
Co-creation of Ecosystem-level Value Propositions

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Abstract: A joint value proposition has been claimed to be a fundamental part of ecosystems' success. The propositions have been either end-customer or ecosystem leader-centric and focusing on functional and financial value. However, according to social exchange theory, the ecosystem actors are likely to expect to be equally rewarded from their value creation efforts and thus the value propositions should be evaluated on ecosystem-level. Secondly, the value denotes much more than just functional and financial value. This study proposes that also emotional, and social value propositions should be included when designing an ecosystem. The study was conducted in two phases. First, the ecosystem value proposition literature was reviewed to define the required value dimensions. After that, the dimensions were applied in a multiple case study. The results show that emotional, epistemic, and social dimensions, as well as ecosystem-level value propositions, require more scholarly attention.

Keywords: Value co-creation; Value proposition; Ecosystem; Value types; Ecosystem-level

1 Introduction

Ecosystem as a concept has gained continuously increasing attention among both scholars and practitioners in the fields of technology, innovation, and business. Based on the public discussion, the ecosystems have (incorrectly) been seen as “silver bullets” that solve all challenges. Regardless, the successful stories remain scarce. One of the reasons can be that currently, the literature focuses on the joint ecosystem value propositions from either the end-customer or ecosystem leader perspective. The value capture possibilities for all individual actors on the ecosystem level have remained under-explored. Only a few articles have studied the ecosystems value proposition from an ecosystem-wide perspective considering the value capture possibilities of all ecosystem actors

However, when combining the current ecosystem theories with the social exchange theory (SET), it can be proposed that value propositions should be evaluated at the ecosystemic level to guarantee appropriate propositions to all ecosystem actors – current and future ones. The actors should find the distribution of value equitable and the value each captures sufficient compared to the effort required in value creation.

To create a holistic understanding of the ecosystem-level value propositions, an increased understanding of value proposition dimensions is required. The current literature focuses mainly on functional and financial value propositions (see e.g. (Keränen, 2017)). However, the Service-Dominant Logic proposes that the exchanged value does not necessarily require a financial transaction but rather an exchange of user-experienced value not only dyadic but also multilaterally (Thomas et al., 2014).

This study presents a classification of ecosystem-level value proposition dimensions. These dimensions can be either dyadic, multilateral, or both. The identified dimensions enable ecosystem actors to evaluate the comprehensiveness of the value proposition of the ecosystem and thus, improve its probabilities to become attractive and successful. A value proposition can, at its best, fit many dimensions. In those cases, the proposition may have more impact than those that affect through only one dimension. This supports the importance of co-creation and other joint activities within an ecosystem as reciprocity supports building trust and thus, leads to social stability.

The study is based on a literature review and a multiple-case study. First, it identifies how value propositions have recently been described in academic literature. The propositions are classified by value dimensions established in value theories. The latter part of the study compares the theoretical findings of the value propositions to eight case ecosystems. The study shows how these dimensions were earlier communicated in the case ecosystems and how the situation has evolved during the past few years.

This study contributes to the ecosystem theory building by presenting the variety of value dimensions required to be considered when designing an ecosystem. It also opens new perspectives to the practitioners in designing a successful ecosystem.

2 Previous works and developing the research framework

Ecosystems are complex systems open to their environments, thus it is difficult to predict, or even understand, how they function (Skyttner, 2006; Tsujimoto et al., 2018). An ecosystem consists of multilateral and mutually consistent actors (Adner, 2017), who are only loosely connected (Iansiti and Levien, 2004), thus ecosystems' structure is flexible (Hein et al., 2019) and can therefore be constantly changing.

The core of an ecosystem is the co-created final value proposition (Den Ouden, 2012; Polizzotto and Molella, 2019). The value proposition in ecosystems consists of super-modular, and non-generic, complementaries offered by the actors. (Jacobides et al., 2018). While co-creating the value, the actors co-operate and collaborate, but also compete within the ecosystem (Bogers et al., 2019) as business models of the actors may overlap (Langley et al., 2021). This may cause friction in value co-creation.

While creating value together, actors of an ecosystem should aim to maximize the value for the whole ecosystem, not just maximize the value capture of the leader firm (Li et al., 2019). This requires coordination and alignment of the roles and capabilities of all actors, and a mutually shared vision (Jacobides et al., 2018; Moore, 1996, p. 53). Maximizing the value capture for all actors also means that understanding the real-time and future needs of the actors is an ecosystem-wide challenge to be solved to be able to innovate co-created unique and sustainable value propositions for lucrative business models (Matthyssens, 2019; See-To and Ho, 2014). Value co-creation can be considered to be a collaborative process between ecosystem actors, facilitated by technology where also social changes are required before the society accepts it (Mejtoft, 2011).

