



Navigating Value Cocreation and Value Capture in the Developing Phases of Collaborative Platform Ecosystems: a Single-Case Study

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NAVIGATING VALUE COCREATION AND VALUE CAPTURE IN THE DEVELOPING PHASES OF COLLABORATIVE PLATFORM ECOSYSTEMS: A SINGLE CASE STUDY

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Abstract

This paper focuses on the double-sided challenge of value cocreation and value capture in collaborative digital platform ecosystems. Collaborative digital platform ecosystems are characterized by shared ownership, in which a group of companies are in charge of setting the direction of the ecosystem. Based on a single-case study within the Norwegian aquaculture industry, this paper identifies factors that affect value cocreation and value capture and suggests preliminary propositions that can be empirically validated in future studies. The paper's findings contribute to the literature on platform ecosystems, with special attention paid to value cocreation and capture in the early stages of platform ecosystems. The paper also contributes practically by providing lessons learned for managers involved in cocreating value in ecosystems.

Keywords: Value cocreation, Value capture, Collaborative platform ecosystems.

1 Introduction

Digital platform ecosystems are receiving increasing attention from researchers and practitioners because these ecosystems are changing the way companies work. More and more companies have started building platform ecosystems to leverage a set of external actors for value cocreation (Ceccagnoli et al., 2014; Foerderer et al., 2018b; Schrieck et al., 2021). Value cocreation represents the fundamental reason for companies to collaborate and participate in ecosystems (Adner and Kapoor, 2010; Ceccagnoli et al., 2012). In contrast to supply chain-based companies, value cocreation is a process that entails collaboration among multiple stakeholders, for instance, to develop innovative solutions or to enable transactions across two groups of actors (Hein et al., 2020; Van Alstyne et al., 2016a).

Developing a successful digital platform ecosystem requires platform owners to foster value cocreation and, at the same time, capture a sufficient share of the cocreated value (Tiwana et al., 2010). Value cocreation and value capture must be balanced because they affect each other. To enable value cocreation, a platform owner must give up some control, which reduces the ability to capture value. Moreover, a platform owner cannot capture an excessive portion of the value or share it in a way that dissatisfy other participants, or else recruiting other actors becomes difficult because these actors may lose interest in joining the platform ecosystem (Ceccagnoli et al., 2012; Cennamo and Santaló, 2019; Jacobides et al., 2018; Van Alstyne et al., 2016b). For example, in the 80s, Apple struggled in penetrating the market because it charged developers for toolkits; Covisint, an online marketplace for auto parts, failed because of little or no residual value for producers (Van Alstyne et al., 2016b).

This value trade-off is even more problematic when a platform ecosystem is under development in that the overall value proposition must be jointly created by the ecosystem (de Reuver et al., 2018; Van Dyck et al., 2021). With unsatisfactory value cocreation, the platform ecosystem will not only be unat-

tractive for others to join, but network effects will also not appear. Without satisfactory value capture for platform owners, the platform ecosystem may still grow, but at an unsustainable rate.

Extant research has mainly focused on the established platform ecosystems of digital native companies that have a single platform owner, such as Google, Apple, and Amazon, which governs the ecosystem for value cocreation and capture (Foerderer et al., 2018a; Zhang et al., 2022; Zhu and Liu, 2018). However, there is scant research on what happens in developing platform ecosystems that have not reached maturity (Van Dyck et al., 2021). Moreover, as the platform landscape is becoming more variegated (Hein et al., 2020; Perscheid et al., 2020), there is a need to investigate types other than centralized platforms. Therefore, this paper focuses on collaborative platform ecosystems (Costabile et al., 2022; Iden et al., 2021). In these ecosystems, independent companies come together and collaborate on a common problem that cannot be solved in isolation. In the absence of a single owner, shaping the value proposition and balancing value cocreation and capture may pose additional challenges.

Based on these points, this paper asks the following research question: *How can collaborative digital platform ecosystems address the double-sided challenge of value cocreation and value capture in their developing phases?*

To answer this question, this paper is based on a longitudinal qualitative case study, which fits with the study's exploratory nature on a topic that needs further investigation. The selected case is a developing collaborative platform ecosystem in the Norwegian aquaculture industry. The goal of this ecosystem has shifted from reducing the infestations of a deadly parasite to becoming the industry's data hub for innovation. The ecosystem's changing aims and different actors' perspectives prove to be an interesting case for investigation. This paper contributes to the literature on platform ecosystems, value, and governance in three ways. First, this paper confirms the importance of looking at both value cocreation and capture (Bharadwaj et al., 2013). Second, it identifies factors that contribute to and inhibit value cocreation and capture in the underexplored ecosystems' developing phases (de Reuver et al., 2018; Schrieck et al., 2021; Van Dyck et al., 2021). Third, this paper contributes new perspectives on value due to its focus on collaborative platform ecosystems in the business-to-business/government (B2B/G) context. This paper also provides practical implications for balancing value dynamics.

