Stimulating Ecosystem Initiation: Using Paradox-Based Design Principles in Sharing Economy Workshops

Names redacted for review

Abstract

The sharing economy promotes sustainable consumption by encouraging reuse, renting, and borrowing over ownership. Realizing its potential requires coordination across digital platforms, businesses, public agencies, and consumers within regional ecosystems. While frameworks like the Ecosystem Pie Model can help would-be ecosystem designers map structure of the envisioned ecosystem, they are not geared to take into account the dynamic aspects of ecosystem emergence. We address this by introducing paradox-based design principles to foster creativity and strategic reflection in ecosystem design. We tested the principles in a workshop with seven European municipalities and contribute a validated set of design principles.

Keywords: Sharing sconomy, Design Science, Design principles, workshops

Introduction

The sharing economy has emerged as a phenomenon in which digital platforms facilitate access to goods and services within a community, often promoting more sustainable modes of consumption (Acquier et al., 2017; Ganapati & Reddick, 2018). It involves a diverse set of actors—including businesses, consumers, and government agencies—who together form dynamic ecosystems (Ganapati & Reddick, 2018).

Business ecosystems differ from traditional supply chains in their dynamism and the complex links among actors who organize around a central "ecosystem leader" and a shared value proposition (Jacobides et al., 2018; Adner, 2017). For the central actor, initiating an ecosystem is a challenging task (Lingens et al., 2021). The literature offers management artefacts like the Ecosystem Pie Model to map actors and their roles in an envisioned ecosystem (Talmar et al., 2020).

However, while frameworks like the Pie Model are useful for outlining structure, they often overlook the dynamic processes of ecosystem emergence, initiation, and leadership (Thomas & Ritala, 2022; Roundy et al., 2018). In this paper, we address this gap by developing a set of paradox-based design principles to enhance creativity and strategic reflection in ecosystem design. We test these principles in a workshop with seven European municipalities working to stimulate local sharing economy ecosystems. We contribute a set of design principles whose applicability was tested in a workshop with seven European municipalities.

1. Business ecosystems in the sharing economy

Business ecosystems in the sharing economy revolve around a shared value proposition, bringing together diverse stakeholders including businesses, customers, suppliers, and regulatory bodies (Adner, 2016). A digital platform often serves as the central hub, managing both cooperative and competitive interactions among supply and demand (Parente et al., 2017). However, building such ecosystems is challenging (Foss et al., 2023). Ecosystem leaders must navigate governance complexities and regulatory constraints to build trust and reach critical mass (Thomas & Ritala, 2022).

The organizing framework proposed by Acquier, Daudigeos, and Pinkse (2017) highlights how the sharing economy integrates access, platform, and community-based models, each carrying distinct promises and paradoxes. This perspective helps explain why initiating such ecosystems involves navigating tensions between market-driven scalability and community-oriented governance.

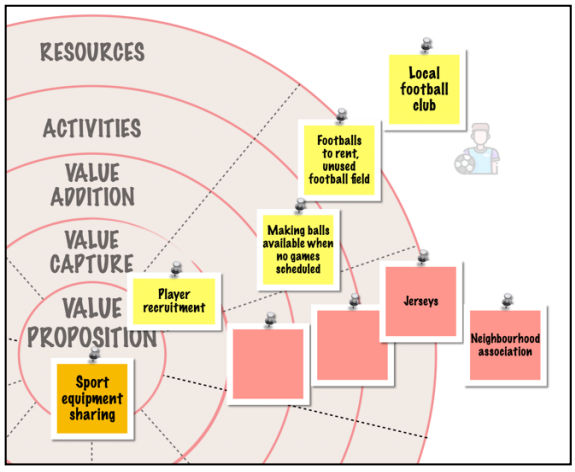
More broadly, the literature on ecosystem emergence reveals seemingly conflicting insights. This is not unusual, as organizations—including ecosystems—are inherently full of paradoxes. A paradox is defined as a persistent contradiction between interdependent elements (Schad et al., 2016). For example, both efficiency and flexibility are desirable, yet often create

opposing demands. Likewise, openness can foster growth, but too much openness may lead to instability. These tensions are not problems to be solved but conditions to be navigated, shaping how ecosystems take form.

