Understanding the mechanisms of household and stakeholder engagement in a recycling ecosystem: The SDL perspective

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A B S T R A C T

For a recycling system to work, both stakeholders and households need to feel engaged in the process. When studying engagement in the context of recycling, it is clear that a broader view is necessary to understand the opportunities and limitations that exist among stakeholders and users. Service dominant logic is undertaken to shed new light on how stakeholders, with the household as a focal point, engage with each other in the service ecosystem. Thematic network analysis was employed using interviews with households, stakeholders, as well as workshops in a project about recycling. The analysis reveals four mechanisms (*channeling information, managing different resources, understanding impact, and dynamic and time-related engagement*). There are several goals and values present when stakeholders and households engage with each other. When values of different actors align, it provides a solid basis for collaboration. Engagement was also found to be time-related and linked to calculated or perceived future effects, but also required to be maintained with the integration of different resources (e.g. money, space, time, cognitive, emotional, bodily energy). In the short-term perspective, utilitarian (functional) values such as the function of the recycling house emerged essential, while the long-term perspectives included feelings about the environment or one's own contribution. Implications for waste management include the importance of recognizing the relation between, and the involvement of stakeholders and households, as well as understanding how these interact to optimize recycling systems.

1. Introduction

While the world faces resource shortages and the effects of climate change, the economy still follows a linear take-make-dispose path. At the same time the alternative, circular economy, has become a world-wide priority in industry, public sector and academia (Brandão et al., 2020). Here the aim is to close the resource loops and to reach this goal, in the light of increasing amounts of waste in the coming years (Kaza et al., 2018), recycling will be an important circular system for the foreseeable future (Ragossnig & Schneider, 2019). In Sweden manufacturers of packaging and newspapers retain the responsibility for the materials and must provide facilities for households to sort their packaging waste. While this is a functioning circular system, and households are required by law to sort out the packaging, a third of packaging is still lost in the process (Swedish-Waste-Management-Association, 2016).

Past research has tried to explain various behavioral intents, motivations and factors explaining how people act or engage in recycling processes (Knickmeyer, 2020; Leeabai et al., 2021), yet many theories emphasize the significance on performance by viewing engagement in relation to a larger context (Pinna et al., 2020; Sharma et al., 2020). Waste separation is not an isolated entity, hence needs to be seen through a system of actors creating value together and engaging in diverse, but at the same time, conforming activities (Halldorsson et al., 2019; Osborne et al., 2013; Tong et al., 2021) similar to the literature in service research (Akaka & Vargo, 2015; Vargo & Lusch, 2016). Shifting the perspectives of households as waste-producers to service-users or consumers may be a possible approach in order to encompass and investigate how engagement occurs in micro/macro contexts. Knickmeyer (2020) emphasize a study by Shrum et al. (1994) and mentions: "To achieve social change the use of marketing theory, skills and practices is key: recycling behavior is considered being the product that has to be 'sold' to the 'consumer'-households and researched likewise" (p. 7). More recently the perspective of service dominant logic (SDL) has been employed in various domains (Vargo et al., 2020) and been

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portrayed as an important part of engagement (Hollebeek et al., 2019b) as well has evolved into a *meta*-theory framework used in different domains and contexts (Brodie et al., 2019; Vargo et al., 2020).

The rationale for choosing service literature for studying the recycling context is also captured in Halldorsson et al. (2019) where the study shows the need of extending the system boundaries of waste collection to also include the user and/or consumer. They discuss that within the system, value is created and shared between different actors which becomes fruitful to examine when understanding how energy efficiency may be improved. In a sense, the user (e.g. a household) is also a collaborator, acting as a part of a larger waste collection system. This perspective also highlights the discrepancies in that users and actors may not only function to sustain value or balance in a service system, but that these may also be the cause for destruction and deliberate attempts to influence the system for own-benefit (Buhalis et al., 2020; Mele et al., 2018). In this regard, the perspective of actors and resources is in line with the service ecosystems can be relevant when studying recycling, but to our knowledge this is currently limited.

The concept of engagement has been used within the domains of psychology, political science, organizational behavior and sociology (Brodie et al., 2011), sometimes discussed in terms of public engagement (Schröder et al., 2019), and how people engage in behaviors (Jaakkola & Alexander, 2014). Within service dominant logic literature, engagement has been conceptualized through the interplay between learning, knowledge sharing and resource integration (Behnam et al., 2021; Hollebeek et al., 2019b), which this study will undertake to understand engagement and its elements in a recycling complex and the actors therein.