2 Theoretical background

2.1 Digital platform ecosystems

Due to changes in the way business activities are performed in several industries, digital platform ecosystems have increasingly been investigated across several streams of research. This multidisciplinary interest has led to different perspectives on digital platform ecosystems (Asadullah et al., 2018). The economics perspective has mainly examined platforms as two- or multisided markets, where the focus is on network effects and on enabling transactions between two or more groups of actors. The technical perspective focuses on the technical aspects of platforms, such as software, hardware, and capabilities that can be used for innovation. The sociotechnical perspective bridges the two and sees platform ecosystems as evolving metaorganizations, consisting of technological (e.g., platform, hardware, and software) and social (e.g., actors, rules, and processes) components (Gawer, 2014). Traditionally, researchers have focused on centralized platform ecosystems led by a single focal actor. This is the case with Apple, Google, and Amazon, which establish and enforce the rules for access to and use of the platforms. Recently, researchers have started investigating more decentralized types of platform ecosystems based on blockchains or governed in a more collective way (O'Mahony and Karp, 2022; Pereira et al., 2019; Perscheid et al., 2020; Saadatmand et al., 2019). Relying on a sociotechnical perspective, this paper examines collaborative platform ecosystems in which independent companies come together and collaborate on a common problem that cannot be solved in isolation (Costabile et

al., 2022; Iden et al., 2021). In collaborative platform ecosystems, a consortium of companies is responsible for leading the ecosystem and for taking care of the value dynamics.

2.2 Value cocreation and value capture

Value cocreation is a fundamental reason for companies to collaborate and participate in ecosystems (Adner and Kapoor, 2010; Ceccagnoli et al., 2012). In fact, when value is missing, ecosystems may erode (Hein et al., 2020). A value proposition understood as the benefits that actors are to receive (Adner, 2017) is what makes actors align and collaborate. In digital platform ecosystems, value cocreation does not happen in a linear way as with supply chains, but in a circular way shaped by collaboration; thus, value shifts from inside a company to its external world (Hein et al., 2020; Lush and Nambisan, 2015; Schrieck and Wiesche, 2017; Van Alstyne et al., 2016a). Successful platform ecosystems focus on the whole ecosystem's value, which needs to consider actors' divergences (e.g., in interests or perspectives) that, to a certain extent, do not hinder the ecosystem's possibilities of bringing the promised value (Adner, 2017; Van Alstyne et al., 2016a). In addition to value cocreation, platform owners face the challenge of how to capture a sufficient part of the cocreated value and of how to share it in a way that ensure valuable interactions for all the participants (Bharadwaj et al., 2013; Van Alstyne et al., 2016b). Thus, they must balance value cocreation and value capture, or the ecosystem's sustainability will be at stake (Teece, 2018). For instance, by devolving control to complementors, a platform owner can foster value cocreation at the expense of value capture. However, if a platform owner captures excessive value, the willingness of complementors to participate in the ecosystem decreases (Ceccagnoli et al., 2012; Cennamo and Santaló, 2019). Extant research has examined value cocreation and value capture in platform ecosystems by focusing on governance, that is, how a platform owner manages collaboration with complementors (Ghazawaneh and Henfridsson, 2013; Tiwana, 2014). For instance, to foster value cocreation, platform owners can provide boundary resources or set openness by considering how complementors perceive it at both technical and business levels (Benlian et al., 2015; Ghazawaneh and Henfridsson, 2013). As for value capture, platform owners can leverage revenue sharing mechanisms (Oh et al., 2015) or enter complementary markets and compete with complementors (Foerderer et al., 2018a; Wen and Zhu, 2019; Zhu and Liu, 2018). Most studies have investigated centralized platform ecosystems in their mature stages. As for emergent phases, subsidizing one side of the platform to address the chicken-and-egg problem (Rochet and Tirole, 2003), as well as strategically opening selected resources, leveraging capabilities, understanding actors' roles and what they bring, aligning motivations, and building trust have been mentioned as important for value dynamics (Annanperä et al., 2016; Gelhaar and Otto, 2020; Lin et al. 2012; Schrieck et al., 2021; Van Dyck et al., 2021). Despite these insights, it is still unclear what happens when ecosystems are under development and how value considerations are made, especially in decentralized platforms (de Reuver et al., 2018; Hein et al., 2019; Hein et al., 2020; Van Dyck et al., 2021).