In conclusion, while business ecosystems in the sharing economy offer opportunities for innovation and value creation, they also require careful orchestration to manage constraints from both market forces and regulation.

2. Frameworks for ecosystem design

Several frameworks exist to support ecosystem design, though most focus on structural configuration rather than early-stage orchestration. The *Ecosystem Pie Model* (Talmar et al., 2020) is widely used for mapping actors, roles, and value flows (Picture 1). Similarly, the Ecosystem *Design Canvas* (Lewrick, 2022) draws on business model thinking and design thinking to support iterative exploration of ecosystem scenarios. While these tools are valuable for visual clarity, they offer limited guidance on the tensions and strategic decisions that arise during ecosystem emergence. The design principles introduced in this paper help with surfacing key dilemmas and supporting facilitation in the formative phases of ecosystem development.



1: Ecosystem pie model

3. Design principles as creative stimulation

Design principles are statements that encapsulate know-how or prescriptive knowledge derived from a specific instance of some problem-and-solution pair (Pries-Heje et al., 2011) and present it in a reusable form (Iivari et al., 2021). Design principles may describe how technical artefacts should look or—more relevant here—provide artefacts to help address organizational problems. A principle typically includes what should be done to achieve an aim, as well as a theoretical justification for why the approach works (Gregor et al., 2020). Such concise statements are digestible in practice and can quickly enter a design process.

Picture 2: Design Principles as playing cards

Design principles are formulated with backing in literature, theory, or experience (Schoormann et al., 2025). Organizational problems are complex, and often, seemingly contradictory recommendations can be formulated, substantiated, and exploited. For instance, in designing patient flow in hospitals, it makes sense to pursue both quality of care and efficiency (Vallandingham et al., 2024). In digital transformation, both new and existing capabilities are valuable (Danneels & Viaene, 2022). Across such cases, paradoxes function as productive stimuli rather than restrictions. Danneels and Viaene capture this well when they write that "using paradoxes for decision-making makes the formulation process dynamic and that collectively identifying paradoxes leads to both/and-thinking in the organization" (p. 484).

The apparent contradictions between recommendations in design principles can often be reconciled naturally in practice. Because designing is an open-ended reflective practice (Schon, 1983), principles are interpreted creatively, not followed as deterministic prescriptions. A recent study of how design principles are used in practice (Kruse et al., 2022) highlights that design doesn't always start from problems. Sometimes, designers begin with principles as creative stimuli that help uncover problem aspects or paths to viable solutions (p. 1251). A similar view appears in conceptual work by Schoormann et al.

(2025), who describe multiple ways principles are recombined and translated in implementation. In both views, design principles are not fixed instructions but sources of inspiration.

This view of design principles as creative stimulation is especially suited to open-ended or "soft" problems. Strategic challenges—such as designing ecosystems or formulating value propositions for diverse stakeholders—resist straightforward problem-solving. Applying rigid, well-defined principles may offer a false sense of certainty. Using paradox-based principles instead as ideation stimuli can productively shape viable ecosystem concepts.

4. Distilling theories of ecosystem emergence and leadership into design principles

Whereas available frameworks tend to focus on the structural configuration of ecosystems, a complementary strand of academic work has explored the process of ecosystem emergence and the strategic activities that designers can undertake to stimulate formation. In what follows, we review this literature to derive a set of design principles. Before presenting our methodology in Section 5, we outline the theoretical foundations of these principles to situate them within current debates on ecosystem emergence.