To clarify the complexity of value co-creation, Bharti et al. (2015) created a conceptual framework of the "pillars of value co-creation" by synthesizing academic literature. The framework includes five pillars, which all have to be in place for value co-creation to happen. These pillars are interactive environment, resources, co-production, perceived benefits, and management structure. The perceived benefits include e.g. customer learning, expected benefits, and value. The benefits can be personal or social integrative, learning or emotional, but the major motivators to participate in value co-creation are emotional and utilitarian values ie. to the ecosystem actors, value denotes much more than just pure monetary value.

According to Service-Dominant Logic (SD-L) “The customer is always a co-creator of value” (Vargo et al., 2008) as value stems from use rather than exchange (ibid). This means that the customers’ expectations and previous experiences should be considered when designing the value proposition. This is likely to be difficult as both ‘value’ and ‘expectation’ as concepts are ambiguous, especially, when value can include other than monetary transactions, and simultaneously, the value exchange can be multilateral (Autio and Thomas, 2020).

There are several ways to classify different types of value. For one, types of value can be divided into two types: utilitarian and experiential hedonic value (Hirschman and Holbrook, 1982). On the other hand, Sheth et al. (1991) considered the value consisting of five different types: conditional, emotional, epistemic, functional, and social value. The conditional value means that the customer perception of the value depends on the circumstances or situation (e.g. seasonal products or services). The emotional value includes utilities that cause feelings like achievement or trust. The epistemic value consists of a sense of novelty and knowledge-related aspects like data, information, and learning. For example, collaborative filtering can offer epistemic value.

Table 1 Examples of value propositions per value dimension

Value Dimension	Examples
Emotional	Risk reduction, trust, stability, sensory appeal, loyalty, motivation, wellness, nostalgia, aesthetics, fun/entertainment, self-actualization, badge value, cultural fit (e.g. ethics), responsiveness, achievement, attention, fame trust
Epistemic	Novelty, data, information, knowledge, transparency, learning, insight, innovativeness, interesting
Financial	Reduce cost, make money, increase brand value, gain investors
Functional	Time savings, customization, availability, simplicity, usability, convenience (reduce effort, avoid the hassle), quality, integration, security (e.g. data security), accessibility, scalability, meeting specifications, flexibility, durability
Social	Group identification, network expansion, social responsibility, reference, interaction, sense of belonging, engagement, status, reputation

Functional values include perceptions of the product or service, which affect e.g. usability, quality, durability, scalability, or availability of a service. Social value aspects like group identification, network expansion, reputation, and social responsibility (Almquist et al., 2018, 2016; Parker et al., 2017; Sheth et al., 1991). Pura (2005) adds one more type: financial

value including making money, saving costs, increase in brand value, etc. These different dimensions of values affect behavioural intentions and commitment to those. It is very difficult, if not impossible, to explicitly allocate different value propositions to the dimensions. Table 1 summarizes some examples used in the above-mentioned literature to elaborate the variety within each dimension.

A traditional way to analyse networked business has been to use Transaction cost economics theory (TCE), which focuses on the costs of making an economic exchange. However, that doesn't cover the complexity of ecosystems (Jacobides et al., 2018), as TCE assumes the exchange is made based on a contract (Williamson, 1979). The dynamic and coevolving nature of ecosystems would benefit more from using the Social exchange theory (SET) instead of TCE in analysing the interdependences and co-creation of value (Benitez et al., 2020). SET was introduced in 1958 to understand the relationship of actors in exchanging goods – let those be material or non-material (Homans, 1958). The core of the theory is, as Homans presented it, that "persons that give much to others try to get much from them, and persons that get much from others are under pressure to give much to them. This process of influence tends to work out at equilibrium to a balance in the exchanges." (Homans, 1958, p. 606) This means that the behaviour of actors changes based on the actions and expectations of others. SET also emphasizes the importance of non-material goods. Those can be e.g. services but also rewards like prestige or admiration. One of Homans's other findings was that the exchange propositions can lead to a generation of a group structure. Reciprocal relationships evolve through continuous evaluations and SET can be used in explaining trust, satisfaction and loyalty builds between the actors (Jeong and Oh, 2017), hence SET helps in explaining the motivations of value co-creation.