3 Method

To address the research question, this paper followed a qualitative single-case study (Yin, 1994), which fits its exploratory nature. Qualitative case studies have been largely applied in the Information Systems field of research (Myers, 1997) because they allow for the investigation of an unknown phenomenon within its real-life context, generating rich insights (Benbasat et al., 1987; Darke et al., 1998; Gable, 1994; Orlikowski and Baroudi, 1991; Walsham, 1995). The investigated case is a collaborative platform ecosystem within the Norwegian aquaculture industry. The choice of the case is appropriate for several reasons. First, the ecosystem was built by a group of companies that govern it with their different perspectives on what value is and how it should be cocreated and captured. Moreover, it is a B2B/G ecosystem that has not yet reached maturity. These features allow for an investigation of value dynamics in developing ecosystems and in a context that has not received much attention.

3.1 Case Description

AkvaEco was first conceived in 2016, when four leading fish farming companies discussed the need to collaborate to address the industry’s most severe environmental challenge, the parasite sea louse. This parasite spreads very quickly across adjacent open cages in which production occurs, easily affecting neighbouring farming companies. Sea lice impair the health of farmed and wild fish, which can also lead to death; sea lice also impact fish escapes, and the environment, due to the chemical treatments used against the parasite. The four leading fish farming companies understood that they could not continue addressing this environmental challenge in isolation and decided to build a digital platform ecosystem to reduce lice infestations. They decided to share data from the cages to make forecasts on which to act before an outbreak. Farming companies collect data through technologies (e.g., sensors and cameras) and send them to the central platform, which performs aggregations and analyses. After a pilot phase in which the companies agreed on the technical partner that provides the central platform and made some tests with historical data, they launched the collaborative platform ecosystem in 2017 under the guidance of an innovation cluster, which assumed the role of facilitator. The collaborative platform ecosystem is governed by the different farming companies that have representatives on the steering committee. Over time, the selected case has seen several changes. For instance, data were first sent manually to the central platform and then automatically via application programming interfaces. The number of farming companies increased from four to seven. The value proposition also changed from reducing sea lice infestations to becoming the data hub for the benefit of the entire industry. Because of the interest that the collaborative platform ecosystem received and the new value proposition, new groups of actors (i.e., researchers, innovators, and authorities) started gravitating to it.

3.2 Data collection

This study is based on primary and secondary data sources. Semistructured interviews are the primary and main data source. Secondary data are in the form of documents provided by informants, information found on the internet, and participation in several arrangements (e.g., seminars, events, and a professional course organized and held by the cluster and other members of the collaborative platform ecosystem). Nineteen interviews were conducted with 17 informants from September 2020 to June 2022. The interviews were first aimed at understanding the initial motivation for the launch and development of the collaborative platform ecosystem, and then at investigating value cocreation and what companies were getting back from their participation. Informants were chosen through purposeful sampling (Marshall, 1996) based on their involvement and their ability to provide rich insights. The interviewed informants had different roles (e.g., managers and researchers) in different companies (e.g., the innovation cluster, farming companies of different sizes, research institutes, and the technical partner). These roles were chosen because they could ensure a variety of viewpoints on value and influencing factors, which appeared to be firm dependent. The interviews lasted between 30 and 90 minutes and were based on an interview guide that allowed for follow-up questions and new areas of exploration. Due to the Covid-19 pandemic, most of the interviews were held on Microsoft Teams and videorecorded for subsequent transcription. Secondary data enabled the collection of contextual information about the case and of some new information and offered a way to crosscheck primary data.

3.3 Data analysis

The data analysis followed three steps, as shown in Table 1.

Step	Description	Outcome	Section(s) in the paper
1	Reading through transcripts, notes, and documents	Familiarizing with the data and the case	Case description

2	Coding the data through provisional and descriptive codes Taking notes	Understanding the essence of the data: what value proposition and value cocreation and capture entail in the specific case. Identifying factors connected to these concepts. Understanding preliminary relationships	Needed steps for organizing and providing content for the findings
3	Identifying the relation among the identified concepts and factors	Writing findings section and developing preliminary propositions	Findings and discussion with preliminary propositions

Table 1. Data analysis process.

The first step was to become familiar with the data and the case. To this end, the interview transcripts, notes, and archival data were read multiple times. The second step was coding the data. Coding means identifying small elements in the data that are significant when brought out from their context (Belk et al., 2013; Miles et al., 2014). A mixed coding approach was used (Miles et al., 2014). The data were analysed through provisional and descriptive codes. The former refers to researcher-generated codes within a “start list” (Miles et al., 2014, chapter 4) defined before the data collection and based on the literature and the topic of investigation. The list included value proposition, value cocreation, and value capture. Descriptive codes summarize in a word or short phrase the basic topic of a passage. Through coding, it was possible to understand the essence of the data, i.e., to identify what value proposition, cocreation, and capture entail in the case, as well as other factors connected to these concepts. Notes were taken during the coding for an initial understanding of relationships (see table 2), which was necessary for organizing and providing content for the findings section. Third, the relations among the identified concepts and factors were identified. These relationships were relevant in writing the findings and the discussion (preliminary propositions included).