Despite the number of studies investigating engagement in different service ecosystems, there is still a lack of empirical studies within contexts than marketing, such as circular economy, public management and waste management. With this in mind, Halldorsson et al. (2019) employ similar concepts in waste supply chains and emphasize that looking at users/consumers as performers of activities to co-producers widens the perspective of their willingness to participate in recycling activities. Petrescu (2019) emphasizes instead the differences between the private and public sphere, namely that public value, has both individual and collective perspectives in service ecosystems. In regard to SDL approach within public management, Osborne et al. (2013) presents the proposition (*P1*): "both the citizen and user are situated as essential stakeholders of the public policy and public service delivery processes and their engagement in these processes adds value to both." (p. 149). To summarize, scarce knowledge exists about the mechanisms of engagement in a larger recycling context as well as how users together with stakeholders can be more engaged in a service ecosystem. Addressing these issues would provide novel insights when looking at how knowledge and resources are shared and integrated in recycling contexts.

In order to address these issues and to understand the mechanisms of engagements between households and stakeholders this paper aims to address how stakeholders, with the households and the recycling house as a focal point, engage with each other in the service ecosystem. Thus, the research question is twofold: (1) How do stakeholders and households in recycling house-centered service ecosystem engage with each other? (2) What mechanisms of engagement can be identified in the ecosystem? This will be examined in the context of a newly built recycling house, built for the recycling of six fractions in accordance to the Swedish recycling system (plastic packaging, paper packaging, newspapers, colored glass, uncolored glass and metal packaging) further described in the methods section.

2. Theory

2.1. Recycling behavior and its role in society

Although the goal of a circular economy is zero waste, it has been estimated that worldwide household waste will grow in the coming decades (Hoornweg & Bhada-Tata, 2012). Europe is transitioning from landfilling to a waste to energy approach as is the case in Sweden. The downside to this is a loss of possibly recyclable materials (Malinauskaite et al., 2017). In Sweden it is still about one third of packaging waste and newspapers are thrown in the mixed waste fraction and thus not sorted correctly (Swedish-Waste-Management-Association, 2016). While this is a functioning recycling system, there is room for improvement. From an international perspective, although the recycling system is developed, Sweden is still less circular than the world in general (CGRi, 2022).

One review summarized different factors influencing sorting behaviors including demographic factors such as age, economic incentives, awareness and knowledge (Mwanza et al., 2018). We know from previous research about recycling behavior that effort to recycle, commitment and knowledge about the recycling process, social pressure, environmental values and the distance to recycling station has an impact (Barr, 2007; Dahlén & Lagerkvist, 2010; Hornik et al., 1995; Reid et al., 1976). A mix of social, psychological, financial and legal aspects that also acknowledge the situational context is necessary for a functioning waste sorting. The user and behavior always needs to be considered along with the corresponding demographic and psychological factors such as effort and time (Knickmeyer, 2020; Pegels et al., 2022).

Other factors that have been explored include gender differences and the importance of social norms (Oztekin et al., 2017; Sorkun, 2018). Further there is evidence that attitudes to recycling are only important when proper conditions for recycling are in place (Stoeva & Alriksson, 2017). The housing company has also been shown to be a link between the user and the waste management system where it is important to understand the user perspective (Ordoñez et al., 2015). Another example from Sweden showed that sorting of packaging waste increased with improvements to infrastructure such as recycling centers and curbside collection. With the example of plastic packaging the study also showed the regional variations depended on policy factors rather than demographics (Hage et al., 2018).

Further, there has been an increasing interest for studies centered on the stakeholders especially the civil sector which needs to be engaged in the waste management system (Tong et al., 2021). The public acceptance of a waste management system is also crucial (Liu et al., 2018) and this warranties a more service aligned perspective described in the next section. Being part of a community is in itself important for recycling to become a common cause (Pei, 2019).

