order to determine which ones are most representative of them
	What actions can be taken after utilizing the value ecosystem tool?	Adapting or creating service design methods for another divergent procedure (C-Box, impact, feasibility matrix, collaborative brainstorming).
Power Dynamics	How can we identify potential power structures within the ecosystem of Amsterdam and leverage on them?	Analysis of stakeholders in the Amsterdam Zuidoost area, examining their current actions and power relationships
	How can we acquire a greater understanding of the existing power structures within the ecosystem?	Develop a tool to incorporate a 'power lens', that analyzes existing power to and power over relationships
Values as guiding principles	What does energy security and inclusion mean for the LIFE project?	Participatory design analysis to determine what these values imply for the project and how they could be reflected on the LIFE platform
	How can values as guiding principles be integrated in the project?	Strategic recommendations for incorporating values as guiding principles into project workpackages
LIFE project vision	How can we define a LIFE project vision that incorporates the perspectives of all project partners?	Co-create and define a shared vision with LIFE project partners
	What are the LIFE project's current interdependencies, and what is LIFE's project position within the ecosystem?	Analysis of each ecosystem actor to determine leverage opportunities
	How can we balance the quintuple helix ecosystem?	Analysis of quintuple helix stakeholders, considering how society and the environment can be better represented
Tech developments	How can we obtain a portrait of the trends and developments that impact the LIFE project ecosystem?	In depth trend scanning and DEPEST analysis to scan for technological developments to identify LIFE USP
	How to create a low-fidelity prototype to demonstrate to internal and external partners?	A brief animation of a LIFE platform interface could be sufficient to convey to external stakeholders (LAOs, residents) the value that the platform could offer to them
Value tensions	How can we improve collaboration between project partners?	Based on participant values and current project direction rework project packages to align with the project's new vision and objectives
	What are LIFE project expectations from a project partner?	Define existing project partner expectations and a procedure for outlining prospective partner onboarding

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Personal Reflection

LIFE is a complex multi-stakeholder project that initially presented challenges due to its broad scope and systemic intricacy. Dealing with uncertainty, complexity, and time pressure added to the difficulty. As a designer facing a multi-actor consortium for the first time, it was intriguing to observe how our education primarily focused on ‘traditional’ organizations or institutions, highlighting the new challenges brought by collaborative approaches in alignment, interaction, and complexity.

During a significant portion of the project, I found myself in the research understanding phase, hesitant to transition into the tangible phase without being certain about the problem I aimed to address. However, I discovered the power of prototypes and making things tangible, as they facilitated conversations and interactions, enabling others to grasp my ideas better and contribute to the project.

Facilitation and co-creation sessions allowed me to interact ‘creatively’ with stakeholders both inside and outside the consortium. These sessions provided valuable insights into the project’s dynamics, its societal significance, internal politics, and the complexities of applying and translating theoretical knowledge.

The project’s focus on redesigning energy systems and challenging established paradigms was inspiring. It made me contemplate the value of design in such innovation laboratories, where designers are increasingly integrated as researchers, often struggling to define their role, especially in ‘strategic or service design.’

Writing played a significant role in the thesis project, forcing me to converge, structure, select, and narrate, despite not being an enjoyable task. However, it proved to be a valuable reflection tool.

Reflecting on how design can bridge the five sectors of innovation, I realized that top-down innovation, while well-intentioned, faces the curse of knowledge. Design can contribute by adopting a learning-by-doing approach, engaging in participatory methodologies, and fearlessly thinking outside the box to reevaluate and reshape existing systems.

In this project, I experienced that the strength of a strategic designer lies in their ability to move between layers of interaction, from individual project details to framing the project within national and global efforts.

Service ecosystem design may sound ambitious and large-scale, but I understand that designers must play a role in its development and implementation. Without their presence, there is a risk of creating isolated interventions that lack systemic impact.

Concluding this thesis, I realize that the project served as a profound exploration of the dynamic and complex issues designers we will face as designers of tomorrow. It emphasizes the need for design maturity across various domains, as our role as designers relies on demonstrating the value design can bring to these multifaceted challenges.

Thank you for reading.



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(Appendices are located in a separate document)

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