3 Data gathering and analysis process

The research was designed to have two phases; It began with a literature review to be complemented with a multiple case study. The literature review was started with a search string (ecosystem AND "value proposition") of title, abstract, and keywords in Scopus, which resulted in 199 articles between 1987 and January 2021. Figure 1 illustrates the yearly frequency of publications.

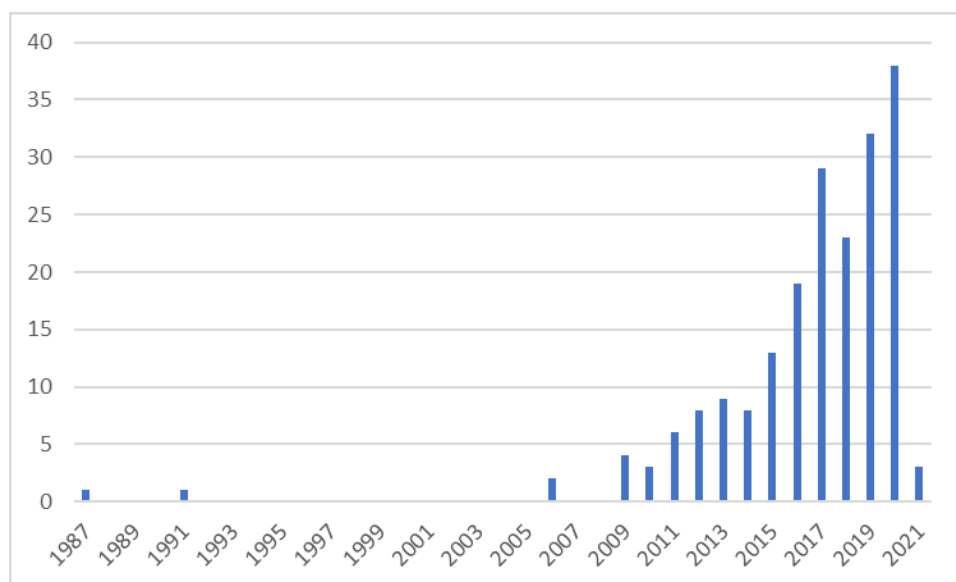


Figure 1 Frequency of publications

Full-text reviews were conducted on 60 most recent, accessible articles. The subject has received global interest since the first author affiliations are scattered to 26 different countries in six continents (see Table 2). Most of the authors are, however, from Northern America and Western Europe.

Table 2 Country of the Affiliation of the First Author

Country	# of Pubs	Country	# of Pubs
Germany	9	Netherlands	2
USA	8	Spain	2
Finland	5	Austria	1
Switzerland	3	China	1
UK	3	Czech Republic	1
Australia	2	Greece	1
Belgium	2	Italy	1
Brazil	2	Portugal	1
Canada	2	Russia	1
France	2	Serbia	1
India	2	Singapore	1
Ireland	2	South Africa	1
Malaysia	2	Trinidad and Tobaco	1
		(blank)	1

The results have been scattered also widely in different conferences and journals. Fourteen articles were published in conference proceedings and 46 were journal articles. Table 3 shows the top ten publication outlets, the remaining 40 had one paper per outlet. Since the results have been published in diverse outlets, it can be concluded that the co-creation of value in ecosystem-context has not yet established a research domain.

Table 3 Top 10 publication outlets

Publication	Number of Articles
Industrial Marketing Management	2
Managing Technology for Inclusive and Sustainable Growth	2
Lecture Notes in Business Information Processing	2
ACM International Conference Proceeding Series	2
Advances in Intelligent Systems and Computing	2
Long Range Planning	2
IEEE International Conference on Industrial Engineering and Engineering Management	2
Marketing Theory	2
Sustainability	2
Journal of Cleaner Production	2
Other	40

In 58/60 articles, at least one description for value proposition was identified. The identified descriptions were classified into the six dimensions of our framework as follows: financial (n=42), functional (n=42), epistemic (n=37), social (n=30), and emotional (n=29) value dimensions. Conditional value in an ecosystem context was not mentioned.

The second part of the study was conducted as a multiple case study. We selected eight different ecosystems, each led by a Finnish company, to be interviewed. The cases are elaborated on in Table 4. The representative from the focal company in each ecosystem was interviewed in 2016. They were asked to describe the value propositions of their ecosystem.