2.2. Service ecosystem through the perspective of SDL

2.2.1. Understanding SDL

To understand service dominant logic (SDL) and its application to recycling, it is important to first discern the underpinnings of the macro theories saturating midrange and micro theories (Petrescu, 2019; Vargo et al., 2017). In contrast to traditional logics of exchange, SDL explains how value co-creation occurs between different actors and stakeholders, where operand resources (e.g. skills and knowledge) are integrated through various intangible activities (Vargo & Lusch, 2016), consisting of several foundational propositions and axioms (FP), of which one indicates that the customer (user) is always part of value creation, and that no value exists while not in use.

While originating within the domain of marketing and service exchange (Vargo & Lusch, 2004), it has become multidisciplinary and used in fields among public management (Osborne et al., 2013; Petrescu, 2019) innovation studies (Michel et al., 2008), health (Hardyman et al., 2015), tourism management (FitzPatrick et al., 2013; Shaw et al., 2011) and much more. Vargo et al. (2020) further emphasizes that SDL has been used in various disciplines and brings a unifying perspective that can contribute to novel insights on co-creation of value within different research domains. In the context of recycling the place or space where or service providers offer services is not seen as value, but rather a value proposition or a value-creation space.

When it comes to sustainability or green design, SDL has found some avenues. For instance, Werner et al. (2017) argues that SDL can serve well to explain and understand the complexity of sustainability of events. By separating the interactions of various actors and the co-creation of value into different levels, namely micro, *meso* and macro, they present a nuanced picture of interaction. Other studies have discussed how the SDL-perspective can aid entrepreneurs in finding new opportunities that were not apparent in other logics, such as in health-care and green design contexts (Callaway & Dobrzykowski, 2009). In terms of how stakeholders embrace sustainability, Lacoste (2016) uses case studies to illustrate this to co-create values in business to business contexts. The authors emphasize that looking at the network as large shows how the role of sustainability can take shape in these networks.

Halldorsson et al. (2019) study delimited their study to the first mile of the recycling supply chains, they emphasize various different and independent activities by different actors, such as waste generation, collection and disposal. The study emphasizes that using consumers and households into the system, provides new insights and new perspectives on how for instance value co-creation occurs. A perspective that is potentially fruitful is to see consumers as active in the creation process.

2.2.2. Recycling system as service ecosystem

To understand the composition of the stakeholders and the integration of resources in the recycling ecosystem for creating engagement, a service ecosystem perspective is undertaken. Vargo and Lusch (2016) defines the service ecosystem as "self-contained self-adjusting systems of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange" (p. 10–11). In the context of recycling, Sezer and Bosch-Sijtsema (2020) employed the service ecosystem to study actor to actor tensions in waste management, which showed spatial barriers as being a common theme in the service ecosystem. These disciplines and examples indicate a part of a system level construct that constitutes a service ecosystem. Value within these service ecosystems also emphasize the degree of value 'resonance', meaning how value corresponds within stakeholders within the ecosystem (Aal et al., 2016). In the context of recycling, this can correspond to the degree of knowledge, attitude, perceived importance that correspond between stakeholders and actors. For instance, whether the perceptions of environmental issues are aligned among the organizations and households.

It is assumed that all stakeholders co-create value to various degrees and in different situations, more or less sharing resources between each other. However, it is important to pinpoint that value is time-related and contextual. Vargo et al. (2017) also discuss value within service ecosystems as needing to be zoomed out and in on, and seen as more than sum of its part. They portray value as translucent adhesive that keeps the service ecosystem intact through motivating collaboration and resource integration.

This is influenced by institutional forces through social rules, shared meaning (Akaka et al., 2012) and can define the expected actor engagement behavior (Alexander et al., 2018). Akaka and Vargo (2015) suggest that service ecosystems go beyond time and space, where institutions also have an imperative role. The institutions are norms, rules, symbols and arrangements that can enable or constrain value co-creation in these systems (Koskela-Huotari & Vargo, 2016; Siltaloppi et al., 2016). In a sense the perception of value becomes multidimensional and holds different meanings to different users/actors/stakeholders, as well as through time and place.

It must be noted, that there may exist stakeholders within these ecosystems that could attempt to influence the system for their own benefit (Mele et al., 2018), as well as facilitate co-destruction (Buhalis et al., 2020). Therefore, understanding these ecosystems may be imperative for regulators and policymakers when shaping them, "Without such understanding, the dark side of agency might not become evident, because the actors engaging in such behaviors fall outside conventional radars" (Mele et al., 2018, p. 536).