Provisional codes	Descriptive codes	Quotes	Notes
	Common challenge	We are in the same boat, so to speak – Informant 15	These two topics seem related
	External pressures	All the farmers want to show how sustainable they are ... it has to do with consumers’ confidence ... – Informant 10 Sharing will be the key ... to be sustainable and compatible towards the land-based competitors – Informant 8	
Value cocreation		If we get quality data, this will have an impact also for the development of new services – Informant 1 The most important value that [the ecosystems] has provided is maturity ... one day we will be able to do that [production with low sealice], but it takes some time – Informant 11	Value cocreation is what has been/can be achieved while working toward the main goal. Timing is also key
	Time		
	Funding	They were reluctant ... on the funding level ... [so] the progress of [the ecosystem] has been [a sinusoid shape] ... and if they are saying no ... then the rest is saying no as well or to reduce the amount of money – Informant 8 They need to show us some value back [to] continue paying... or we need to understand that ... is ... making value for us in a greater sense – Informant 16	Money is being related to value to cocreate but also to value capture

Table 2. Examples of codes and notes.

4 Findings

In this section, the results of the analysis of the selected case are presented. I identified different factors that affect value cocreation and/or value capture. Some of the identified factors affect only one aspect of the challenge, whereas others affect both, as shown in Table 3. Moreover, I also observed that these factors can be affected by value cocreation and capture.

Factor	Value cocreation	Value capture
A common challenge and external pressures	Plant the seed for the value proposition, i.e., around what to collaborate for value cocreation	N/A
Value proposition	Value proposition fosters alignment of actors toward value cocreation Uncertainty and/or changes related to the value proposition can reduce recruitment and/or interest in the platform ecosystem	N/A
Funding	Money allows the actors to start organizing value cocreation Disagreements about funding (the amount) may impact the actors' alignment and the ecosystem's value cocreation	N/A Funding may be reduced if there is no value capture
Value cocreation along the way toward the main aim(s) and its timing	Push toward further value cocreation Timing of these values may affect the perception of what it is possible to cocreate	Benefits (e.g., learning, and increased maturity) along the way are values captured while working toward the main aim(s) Timing of these values may affect the perception of what it is possible to gain
Multitude of needs	Different actors with different interests to mediate may make value cocreation more complicated	Creates uncertainty of who will get the value created in the ecosystem
Monetization strategies	An incentive model may raise contribution toward value cocreation	Charging a fee for datasets aids value capture, but at the same time raises questions of how this value should be allocated

Table 3. Factors affecting value dynamics.

4.1 A common challenge and external pressures

A common challenge that cannot be solved in isolation was what drove the launch of the chosen collaborative platform ecosystem. Fighting sea lice, the most serious environmental challenge in the industry, was understood as something that the farming companies needed to address together. “*We are in the same boat, so to speak*” (Informant 15). Therefore, they understood that they had to communicate and collaborate more. In addition to the common challenge, pressures from the broader industry were another driver for collaboration aimed at value cocreation in terms of higher sustainability. The government was asking to better understand what was going on in the cages. Competitors, such as land-based salmon farmers, were challenging the companies' competitiveness. Moreover, being con-

sidered sustainable by consumers in terms of producing and operating in line with nature was a key goal. As a researcher (Informant 10) stated:

“All the farmers want to show how sustainable they are and how they are working toward it and its different aspects ... They are really good in what they do, and they do it because it has to do with consumers’ confidence, otherwise they won’t go to be selling so many fish. The world has come to a point where, if you don’t work toward sustainability, we don’t want to have anything with you.”

4.2 Value proposition

At the very start, based on the common challenge, the four companies and the cluster agreed on the value proposition of fighting sea lice. The plan was to address this challenge by sharing the data from the pens and on which to create forecasts to act before an outbreak. The more data, the better. This means that recruiting other farming companies to cover a larger portion of the industry was relevant. However, deciding whether to join the platform ecosystem was not straightforward, especially because sensitive data were to be shared, and the result was unknown. Later, due to an agreement with an accelerator that provided money, the value proposition changed. From developing lice prediction models, the focus became on creating a data platform for innovation where data should be made more generally available. Given the larger potential number of data users, this change made the commitment to the value proposition even more complicated. It was not clear whether the ecosystem would have added to or threatened a company’s business. One of the project managers (Informant 3) said:

“What’s in it for me? It is difficult to clarify: We need to clarify you can work with us, and this is what we do. We provide data; everyone can access it, and we can help you succeed with your business.”

Moreover, this change in the value proposition was welcomed in different ways. For some farming companies, the ecosystem was not only about sea lice but also about how the industry was impacting the environment and everything. Therefore, a wider focus was deemed to be positive. In contrast, the chief financial officer (CFO) of a small farming company (Informant 16) stated:

“Because sea louse is one of the main threats, we use a lot of money and focus and time to work toward that. And when they change focus..., it was further away from our daily [operations]. And what we were and are concerned about. So, [the ecosystem] is more like in the background.”