Table 4 Description of cases, interviewees, and exemplary value propositions

Case ID	Industry	Interviewee position	Examples of a Value proposition
Alpha	Industry automation	Sales Manager	Efficiency, simulation, part library, institutional co-operation
Bravo	Cargo handling	VP, Service Business Development	Asset optimization, maintenance management, safety
Charlie	Metal industry	Software Manager and Director, Product Software Customer Operations	Productivity, qualification management, quality, data, instructions
Delta	Cargo handling	Product Manager, Remote Service	Efficiency improvement, continuous revenue, risk mitigation
Echo	Health industry	Product Manager and Vice President, Digital Imaging and Applications	Efficiency, multi-channel, part libraries, information
Foxtrot	Forestry	Technology and R&D Manager	Cost reduction, reporting
Golf	Health industry	Head of Strategy and Business Development	Ease of use, peer-to-peer co-operation
Hotel	Cargo handling	VP, Service Business Development	Single interface, data, maintenance management

In January 2021, the value propositions of the same ecosystems were reviewed as a desktop search. The identified propositions were compared against the original propositions. Further, we evaluated the value propositions against theoretical dimensions in the framework. Table 5 elaborates on how the value propositions have been developing. A short line (-) means no proposition was offered in that particular dimension. One spot indicates that a particular dimension has been identified from the value proposition (e.g. the case Alpha, offered simulation, and APIs as a functional value in 2016). If the number of spots has increased, there has been a progression in this particular dimension in value proposition between 2016 and 2021 (e.g. the case Alpha offers also virtual commissioning, augmented reality, and virtual reality as functional values in 2021 or, in emotional value, when the case Alpha has not offered anything (-) in 2016, but in 2021 offers risk reduction (one spot)). If the number of spots has remained the same, the offer is the same.

Table 5 Progress of Value Dimensions in each Case from 2016 to 2021

Case	Financial		Functional		Emotional		Epistemic		Social	
	2016	2021	2016	2021	2016	2021	2016	2021	2016	2021
Alpha	•	••	•	••	-	•	•	•	•	••
Bravo	•	•	•	•	•	•	-	-	•	•
Charlie	•	••	•	••	-	-	•	••	-	•
Delta	•	••	•	••	-	•	•	••	•	•
Echo	•	•	•	••	-	•	•	••	•	••
Foxtrot	•	••	•	••	-	-	•	•	-	-
Hotel	•	•	•	••	•	•	•	••	-	-

Case Golf is not included in the analysis, as it has decided to terminate its platform and continue with a single app to support the value creation to the users of its products.

4 Findings and discussion

The literature analysis supports the assumption that social and emotional value has had less attention in ecosystem literature. Typical financial values are cost savings, increased revenue or market share, constant revenue flow, increased profit, and correctly timed investments. Functional value is often described as convenience, scalability, access to resources (like technology or assets), individualization, improved maintenance scheduling, speed, and availability. The epistemic value includes e.g. data, information, knowledge, customer insight, novelty, and leveraging creativity and innovation. Social values include two streams 1) the social value as described earlier e.g. interaction, collaboration, common identity, and inclusion, but also 2) the societal values, which include e.g. community well-being, sustainability, and reduction of the digital divide. The latter stream of social value is emphasized typically in sustainability and circular economy-related articles. Emotional values identified from the literature include e.g. trust, safety, risk mitigation, well-being, interdependency, and reputation. Both trust and risk mitigation were mentioned in 11 articles. Considering that trust is a prerequisite of value co-creation, it has had relatively little attention as part of offering value to the ecosystem members.

In certain situations, an activity can offer multiple types of value. For example, co-design can offer social value (as experiencing belonging to a group) as well as epistemic value (creating something new) or even

emotional value through being valued as a group member. Also, crowd-related activities, like crowdlending or crowdfunding, can offer both social value and financial value. The social aspects of value co-creation were not mentioned in the reviewed literature. However, when assigning the value propositions to classes, all values starting with “co-“ were classified as social values. Had this not been done, the number of social value propositions would have reduced to 26/60.

Only 22/60 articles mention ecosystem-level value proposition and from those only five (typically a platform ecosystem-related article) recognize the importance of offering value to all ecosystem actors. In most cases, the focus is only on the joint value proposition towards the ecosystems’ customer. Some articles emphasized the value created to the ecosystems’ leader. According to the social exchange theory (SET), the actors who give much also expect to be much rewarded and actors capturing much value are expected to invest more into the value creation (Homans, 1958). The current literature on ecosystem value proposition fails to include the propositions to ecosystems’ actors, hence explaining how to motivate them to invest in value co-creation.