The perspective of service ecosystems emphasizes the complexity of simply defining a basic set of rules for determining what value is or is engaging, as it can differ immensely, especially in a service ecosystem. However, this perspective becomes fruitful when trying to view the reasons for why users (e.g. households) and stakeholders (e.g. waste management companies) in a certain system behave as they do. Understanding the environment beyond looking at a single instance, may provide richer reasons for why these engage and become a vital part of a system. For the context of recycling this becomes important as the perspective encompasses a wider set of players that can influence how recycling occurs and how it can be improved.

2.3. Synthesizing engagement in SDL for recycling

Participating in recycling activities requires the investment of one's time, cognitive, emotional or other types of resources, which is similar to the concept of engagement. Engagement within the theory of SD-induced logic has been termed as customer- or consumer engagement (Behnam et al., 2021) and has been increasingly employed in various domains (Chandler & Lusch, 2015). Recent special issues emphasize various takes on this engagement, as well as the need for more research on it in multi-actor service systems or technological environments (Hollebeek et al., 2019a; Sharma et al., 2020), which is in line with a system such as a recycling house and the actors required for an installment and ongoing use. The autonym for engagement, more specifically disengagement, its implication in recycling behavior has been mentioned in few studies concerning moral disengagement and how some users can deactivate moral self-regulation, hence not suffering as much. Reasons may be such as denial of responsibility and displacement (Wu et al., 2021), or self-told reasons for why users may not engage in sustainable behaviors, such as "not my responsibility", "it could be worse", "it is not that bad", "I would like to, BUT", "I'm doing more good than bad" (Juvan & Dolnicar, 2014). Rather than conceptualizing disengagement, SDL, employs the perspective of co-destruction, namely how stakeholders and users may rather find themselves in a situation where instead of creating value together, they destroy it as to mis-aligned- communication, practices or unexpected behavior (Li & Tuunanen, 2020).

For the purpose of studying how 'positive' engagement unfolds in a larger system, such as in a recycling system, (Hollebeek et al., 2019b) perspective on customer engagement is employed, which is both in line with the perspective of SDL and service ecosystems. They developed an integrative framework for bridging the mentioned logics and theories while at the same time showing engagements antecedents and consequences in the context of SDL. Furthermore, in the context of recycling this study will use less focus on the 'customer' and more on the concept per se to discuss the essence of engagement.

Customer engagement is portrayed as the nucleus, defined as "A customer's motivationally driven, volitional investment of focal operant resources (including cognitive, emotional, behavioral and social knowledge and skills), and operand resources (e.g., equipment) into brand interactions in service systems" (Hollebeek et al., 2019b, p. 167). Three main antecedents are constituting this engagement (E), (1) customer knowledge sharing (KS), (2) customer learning (L), and (3) customer resource integration (RI). In the crossover between these, three outcomes are represented. These are (4) Customer individual operant resource development (IND), (5) Customer interpersonal operant resource development (INTER) and (6) customer co-creation (*Cc*). However, it must be noted that these mentioned can coincide with each other and classifying empirical data may overlap. In the context of service ecosystems, it provides more flexibility as to the number of perspectives. While it is emphasized that the antecedences are similar or are contextual, the framework provides a yet elusive, at the same time a theoretical foundation for exploring engagement with different elements in recycling contexts.

To adjust these theoretical notions for a public context, these will be

less focused on the customer, but rather recognize the user and different stakeholders with potentially other logics than those in the private sector (Halldorsson et al., 2019; Petrescu, 2019). These are explained and synthesized to recycling contexts in Table 1.

3. Method and project background

The project was based on previous research regarding recycling in dense city centers (Sörme et al., 2019). The blueprint for the recycling house was developed by two bachelor students of building technology and an architect (Harrysson & Strandman, 2018) proposing a design with mirrored surfaces that would suit any environment, having no back side and reflecting the person that is recycling. The bins for six waste fractions (paper packaging, plastic packaging, metal packaging,

Table 1
Mechanisms of engagement in a recycling context.