Overall, the clarity of the value proposition and its changes can undermine recruitment, with difficulties attracting additional members for value cocreation. Moreover, there can be effects on the existing actors’ interest in the developing ecosystem in different ways, because the actors may not completely agree on the definition of the value proposition.

4.3 Funding

Money is a necessary resource to invest in cocreating value. Funding makes it possible to have the platform and all the other technologies in place. Since the start, money has come from farming companies, which have not always agreed on the extent of the investment to be made. In the very early stage of the ecosystem, one farming company was not willing to invest money. This stance, in turn, affected others that wanted to reduce the amount of money they were providing. Somehow, there were two different speeds in working toward the main goal. As a result, the progress of the ecosystem followed a kind of sinusoid shape going on and off. Overall, agreeing on the amount of money to invest makes companies more willing to move the ecosystem toward value cocreation. In contrast, disagreements on funding can impact the actors’ alignment and the ecosystem’s value cocreation, in a similar manner as changes in the value proposition due to additional, external funding (see 4.2).

In addition, funding is put in relation to the value cocreated and captured. Perceptions differed. One of the larger farming companies (Lead digital transformation, Informant 11) was very positive about the money invested thus far because it enabled some gain in forms of, for instance, an increased level of skills (see 4.4). The same informant also pointed out that whether this money was considered a profit-

able investment in the future would depend on what it would allow them to gain. Informant 11 said, *“When you come to a certain level of skills, you have to choose very, more precise.”* A smaller farming company was less positive, was questioning the amount they were paying but still decided to become a member and see if anything came of it. The CFO of this farming company (Informant 16) said: *“I think that they need to show us some value back if this is going to be something we will continue paying. We need to get something back that we can use, or we need to understand that the work that they’re doing is really making value for us in a greater sense of, and if ... it makes it easier for us to be in contact with governments in different kind of law and institutes.”*

Overall, to fund an ecosystem, members need to see that they are creating and receiving something back, and this shows the importance of creating value along the way (see 4.4).

4.4 Value cocreation along the way toward the main aim(s) and its timing

Although the original envisioned main outcome (combating sea lice) has been partially achieved, and the ecosystem is progressing toward becoming the industry’s data hub for innovation, actors have benefited from participation in the ecosystem. These values along the way toward the main goal represent value that actors can capture.

The farming companies reported that they had obtained learning and maturity. Most agreed that the ecosystem had made them more open to each other, from which they were learning a lot. As for maturity, it was mentioned as the most important cocreated and, thus, captured value that the ecosystem had provided until that moment in terms of technologies, processes, and people. People were more knowledgeable in understanding what they were doing and how, and what else they could achieve. This knowledge fuelled further value cocreation. For instance, by processing data, farming companies learned about the low quality of their data on which to make forecasts and datasets. The sea lice forecasts reached around 70% accuracy. Therefore, the farming companies started standardizing technologies (sensor data infrastructure), terminologies, and data collection practices. Standardization was understood as an important step toward a greater understanding of how to solve the sea lice problem and for the industry’s innovation, because it could increase comparability among different farming companies’ data and data from different facilities of a single farming company. The importance of standardization for higher-quality data and more trustworthy forecasts was recognized at a broader level, far beyond the farming companies, including innovators and researchers. For instance, for researchers, standardized data such as causes of death were considered valuable for their studies. However, value cocreated along the way may be perceived differently by the actors. For instance, a small farming company with a single standard within its facilities perceived standardized data as having less effect on its daily operations.

The data analysis also revealed that the timing of benefits along the way was an important aspect. Some informants agreed that it was necessary to wait for value dynamics to happen, while others also believed that it was too early to talk about value cocreation and capture. Informant 11 said:

“I’m sure we will be able to handle lice in a much better way than we do today. And then you’re talking about high value, if we can reach production growth with low lice, for instance ... I’m sure that one day we will be able to do that, but it takes some time. And then you need patience and openness.”

However, time may also generate a feeling of impatience and of being trapped in the ecosystem. Two quotes exemplify these feelings: *“The time is running fast, and we are not running fast enough”* (Informant 15), and *“So, I think that maybe we’re just now still hanging in there, ... Yeah. What can I say? Maybe more just because we wanted to contribute in the start”* (Informant 16). Timing may undermine the perception of the ecosystem’s possibility of creating value and thus of capturing it.