When the value propositions in each case ecosystem were assessed by the above-mentioned dimensions, the order of prevalence is the same as found in the literature review. When a leader company communicates the ecosystem value proposition, all seven companies include financial and functional value. Four out of seven are describing the financial value in more detail now than in 2016. Also, the companies have long lists of different financial values from optimization, cost reduction, efficiency improvement, revenue growth to free service. In functional value, the increase is even bigger as six out of seven leader companies are elaborating the functional value more explicitly. All of the ecosystems have a long list of functionalities described in detail. The functional values include e.g. possibilities to make simulations, having a single interface, improve maintenance management, APIs, part libraries, and ease of use. In the past few years also mobile access and augmented and virtual reality have become part of value propositions.

The epistemic value was communicated in six of the ecosystems. Also, in this dimension, the value is currently described in a more versatile manner. Data is in a key role as is information and insight, too. The latest improvements include KPI reporting, prediction, guidance, and data aggregation. Only the case Bravo seems to have missed the communication of epistemic value. This was unexpected as Bravo utilizes IoT in their ecosystem and collecting and utilizing data is what IoT is

designed to do.

Also, social value descriptions have increased, though the start level was lower (four cases) and they have increased less (three cases). Only one case mentions anything about co-creation of value, co-design, or other “co-“-terms. It makes co-operation with educational institutions to lock in new users already before graduation. Social value is mainly seen as brand value, openness, and transparency. In addition to those, peer-to-peer information sharing, and openness are seen as offerings of social value.

The biggest relative change has happened in emotional value. While in 2016, only two of the cases described any kind of emotional value, in 2021 the number has multiplied to five cases. However, the cases emphasize mainly only safety and risk mitigation. None of them mentions anything about trust or trustworthiness.

Conditional value was not included in value proposition theories in an ecosystem context, nor do the cases offer any conditional value. Therefore, there seems to be no reason to include a conditional value dimension in designing an ecosystem-level value proposition.

5 Conclusion and Further Research

There is a deficit of scholarly knowledge in understanding value proposition co-creation at the ecosystem level. To enhance ecosystem business, more profound knowledge about the value propositions and their distribution principles within ecosystems is required. This study proposes a classification of value proposition dimensions in business ecosystems. In an ecosystem context, dividing the propositions into five dimensions of value is appropriate (leaving conditional value out). These five dimensions are emotional, epistemic, financial, functional, and social value.

More scholarly attention should be devoted to social and emotional value propositions. Based on the results, we claim that ecosystem-level value propositions are defined too narrowly. The companies leading the ecosystems are focusing mostly on functional and financial value propositions. Putting more emphasis on epistemic, social, and especially emotional value propositions may help the ecosystem to thrive. Especially now, when the data-based business models are becoming more popular, it is important to understand, which kinds of epistemic value the ecosystem actors want and what they can offer. Social expectations are important as value co-creation can be done only through collaboration – co-design and co-innovation being good examples of necessary collaboration. Trust is an

important emotional value. See-To and Ho (2014, p. 186) claim “trust is a prerequisite of value co-creation”, hence ecosystems should put more emphasis on designing and communicating emotional value.

Value co-creation is a complex process. Emotional and functional values are the main motivators for the actors to join co-creation. However, emotional value has not attained scholarly interest in ecosystem-context. This may be one of the reasons many ecosystems fail to be able to sustain their competitive edge. Also, considering the commonly agreed notion of the joint faith and the importance of co-creation of value, the “co-“ and “crowd”-terms are relatively scarce in the reviewed literature. Thus, we propose the social dimension of value co-creation, together with the emotional dimension, to be studied to elaborate their role in developing a sustainable and viable ecosystem.

While understanding the dimensions make a foundation, the practitioners would benefit from a framework supporting the designing of a co-created value proposition. The framework should scrutinize the value creation and capture the possibilities and potential of all ecosystem members.

For academics, this opens new avenues of research in developing an understanding of the effects of value co-creation and distribution of value within ecosystems. The value dimensions should be tested with more cases to verify e.g. the absence of conditional value. However, this study strove to denote the importance of versatile perspective in creating an understanding of the motivational factors of value co-creation.

The study could have benefitted from a more comprehensive literature review and a more in-depth analysis of the current status of the case ecosystems. However, to open a discussion on ecosystem-level value proposition evaluation the study meets the expectations of comprehensiveness.

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