Value proposition paradox

One of the central tensions in ecosystem emergence concerns the breadth versus specificity of the value proposition. An ecosystem is organized around a shared value proposition which binds all actors together. A broad value proposition ensures inclusivity, attracting diverse participants, while a narrow one enhances clarity and strategic focus. This reflects a paradox (Schad et al., 2016) because rather than being opposites, broadness and specificity shape each other, creating a tension that must be navigated rather than resolved. This leads us to the first paradoxical pair of design principles:

DP1a: Formulate a broad value proposition.
A broad value proposition creates a flexible foundation that allows the ecosystem to incorporate a diverse range of actors. The literature on ecosystem emergence suggests that inclusivity in the early stages reduces constraints on participation and fosters adaptability as the ecosystem evolves (Kortus et al., 2025). A broad value proposition ensures that different actors can perceive a role for themselves, even if their specific contributions are not immediately clear. By enabling multiple pathways for engagement, this approach mitigates the risk of early lock-in to a narrow trajectory, which may later prove restrictive. The ability to accommodate a range of interpretations of value has been noted as an important feature in sustaining participation and allowing the ecosystem to scale in alignment with new opportunities (Dedehayir et al., 2018).

DP1b: Formulate a narrow value proposition.
A narrowly defined value proposition ensures clarity and strategic coherence. Research on digital platform ecosystems indicates that a precise articulation of value reduces cognitive overload for potential participants, enabling them to quickly assess alignment with their own interests (Thomas & Ritala, 2022). The clarity of a well-defined value proposition also plays a role in reducing coordination challenges by aligning expectations and reducing ambiguity regarding the ecosystem's core purpose. Datée et al (2018) further suggest that in nascent ecosystems, an unambiguous articulation of value can help create initial momentum by reducing the uncertainty that often inhibits early commitment.

Dependent actors' paradox

Ecosystem participants vary in their dependence on the ecosystem's success. Highly dependent actors provide stability, commitment, and investment, while less dependent actors contribute slack and dynamism, fostering adaptability and innovation. This reflects a paradox (Schad et al., 2016) because stability and flexibility are not opposing forces but mutually reinforcing dynamics that shape ecosystem resilience. The Ecosystem pie model already captures the element of dependence and thus we can just formalize this as a pair of principles.

DP2a: Focus on Highly Dependent Actors
Highly dependent actors play a stabilizing role in ecosystem emergence because their strategic interests are closely tied to the ecosystem's success. Ecosystem literature highlights how actors with high dependence are more likely to invest in shared infrastructure and long-term collaboration, ensuring the continuity of the ecosystem even in periods of uncertainty (Jacobides et al., 2018). Such actors tend to reinforce the ecosystem's legitimacy by committing resources and embedding the ecosystem within their own strategic operations. Dedehayir et al. (2022) describe this as a form of "structural anchoring," where core

participants act as stabilizers that reduce volatility in the ecosystem's formation phase.

DP2b: Focus on less dependent actors
Actors with low dependence on the ecosystem introduce variety and flexibility, making the ecosystem more adaptable to external shifts. Kortus et al. (2025) argue that less dependent actors contribute exploratory innovations that might not align with the core ecosystem strategy but can introduce novel complementarities. Their lower commitment allows them to engage in experimentation without being constrained by ecosystem-wide coordination requirements. Dattée et al. (2018) further highlight that ecosystems that accommodate loosely connected actors maintain greater resilience because they are less vulnerable to rigid dependencies that can lead to stagnation

Coopetition paradox

A fundamental tension in ecosystem emergence is the interplay between collaboration and competition. Collaboration fosters resource pooling, knowledge sharing, and stability, while competition drives innovation, differentiation, and resilience. This reflects a paradox (Schad et al., 2016) because rather than opposing forces, collaboration and competition can coexist in a dynamic balance, shaping ecosystem evolution. This leads to the following pair of design principles:

DP3a: Encourage collaboration among the ecosystem actors

Collaboration among ecosystem participants is a recognized mechanism for reducing uncertainty and enhancing collective value creation. Theorists on platform ecosystems note that shared resource investments, such as knowledge repositories or interoperable infrastructure, reduce the costs associated with participation and enhance network effects (Adner, 2017). Collaboration also fosters trust and reciprocal expectations, which are crucial in early-stage ecosystems where formal governance mechanisms are weak. Jacobides et al. (2018) argue that collaboration enables more efficient problem-solving by distributing complementary capabilities across actors, reducing the likelihood of bottlenecks in ecosystem scaling.