Explanation of mechanisms	→	Recycling context
In line with Hollebeek et al. (2019b) knowledge sharing denotes how consumers seek to create value through sharing knowledge.	KS	In the context of recycling waste, it has been shown that a sense of local community and shared norms has also been shown as an important factor for improved recycling rates. Such norms are partly built by interaction and learning in a community (Tong et al., 2018).
Hollebeek et al. (2019b) discuss customer learning as an iterative process that confers the processing of information.	L	The ability to learn can be via various resources, such as learning videos and instructions. Learning in the context of recycling has shown this.
Customer resource integration is the integration, application or assimilation of different types of resources into various processes. According to Hollebeek et al. (2019b) this depends on the individual (e.g. personality), situation (e.g. stressful) and social (e.g. weak ties).	RI	In the context of recycling waste, customer resource integration may denote how households use time, knowledge, own-made household waste processing systems, transport and other means of co-creating value with the society, municipality, environment or/and other actors. One example is how housing companies function as a boundary spanner between households and waste management (Ordoñez et al., 2015).
Hollebeek et al. (2019b) describe are the customer individual operant resource development - crossover represents the perceived modification, such as growth in one's own knowledge or skills through interactions.	IND	In a recycling context, it becomes imperative for individuals and different stakeholders to perceive growth or some kind of development, regardless if it is feeling to be knowledgeable about the environment, gaining new contacts or discovering new methods of improving the segregation of waste.
Customer interpersonal operant resource development is the perceived change when, and from, receiving and sending knowledge and skills (e.g. information). This is occurring in-between sharing knowledge and learning.	INTER	In a recycling context, perceived change is the things the household or stakeholder perceive by collaboration and communication. For households it could be the impact one's recycling has when sharing information (e.g. data), for stakeholders it may be decreased waste transported when in collaboration with other stakeholders.
Customer co-creation is the perceived value from interacting, collaborating or other activities with stakeholders.	Cc	In a recycling context, this is how households or/and stakeholders collaborate or communicate and the benefits they perceive from this when being part of a recycling process activity.
The central or comprised element of all the above mentioned.	E	The central or comprised element of all the above mentioned.

newspapers and two types of glass) were situated in the five towers of the house accessible by hatches on the outside. The house was built and tested in the period 2021–2022 in collaboration with several stakeholders. Fifteen households agreed to recycle for six months using the new house. These were selected from a 15-story building providing a sample of participants from different floors and apartment sizes. Before using the house they sorted their waste in bins situated in a crowded room on the bottom floor which had issues with incorrect sorting and large objects blocking the way.

To answer the research questions, we used a case study with a thematic network analysis. During the project that spanned over two years, meetings and interviews were held with stakeholders and participants, in addition to field notes, informal talks, as well as a structured workshop with all the stakeholders. Employing Table 1, general theme-based questions were used that concerned, how and why knowledge is needed and shared, how and when learning is occurring, how and what resources (time, space, money and bodily energy) are used, as well as what impact one has (feels) on others and the outcomes of recycling. How and what collaboration and engagement is occurring with others and the stakeholders were also used.

During the project, the workshop discussed various aspects of the recycling house and the project where among other topics, perspectives of motivation, collaboration and the recycling house were discussed. Interviews were held with the fifteen households in the project as well as with relevant stakeholders (see Table 2). In regards to the purpose of this study, we decided to end data gathering when it reached saturation in the number of arguments and ideas. The interviews were recorded, transcribed and organized by employing a thematic network analysis (Attride-Stirling, 2001), a variant of thematic analysis which identifies patterns in the collected data. It is a hermeneutic procedure, with an explicit focus on organizing the collected qualitative data to an interpretation gestalt (Attride-Stirling, 2001). Also scrutinized our collected data through a dyadic, i.e., project-centric, lens, thus determining how we have outlined our stakeholder network (Solaimani et al., 2013) and our thematic network analysis (Attride-Stirling, 2001) (see Fig. 1).

Our approach focuses on dyadic relationships between individual stakeholder groups and a focal entity, the recycling house, at the center of our analysis (Rowley, 1997). Therefore, our analysis concentrates on the straight dyadic relationships between the recycling house and its stakeholders. The dyadic approach assumes that the focal points entity that assembles connects and constructs the various stakeholders' collaborations. In contrast, a network-based approach treats and credits the stakeholders' relations, interdependencies, and ongoing interactions as

Table 2
Stakeholders and Households in the service ecosystem Table 3. Analytical steps.