4.5 Multitudes of needs

Collaborative platform ecosystems need to account for several targets with different needs. Understanding how to mediate among interests toward value cocreation can be difficult. In the selected case, this was true at the start and even more when the value proposition was broadened. Finding a balance is challenging in relation to a single group of actors and among groups. Farming companies care about their production, sustainability, and whether the fish are eating and are thriving. However, as previously described, the farming companies' interests and perspectives may vary regarding the value to cocreate, similar to standardization. Moreover, different sizes and internal resources affect the extent of actors' participation. For instance, a lack of resources makes it difficult for smaller farming companies to join the steering committee, something that impacts their understanding of value cocreation. Informant 16 claimed, *"I think they need to be more open with us even though we don't ask for it ... We will need to have a clearer sort of goal, and what are they working toward? What's the point?"*

In the other groups of actors, researchers are interested in performing sounder studies of the industry's status. Innovators in developing new products and services. A project manager stated (Informant 14):

"One thing is, of course, the data that goes straight back to the farmers, which is going to be very important to deliver on. And then the next stage, we were going to see other things for start-ups and suppliers, and yeah. And right now, we're in several projects where we deliver to research institutions, so ... How can you accommodate everybody? Or can you do that?"

Data represents a key asset for fulfilling these needs. Thus far, the ecosystem has offered datasets based on industry needs. Moreover, the desired level of detail in the data may vary across actors, based on their internal resources and the analysis they would like to conduct. For instance, for a smaller farming company, a higher level of detail in the data would make it possible to perform benchmark analysis, given the few internal resources that can work with data analysis. Having a multitude of needs to consider can make farming companies question whether *"[the ecosystem will be] valuable for us or if it's more for everyone else"* (Informant 16), hampering their chances of capturing value.

4.6 Monetization strategies

Monetization alternatives refer to the ways in which companies can capture value from what the ecosystem creates and delivers to interested actors. For the time being, to increase demand and interest in the ecosystem, the collaborative ecosystem is not charging a fee for providing datasets. In the future, there might be a more aggressive strategy with datasets available for a fee to enhance value capture. However, from what some informants stated, it seems that charging a fee may also lead to instability related to fairness issues around the distribution of this value to be captured. Informant 16 said:

"So, I think that (the ecosystem) needs to be really careful...because then it should be us getting the income. And at the moment, we are paying ... I'm not sure if (the ecosystem) has sort of forgotten it. Who is actually owning the data?"

Informant 11 suggested the importance of developing an incentive model that could affect value cocreation and value capture. The idea was based on incentivizing data sharing for value cocreation, because the more data, the better, while at the same time allocating a share of this cocreated value based on their data contribution. *"If I provide more data into [the ecosystem], then a smaller producer, if we produce value, what will be my share of the value?... This matrix has not been done yet. But in time to come, if we manage to create value, of course that will be a matter"* (Informant 11). Overall, the specifics of monetization alternatives must be considered for value cocreation and capture.

5 Discussion

In discussing the paper's findings, I return to the research question, *how can collaborative digital platform ecosystems address the double-sided challenge of value creation and value capture in their developing phases?*

The short answer is that collaborative digital platform ecosystems need to consider several factors that affect value cocreation and/or value capture. A common challenge is the fuel for a value proposition, the *promised benefit that the target of the effort is to receive*, around which members of the ecosystem can align (Adner, 2017, p. 43). However, different actors may have different views of the value proposition, the main value to be cocreated, and values created over time (value captured); thus, divergences in interests (i.e., competition and value capture) and perspectives (expectations of value creation and value distribution) must be considered (Adner, 2017; Betz et al., 2019). For instance, disagreements on funding can slow progress toward value cocreation. Additional external funding can bring changes to the value proposition, which may potentially reduce interest in and commitment to a common goal. Divergences in interests and perspectives, to a certain extent, do not stop the ecosystem from providing the promised value (Adner, 2017). However, it is important for the ecosystem's members to see that it is worthwhile to remain. Small value cocreated along the way can fuel the motivation to keep going and can potentially bring new energy for value cocreation to occur. In fact, creating value unfolds along a continuum, where small amounts of value creation build upon each other: Value can be seen as an outcome and an enabler of further value cocreation (Le Pennec and Raufflet, 2018; Vargo and Lusch, 2011, as cited in Agarwal et al., 2016). In addition, when ecosystems are of interest to a multitude of actors, it is also important to clarify the targets of the value to be created, who to target first, and who and how will receive part of this value back (Teece, 2018). Moreover, cocreating value is also difficult because it takes time. As shown by the selected case, there is the possibility that a certain amount of time must be spent building up all that is necessary to create the envisioned value, for example, deciding on the technologies to use and agreeing on how to work together. However, it may generate impatience and doubt about what the platform ecosystem is able to create. Overall, addressing the double-sided challenge of value cocreation and value capture is a dynamic process that changes during the evolution of the actors' relationships and of the ecosystem (Austin and Seitanidi, 2012).