DP3b: encourage competition among the ecosystem actors

Competition within an ecosystem ensures that participants continuously refine and differentiate their contributions, thereby driving sustained innovation. Wareham et al. (Wareham et al., 2014) note that competitive dynamics prevent ecosystem stagnation by ensuring that no single actor can unilaterally dictate the ecosystem's evolution. Hannah & Eisenhardt (Hannah & Eisenhardt, 2018) further argue that structured competition among participants can enhance ecosystem-wide value creation by encouraging experimentation and responsiveness to emerging user needs. At the same time, strategic competition mitigates risks associated with dominant actors capturing excessive value, which can lead to the erosion of trust and eventual disengagement from other participants.

Long/short term paradox

Ecosystem designers must navigate the tension between creating urgency and signaling long-term commitment. Urgency generates momentum and encourages immediate action, while long-term commitment reassures participants that their investments will be sustained. This reflects a paradox (Schad et al., 2016) because rather than choosing one over the other, ecosystems must balance both forces to drive engagement and stability. This leads to the following pair of paradoxical design principles:

DP4a Create urgency in creation of the ecosystem
Early-stage ecosystems often suffer from inertia due to uncertainty and lack of perceived necessity. Creating urgency helps overcome this hesitation by signaling a need for immediate engagement. Dattée et al. (Dattée et al., 2018) discuss how momentum-building strategies, such as time-sensitive incentives or early-mover advantages, can accelerate ecosystem adoption. Thomas et al. (Thomas & Ritala, 2022) further highlight that urgency acts as a catalyst for reducing decision paralysis, ensuring that early participants take concrete steps rather than deferring commitment.

DP4b Signal long-term commitment to the ecosystem
A strong signal of long-term commitment reassures ecosystem participants that their investments will be sustained over time. Adner (Adner, 2017) argues that perceived longevity influences participation decisions, as actors are unlikely to commit resources to an ecosystem perceived as transient. Research on digital platforms also suggests that ecosystems that successfully signal continuity attract higher-value participants, who, in turn, contribute to reinforcing the ecosystem's legitimacy (Snihur et al., 2018).

We present the revised design principles in Table 1. The initial formulations, are discussed in the section above.

5. Design Science Methodology

We developed design principles from theory and sought to evaluate them according to the methodology proposed by (Iivari et al., 2021). The overall aim of this engaged research is objective-centered (Peffers et al., 2007) with the specific objective to develop and validate design principles which complement the Ecosystem Pie model (Talmar et al., 2020). The paradox-based design cards were intended to serve as ideation prompts that surface strategic tensions during early ecosystem formation. The cards help participants articulate competing priorities, reflect on trade-offs, and explore multiple pathways—addressing the common tendency in early-stage design to converge too quickly on linear solutions without grappling with inherent dilemmas.

Research context

This research was conducted as part of an EU-funded project involving seven municipalities and affiliated public organizations across the North Sea region, each responsible for deploying sharing economy stations for consumer goods. As a knowledge partner, we supported the project over three years through interviews, regular calls, and bi-annual in-person meetings. One of our key contributions was to deliver a business ecosystem canvas to support municipalities in mapping the actor network around these stations. We adopted the Ecosystem Pie Model (Talmar et al., 2020) as a core framework, and introduced a complementary set of design principles during an in-person consortium meeting in Sweden.