|	Stakeholders and Households in the service ecosystem		
Participants	**Stakeholder**	**Role**	**Type of data collection**
2	Waste management company	Business developer & waste collector	Interview and workshop
2	Municipal housing company	Project leader & landlord	Interview and workshop
1	Architect	Architect	Interview and workshop
1	Project leader	Project leader for building the recycling house	Interview and workshop
15	Households	Households within close proximity of the recycling house	Interviews
12	Mixed	Participants from organizations mentioned above as well the packaging association and researchers	Workshop
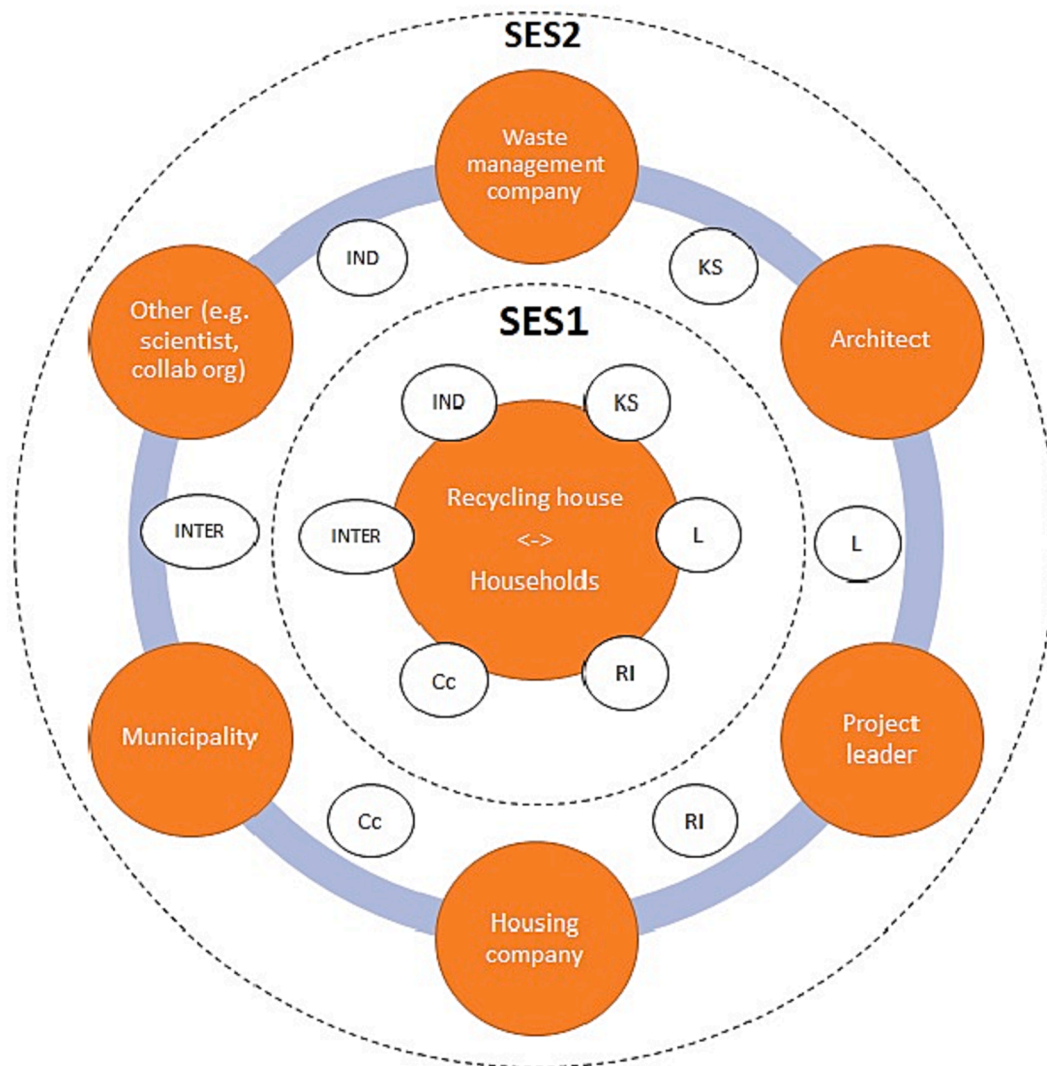
Fig. 1. The service ecosystem and the two levels.

foundations and facilitators for an encircled entity to emerge (Reed & Curzon, 2015; Zarghami & Dumrak, 2020). We processed our data through the *Six Analytical Steps* of thematic network analysis described by Attride-Stirling (2001).