5.1 Theoretical implications

This study contributes to the literature on platform ecosystems, value, and governance in three ways. First, this study confirms that collaborative digital platform ecosystems, such as traditional, centralized ecosystems, need to balance value cocreation and value capture (Bharadwaj et al., 2013). Although value cocreation may be more important for a developing ecosystem to maintain members' motivation and to recruit new participants and sides to the platform, it is insufficient alone. For the consortium leading the digital platform ecosystem, it is important to establish ways for future value capture, as well as a fair distribution of it, to guarantee the sustainable success of the ecosystem from its initial stages (Bharadwaj et al., 2013; Schreieck et al., 2021). Overall, this study highlights the importance of looking at the double-sided challenge of value cocreation and capture, adding to extant research mainly focused on value cocreation (Grover and Kohli, 2012; Sarker et al., 2012, in Schreieck et al., 2021). Second, in contrast to most of the literature focusing on mature ecosystems, this paper adds to the literature by focusing on the developing phases of a collaborative platform ecosystem, which is often underexplored (de Reuver et al., 2018). The evolution of platform ecosystems before maturity is delicate because the value proposition must be jointly created by actors that may have different views on this value proposition (Adner, 2017; Van Dyck et al., 2021), which is truer and complicated in the context of collaborative platform ecosystems. This study adds to the literature by identifying factors that can affect value cocreation and capture in the early stages. Besides openness, trust, and capabilities (Gelhaar and Otto, 2020; Hodapp et al., 2019; Schreieck et al., 2021; Van Dyck et al., 2021), fund-

ing can foster value cocreation but also instil a vicious cycle in the absence of value capture. Funding has rarely been accounted for, excepting for Werner et al. (2020) that see it as influencing a platform's degree of centralization. Fairness in relation to actors' value capture based on money/data contribution is also key, which aligns with previous research on fair revenue sharing (Oh et al., 2015). In collaborative ecosystems, with distributed decision rights, funding and a fair value distribution may become even more important than in centralized ecosystems, because they affect not only the owner-complementors relationship, but also the relationships within its leading consortium. Moreover, this study confirms the importance of standards in the developing phases to align technologies and business practices (Gelhaar and Otto, 2020) toward value cocreation and recruitment.

Third, this paper adds new perspectives to the literature due to its focus on collaborative platform ecosystems in B2B/G contexts. Researchers have pointed out that value in B2B partnerships, such as within (decentralized) ecosystems, has not been sufficiently investigated (Hein et al., 2020; Huntgeburth et al., 2015). This paper suggests that value in collaborative platform ecosystems may move beyond economic value (e.g., increased sales or user satisfaction; Cenamor and Frishammar, 2021; Cennamo and Santalo, 2019; Hein et al., 2020) to embrace (also) gains in terms of learning, maturity, a better way of working, and increased sustainability.

5.2 Practical implications

This study offers two lessons learned to help practitioners navigate the double-sided challenge of value cocreation and value capture in their developing collaborative platform ecosystems.

5.2.1 Provide value(s) while aiming at the main goal

Generating value is a process that takes time. One does not have to fully reach the envisioned value from day 1. Members of an ecosystem aimed at solving a complex, common challenge can welcome and understand that some time is needed to conduct trials and prepare for the main value to be cocreated. Starting the process toward a common challenge is often considered crucial. However, participants need to see that there is value in staying in the ecosystem. This paper's informants highlighted the importance of gaining value along the way such as learning, increased skills and maturity, and standardized technologies and business practices. This resonates with previous research that has stated the importance of small wins from collaboration, i.e., the intermediate outcomes that feed back into the collaborative process and encourage further commitment and trust building (Ansell and Gash, 2008).

5.2.2 Encourage communication, transparency, and fairness

Some researchers have pointed out that, in decentralized platform ecosystems, everyone has access to information related to governance for the platform development (Perscheid et al., 2020). This possibility is referred to as transparency, usually embedded in documentation that allows the actors to understand how a platform is managed and what decisions are made (Hein et al., 2016). This case showed that in collaborative platform ecosystems, some actors may not be able to dedicate the same amount of time and resources to the ecosystem. For instance, an actor's size may prevent involvement in governance. Therefore, it is key to foster communication and transparency to reach, inform, and engage all the actors. Transparency and communication can help ecosystems balance their value dynamics. In fact, through transparency and communication, trust can be cultivated. In platforms without a focal owner, trust can be more relevant than power toward value cocreation (Hodapp et al., 2019). Moreover, especially among the leading companies, fairness in value distribution becomes relevant. Establishing a fair way to share the cocreated value (e.g., through an incentive model) so that all partners can earn and are compensated with the value they bring to the ecosystem is key (Pidun et al., 2020).

5.3 Preliminary propositions

Based on the insights from the case and the literature, this paper developed 12 preliminary propositions (P) on the double-sided challenge of value cocreation and value capture. These propositions must be empirically validated in future studies (e.g., through a survey).