Formulation of design principles

While we found the Ecosystem Pie model (Talmar et al., 2020) suitable to our needs, being familiar with the research on ecosystems more broadly, we were aware of the insights on the *process* of ecosystem formation (Thomas & Ritala, 2022; Foss et al., 2023). The ecosystem pie model seemed excellent at capturing the structural aspects of ecosystems but because our workshop participants were working on new ecosystems, the insight from the research on ecosystem emergence and leadership was valuable. Packaging these insights as design principles seemed quite elegant. We therefore engaged with the key references (Thomas & Ritala, 2022; Hannah & Eisenhardt, 2018) systematically extracting mechanisms formulating and corresponding principles.
We soon realized the literature (much of which is based on case studies and conceptual work) allows to reasonably formulate paradoxical pairs of principles. The work on design principles with the finding that design principles can be used as creative stimulation, helped us embrace the approach (Kruse et al., 2022). The initial set of design principles we formulated is presented in section 4 of this paper.

Ecosystem design workshop

We ran the ecosystem design workshop during an in-person meeting of the EU project, bringing together representatives from all seven participating municipalities along with affiliated organizations. In total, around 25 participants attended. To facilitate knowledge sharing and cross-organizational learning, participants were divided into three groups, each composed of two to three municipalities or organizations. This setup allowed for diverse perspectives within each group while keeping the discussions focused and collaborative.

Picture 3: In person workshop

Evaluation of principles and revision

To assess the quality and applicability of the proposed design principles, we conducted a preliminary validation following the minimal reusability criteria outlined by Iivari et al. (2021). According to their framework, design principles should meet basic requirements of clarity, justification, scope, and usability to be considered reusable across contexts. We adopted a simplified evaluation approach appropriate to our setting: a post-workshop survey and collection of qualitative feedback from both participants and facilitators.

Participants evaluated the principles along three dimensions—understandability, insightfulness, and usefulness—on a 5-point Likert scale (See Table 2). In addition, they were invited to provide open-ended comments. Workshop facilitators shared their reflections in follow-up emails. The results confirm that the principles were broadly seen as clear and helpful, while also highlighting opportunities for refinement.

6. Results

This section presents the results of our evaluation of the design principles, structured into two parts. First, we outline the gathered feedback on the initial design principles, based on survey, participant reflections and views of the facilitators. This subsection aims to assess how well these principles, derived from ecosystem emergence literature, were understood and used by the practitioners. Second, we present the revised versions of the principles, reflecting the insights gained from the feedback to enhance their clarity and practical relevance.

Table 1: Revised principles for stimulating creativity in ecosystem design

Paradox	Design Principle *to design a viable ecosystem, take steps to…*	Justification *from literature on ecosystem emergence and leadership*	What changed after the feedback
Value proposition paradox	**Formulate a broad value proposition** *(DP1a)*	To accommodate diverse actors and allow for expansion. (Kortus et al., 2025); (Dedehayir et al., 2018)	"Broad sets of actors" rephrased as "diverse actors" for clarity.
	Formulate a narrow value proposition *(DP1b)*	To make the value clear and understandable, aligning expectations. (Thomas & Ritala, 2022); (Dattée et al., 2018)	Added "aligning expectations" to reflect survey feedback on clarity benefits.
Dependent actors' paradox	**Focus on actors highly dependent on the ecosystem** *(DP2a)*	Because they provide the ecosystem with stability and long-term commitment. (Jacobides et al., 2018) ; (Dedehayir et al., 2018)	Clarified relationality to express we mean dependent on the ecosystem as a whole
	Focus on actors less dependent on the ecosystem *(DP2b)*	Because they bring adaptability, fresh ideas, and reduce dependency risks. (Kortus et al., 2025) ; (Dattée et al., 2018)	Rephrased "slack" as "adaptability"; expanded based on comments about dynamism and experimentation.
Coopetition paradox	**Encourage collaboration among actors** *(DP3a)*	Because collaboration fosters resource pooling, trust, and aligned incentives. (Adner, 2017) ; (Jacobides et al., 2018)	Added "trust" and tightened phrasing to reflect positive workshop feedback.
	Encourage competition among the actors *(DP3b)*	because competition drives innovation, enhances value creation, and prevents dependency on dominant actors (Wareham et al., 2014); (Hannah & Eisenhardt, 2018)	No changes. The ambiguity was actually productive. The workshop participants thought of various forms of "fun" competition like gamification not just encouraging competing offers
Long/short term paradox	**Create urgency in ecosystem creation** *(DP4a)*	To stimulate early engagement, overcome inertia and build momentum. (Dattée et al., 2018); (Thomas & Ritala, 2022)	Reworded to clarify that urgency refers to early engagement; reflects confusion over "urgency for whom."
	Signal long-term commitment *(DP4b)*	Because when actors believe in long-term viability, they invest more seriously. (Adner, 2017); (Snihur et al., 2018)	Replaced "membership" with "viability" for alignment with ecosystem-level logic.