We emanated from engagement in order to categorize the household/stakeholder findings (see Appendix 2). Following the results, we abstracted premature themes which we iterated into more evolved themes (Step 2). In constructing the thematic dyadic network findings were clustered overlapping each other in terms of context, meaning and themes (Step 3). The procedure resulted in a visual view encompassing themes in appropriate context and congruent to the research questions (see Fig. 2), which paved the way for a more profound analysis stage. Hence, we commenced to depict and, at the same time, survey our network for possible thematic assemblage we had overlooked (Step 4) giving both detailed at the same time holistic perspectives regarding engagement in the service ecosystem (Step 5). As Attride-Stirling (2001) puts a strong emphasis on that the thematic networks are "only a tool in analysis, not the analysis itself" (p.389), we interpret our networks' patterns through our constructed theoretical lens of engagement the service ecosystem (Step 6).

To organize the findings and the perspectives in the service ecosystem (SES), two service ecosystem levels were developed. As discussed, the focal point which was the interaction between users (households) and the recycling house (SES1). The second included the surrounding stakeholders and their perceptions, both the relationship with each other (SES2), but also their perspectives on SES1. To answer the research questions, the thematic network analysis provided overarching themes (step 4–6, Table 2), comprising necessary topics to comprehend and understand the engagement in the recycling service ecosystem and the mechanisms is in play. The specific answers for the research questions were found in both interviews and workshops (see appendix 1). Findings from these are comprised in the table of which have been scrutinized and discussed in the forthcoming section.

Following Table 1 and 3, coding and analysis, as well as Appendix 2, four themes were discovered encompassing the engagement within a service ecosystem in a recycling context. These are illustrated in Fig. 2 and will be elaborated in the findings and discussion. The citations [C^{n}n] may be found in the Appendix 1, and are some examples of many used for highlighting the forthcoming discussion.

4. Findings and discussion

A conceptual model has been developed from Fig. 2, including the four main themes, as well as the resulting main points. For practice, these findings can aid the understanding of complexity in recycling systems with several stakeholders involved. The themes have been illustrated showing the constitution of different engagement mechanisms, as well as that engagement is conceptually dynamic and
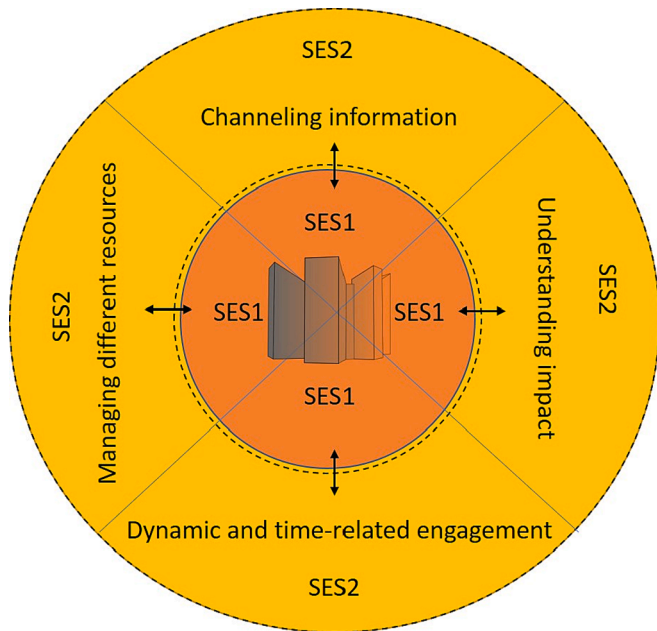
Fig. 2. Themes and levels in the service ecosystem with the recycling house shown in the middle.

Table 3
Analytical steps.

Step 1 Appendix 2	Step 2	Step 3	Step 4 – 6 (Themes)
KS L	Spreading knowledge. Learning from others in the service ecosystem. Communication and information.	Who shares information. Spread of information. Way of gathering information and learning. The value of information. Passing and active information seeking. The timeframe of learning. Functional and hedonic information.	Channeling information
RI	Operant and operand resources, resources needed or used in the service ecosystem.	Cognitive/emotional resources, bodily energy (e.g. walking long distances, carrying heavy objects), time available, space, money and optimization.	Managing different resources
INTER IND	Impacting others, impacted by others, perceiving outcomes and growth.	Actual impact vs perceived impact, Impact moderated with value-resonance. Elements that impact refer to situations, stakeholders, information, time, sense of responsibility and observing others, Social responsibility, community, power and impact.	Understanding impact
Cc E	(Overlaps all), collaboration, involvement, values.	Engaging ecosystem, multidimensional, time-related and dynamic, function and hedonic, dependencies, continuation, consequences of disengagement.	Dynamic and time-related engagement

contextual by not having evident boundaries. In the coming section these four themes will be exemplified and discussed in the following order: channeling information, managing different resources, understanding impact and dynamic and time-related management.