Collaborative platform ecosystems are launched to address a common challenge that actors cannot solve in isolation (Iden et al., 2021). Often, external pressures from the government, competitors, and consumers add to the willingness to launch such types of ecosystems. The value proposition, intended as the *promised benefits to be received*, can, for instance, relate to a sustainability problem, and its definition and relevance bring together actors collaborating for value cocreation (Adner, 2017, p. 43). However, when ecosystems are under development, the value proposition is being defined (Van Dyck et al., 2021), and it may be unclear or may undergo changes. The case shows that a lack of clarity can undermine recruitment (alignment) because actors do not know whether it is worth collaborating toward value cocreation. In addition, changes in the value proposition may make the value cocreated less appealing for existing actors. Therefore, I propose the following:

P 1a: A lack of clarity in the value proposition may reduce recruitment.

P 1b: Changes in the value proposition may reduce value cocreation.

The case showed that several factors may affect value cocreation and/or capture in different ways. Funding refers to the money invested in the ecosystem. Once actors are aligned around a value proposition, money is essential to value cocreation because it allows for progress. However, disagreements on the amount of money to invest may slow progress. The case also shows that if actors are not able to get value back, they may consider decreasing their funding. Therefore, I propose the following:

P 2a: Funding positively affects value cocreation when there is agreement on the amount to invest.

P 2b: Funding is negatively affected by a lack of value capture.

Moreover, the case showed that funding can come from actors other than ecosystem members. External actors' funding may bring changes in the value proposition and thus, in the ecosystem members' alignment (Adner, 2017) with value cocreation. Therefore, I propose the following:

P 2c: External funding affects value cocreation through value proposition (mediator).

Through collaboration toward the main goal, actors may create and capture some value, e.g., an increased set of skills. These value creations along the way are small wins that can nourish further value cocreation (Ansell and Gash, 2008; Le Pennec and Raufflet, 2018). However, if the value comes later than expected, it may change the perception of the value cocreation possibilities within the ecosystem and thus what it could be possible to gain. Therefore, I propose the following:

P 3a: Additional value along the way is likely to fuel value cocreation further.

P 3b: Delayed value along the way is likely to affect value cocreation and value capture.

Collaborative platform ecosystems are led by a set of companies and may target others beyond these companies. Within the companies leading the ecosystems, as well as among them and the broader target, differences in needs affect the double-sided challenge of value cocreation and capture. Defining what value to cocreate may be complicated because what value means may differ across companies (Austin and Seitanidi, 2012). Moreover, when there are several targets to take care of, it is not easy for members to understand whether and what they will take back. Therefore, I propose the following:

P 4a: A multitude of needs negatively affects value cocreation.

P 4b: A multitude of needs negatively affects value capture.

Value capture is often described as coming from pricing, revenue share models, and platform owners' entry into other actors' markets (Oh et al., 2015; Zhu and Liu, 2018). The selected case has not yet introduced any monetization strategies, but it seems that they may affect value cocreation and capture. It is important to look at the specifics. With an incentive model that gives value back to who is creat-

ing more value (e.g., by sharing more data), monetization strategies can fuel value cocreation. However, there must be fairness in how the value cocreated will be allocated and thus captured. Therefore:

P 5a: Monetization strategies are likely to positively affect value capture.

P 5b: Monetization strategies are likely to negatively affect value capture when perceived as unfair.

P 5c: Monetization strategies may fuel value cocreation if they reward contributions toward value cocreation.

Without aiming for completeness, this paper suggests how to measure some variables. Based on the literature (e.g., Croitor and Werner, 2021; Kim et al., 2016), items on a 5-7 Likert scale could be used. For instance, items for clarity of value proposition (Osterwalder and Pigneur, 2010; Teece, 2018) may refer to its awareness across actors, clear definition of products/services, and customers, and existence (or lack) of indicators of its success. Items for fairness of value distribution or monetization strategies may relate to transparency, existence (or lack) of fairly procedures for money distribution across actors, also based on their contribution (e.g., money they bring). Value cocreation may be measured in terms of unit sales, user satisfaction, and sustainability improvements (Cenamor and Frishammar, 2021; Cennamo and Santalo, 2019; Hein et al., 2020), whereas value capture in terms of revenue sharing percentages, and fees on transactions/platform usage (Oh et al., 2015; Springer and Patrick, 2021).

6 Conclusions and limitations

This study investigated how collaborative platform ecosystems can address the double-sided challenge of value cocreation and value capture. Based on an analysis of a collaborative platform ecosystem in the Norwegian aquaculture industry, this paper identified several factors that can affect this trade-off in the early stages of an ecosystem's development. This study also offers two lessons learned for practitioners who want to ensure balanced value dynamics from the very early stages of their ecosystem.

This study has limitations due to its focus on a single-case study in a specific industry. Future research may investigate other developing collaborative platform ecosystems in other industries and countries to provide additional insights through single or comparative case studies or empirically testing the suggested propositions.

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