Feedback on design principles

In this subsection, we focus on the feedback for each pair of design principles. We collected feedback from a survey (n=12), participant reflections (n =3) and points from the facilitators (n=3). While this response rate is not unusual for qualitative feedback, it may reflect a selection bias, as those with stronger views (positive or critical) may have been more likely to respond. We evaluate how effectively the principles were interpreted and applied in the workshop context, allowing to understand how well the principles conveyed the key ideas and tensions described in the literature on ecosystem design.

Value Proposition Paradox: This pair was designed to surface the tension between broad and narrow value propositions as distinct mechanisms for enabling ecosystem emergence. The broad proposition fosters inclusion and enables modular growth (Wareham et al., 2014; Jacobides et al., 2018), while the narrow proposition supports coordination and direction (Adner, 2017). In the workshop, participants consistently found this pair helpful (usefulness: 4.5/5) but relatively less than others. During facilitation, we noticed they were using it to structure discussions around stakeholder alignment. However, the deeper idea that a broad value proposition "delays the burden of coordination" (Wareham et al., 2014) was largely absent in collected feedback, suggesting a shift toward a more operational understanding.

Table 2: Evaluation of principles across understanding, insight, and usefulness

DP Pair	Und.	Ins.	Use.
Value Proposition	4.07	4.14	4.50
Dependent Actors	4.81	4.75	4.75
Coopetition	4.56	4.25	4.62
Long-short	4.46	4.33	4.62

Dependent Actors' Paradox: The original formulation of this pair drew on the idea that engaging highly dependent actors provides stability and commitment to the emerging ecosystem (Dattée et al., 2018), while including less dependent actors introduces experimentation and dynamic learning (Autio, 2021). Although the pair was rated highest in understandability (4.81/5), participants expressed uncertainty about the meaning of "dependence. Actors tended to project their individual role into the reading (e.g. a representative of the government understood the dependence to be the level of support the government provides. This indicates that the intended strategic perspective on sequencing engagement was flattened into a more generic reading of actor involvement.

Coopetition Paradox: This pair was meant to highlight that ecosystems thrive on both collaborative structures and competitive dynamics (Hannah & Eisenhardt, 2018). Participants found this pair highly intuitive; in some cases, the discussion on competition and collaboration emerged before the cards were introduced. However, feedback focused more on stakeholder behavior than on architectural design or value capture, suggesting that while the paradox resonated, the strategic implications were not fully articulated in practice.

Long/Short-Term Paradox: This pair draws on the insight that initiating ecosystems often requires both a sense of urgency to mobilize actors and a demonstration of long-term viability to secure commitment (Ansari et al., 2016); Cusumano and Gawer, 2001). While the pair was rated as useful (4.42/5), the notion of urgency proved confusing in the workshop context. Participants questioned whether urgency made sense at the ecosystem level and for whom it should apply. In contrast, the principle of signaling long-term commitment was broadly accepted and seen as relevant. This asymmetry suggests that the temporality dimension of ecosystem orchestration may require further grounding or framing during facilitation.

Taken together, the feedback illustrates that while participants generally engaged well with the paradoxes and found the principles useful, some of the theoretical nuance was lost or reinterpreted in translation. This reflection, grounded in both the literature and workshop dynamics, informed a careful reformulation of the principles. In the next section, we present the revised versions, highlighting how they respond to the observed challenges while preserving their original intent.

Revised design principles

The feedback from the workshop highlighted several areas where the initial design principles could be clarified to ensure that the key concepts from the literature were fully communicated and practically applicable. The revisions aimed to improve clarity by reducing ambiguity and refining the strategic intent of each paradox, aligning them more closely with theoretical frameworks while also addressing the specific needs and interpretations of the participants.

For the **value proposition paradox,** we adjusted to better emphasize the inclusion of *diverse actors*, a nuance that emerged from the feedback, rather than merely a broad set of actors. The narrow value proposition was also clarified to underscore its role in *aligning expectations*—a theme that directly linked

to ecosystem theory on how aligning actor incentives can help guide ecosystem development (Adner, 2017; Jacobides et al., 2018).

In the **dependent actors' paradox**, feedback pointed out confusion around the term "dependence" and how it applies to actor relationships within an ecosystem. To resolve this, we explicitly defined the relationship of dependence in terms of how actors rely on the ecosystem for stability, while also highlighting how more independent actors can introduce flexibility and *innovation* (Dattée et al., 2018; Autio, 2021).

For the **coopetition paradox**, only minor phrasing adjustments were made, but the principle of collaboration now more explicitly mentions *trust*—a key aspect of ecosystem relationships (Hannah & Eisenhardt, 2018). Feedback on the competition card emphasized its value in sparking productive discussions, illustrating that even minor ambiguities can lead to valuable insights.

Finally, in the **long/short-term paradox**, we refined the concept of *urgency* to clarify that it refers specifically to the need for early engagement and momentum, addressing confusion regarding its applicability to all actors in the ecosystem. The long-term commitment principle was edited to replace "membership" with *viability*, more accurately reflecting the sustainability challenges inherent to ecosystems (Ansari et al., 2016; Cusumano & Gawer, 2001).The refined versions of these principles are presented in **Table 1**, along with justifications for each change based on the feedback received and literature references that informed the revisions.

7. Discussion

This section reflects on the contributions of the study from practical implementation to theoretical implications. We begin by discussing the methodological choice to present design principles as physical "playing cards" to stimulate creative engagement. We then share facilitation guidelines derived from the workshop experience. The next subsection reflects on how the design principles complement the Ecosystem Pie Model and how the study contributes to the literature on ecosystem emergence.

Methodological implications: Design principles as "playing cards"

This study contributes to design science methodology by experimenting with how design principles can be used in early-stage, exploratory settings. Our approach to design principles as playing cards aimed to stimulate conversation and reflection rather than impose structure—a method aligned with recent calls to view design principles as generative and iterative artifacts rather than merely normative outputs (Kruse et al., 2022). The served as boundary objects between municipal policy officers, innovation managers, and technical facilitators, enabling shared exploration of ecosystem design tensions. They also fulfilled a sensemaking function by prompting participants to connect abstract ecosystem tensions to concrete challenges in their local contexts. This echoes recent work in design science emphasizing the performative role of principles in shaping problem spaces rather than just solving them (Schoormann et al., 2025; Möller et al., 2022).At the same time, the format came with trade-offs. While the paradoxical formulation enabled rich discussion, it sometimes introduced ambiguity or interpretive drift which future work could address.

Facilitation guidelines

Our experience facilitating the ecosystem design workshop yielded three key lessons for integrating the paradox-based design principle cards into group-based ecosystem mapping. One confirmed our initial planning; the others emerged during facilitation.

Start with Actor-Focused Cards to Ground the Canvas: We began with cards related to actor definition—specifically the *Value Proposition* and *Dependent Actors* paradoxes. These helped participants identify who should be involved, what motivates their engagement, and how value is created. Starting with the canvas allowed for a quick but structured concept formulation. Through discussion and revision, the value proposition became clearer, confirming our expectation that actor-focused principles are especially effective for initiating ideation and alignment.

Distribute Cards Early in Each Stage: Although we initially planned to introduce cards gradually as guidance tools, giving them out early proved more effective. Distributing actor-related cards at the start, followed later by process-related ones like *Coopetition* and *Short/Long-Term Commitment*, gave participants more time to reflect and apply them organically. Allowing participants to hold and 'play' the cards themselves encouraged timely, self-directed contributions during the evolving discussion.

Give a Card to Everyone: Ensuring each participant had a card created immediate ownership and encouraged balanced participation. Participants often

referenced their cards naturally when relevant topics came up. This fostered organic, distributed facilitation and kept discussion focused without being rigid. We worked with a single group configuration due to logistical constraints. While the chosen group size (around 8 participants) appeared to support rich interaction, we did not experiment with alternative formats in this workshop

Generalizability of the Principles

Although the principles were tested in the context of sharing economy ecosystems, they are written in deliberately generic language and are not specific to that domain. The underlying paradoxes are common across a wide range of ecosystem formation efforts. As such, the principles offer abstracted solutions with broad potential for reuse; what Gregor & Hevner call Type IV Design knowledge (2013). The adherence to the reusability assessment (Iivari et al., 2021) which led to the revision should strengthen the reusability of the principles. That said, the principles can be tailored for specific contexts. Further application and validation in other sectors could help assess how well the principles transfer and where contextualization enhances their effectiveness.

Suggestions for use of the Ecosystem Pie model

The Ecosystem Pie Model (Talmar et al., 2020) was a valuable tool for helping participants visualize the structural elements of their local sharing economy but it does not explicitly address how ecosystems are initiated. As others have noted, emergence is not only a structural process but a socially constructed and politically negotiated one (Ansari et al., 2016); Dattée et al., 2018). The design principles we introduced aimed to address this gap.

Our findings suggest that the Pie Model and the paradox-based principles complement each other well. This aligns with broader trends in ecosystem research calling for multi-layered tools that support both architectural clarity and strategic reflexivity (Jacobides et al., 2018; Wareham et al., 2014).

Implications for the literature on ecosystem emergence

Our findings speak to recent discussions in the ecosystem literature that shift the focus from discussing the structure to illuminating the process of ecosystem emergence (Adner, 2017; Autio, 2021; Nambisan & Sawhney, 2011). This study contributes to this stream by testing how abstract tensions identified in the literature are interpreted in real-world ecosystem design settings.

One representative insight is that while participants intuitively grasped the paradoxes, they often reinterpreted them in more operational terms. For example, the idea that a broad value proposition "delays the burden of coordination" (Wareham et al., 2014) was not spontaneously articulated; instead, participants saw it as a way to attract interest from their perspective. Similarly, dependence was understood in personalized terms (dependence on the municipality) rather than as a concern for the full ecosystem (Dattée et al., 2018).

This highlights a gap between how the literature theorizes emergence and how practitioners make sense of those tensions in action. Our approach offers one way to bridge that gap: not by enforcing fidelity to theoretical constructs, but by designing interventions that invite interpretation while still anchoring participants in foundational dilemmas.

8. Conclusion

This paper investigates how to support the initiation of sharing economy ecosystems, a critical step in advancing sustainable consumption. We developed and evaluated a set of design principles—presented as "playing cards. The principles were grounded in literature on ecosystem emergence and tested in a workshop with representatives from seven European municipalities.

Combined with the Ecosystem Pie Model, the cards helped participants structure their ecosystem ideas and surface strategic challenges. The results show that the principles are effective tools for fostering discussion, though their use requires careful facilitation to ensure the underlying theoretical ideas are fully understood. The revised principles presented here offer a practical and transferable approach to early-stage ecosystem design.

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