4.1. Channeling information

Similar to the discussions of Flint et al. (2014), the theme encompasses several central aspects in terms flow, namely of how information is sent out, or received and learned. Also central is how this occurs in the service ecosystem. In regards to the households and their relation to the recycling sorting house (SES1), information is shared mostly informally, with family and friends through dialogues. It seldom occurs with other users (neighbors) or in formal contexts [C¹1-2], which contrastingly may be important for recycling outcomes (Pei, 2019). Household users have learnt the functional properties of segregating waste from home, parents or work. Although limited scope, the discourse facilitates knowledge sharing that spreads, similar to a chain reaction. Situations that facilitates this informal dispersal of information, is during actual waste segregation, or in relation to it [C¹3-5].

As the information regarding recycling may be politically loaded, value driven and emotional, thus may be sensitive and cause different reactions depending on the congruency between information sender and receiver. This type of issue illustrates the importance of adjusting the message. For instance, more affluent neighborhoods may have time and resources to pay attention to environmental benefits, hence more susceptible to these types of messages, while other areas may perceive functional aspects as more important. Knowingly, the household users, emphasizes rather spontaneous and passive ways of consuming information. However, it becomes crucial that the service ecosystem can provide information on-demand or near the points of use (e.g. web or close to the facility such as on the hatches) [C¹6-7].

The content of information is signified as containing several layers of functional and hedonic type of information and attitudes are similar to experiential and instrumental attitudes (Wan et al., 2017). For instance, from the functional and detailed instructions on waste segregation, to more time-related type of information, such as the processing of waste, or future visions of a sustainable society. The waste processing and the outcomes of waste segregation facilitates the intrinsic value for them to learn about sorting waste [C¹8-9]. The type of information desired varies and goes along the spectrum from details, such as how to sort specific type of waste, to what exact benefits do one's waste segregation do, for the environment, for the society and for the world.

The stakeholders emphasize sharing knowledge as a facilitator for sustaining the project (permissions, laws, designs, operative tasks) and that information overlaps different stakeholders in the service ecosystem. Knowledge sharing becomes especially intensive during the start of the project, while having SES1 in mind. How information and knowledge is spread/shared diverges into two streams: (1) knowledge shared to other stakeholders (2) users to understand the effects of recycling.

The intensity or amount of information or knowledge shared is argued to be the number of visits with different stakeholders. The desire of receiving information and knowledge is frequently based on the outcome of SES1 where different methods of data collection and evaluation are conducted, including ongoing feedback [C¹10-11]. Hence stakeholders signify that learning is something occurring in the future, rather than now. Problematization during the project is a part of learning [C¹12-14] and is linked to how stakeholders in the service ecosystem complements each other.

Information and knowledge are portrayed similarly to competence, access and resources. And is similar in terms of what is communicated to SES1, either functional or more hedonic aspects. Stakeholders recognize the complexity and that some users (households) have more or less knowledge.

4.2. Managing different resources

Users (in SES1) revealed resources as cognitive resources, bodily energy, time, space and money similar to past research (Barr, 2007; Dahlén & Lagerkvist, 2010; Hornik et al., 1995; Reid et al., 1976). These are interlinked with each other on different levels throughout the service ecosystem.

In regards to cognitive resources, such as how much users have to reason and think (cognitive load) (Lieder et al., 2018; Plass et al., 2010) when segregating waste, it is not perceived as an issue. It becomes evident that the aspects of habit, or "automatic" or "every-day activity" ease the mental energy spent [$C^2$1-2]. Hence, habit minimizes cognitive and behavioral resources needed. Following this logic, if new habits are to be established, it may require additional effort and stakeholder interventions to change habits. This explains the difficulty of learning new systems of recycling such as for those who are new to the Swedish context in this case.

In regards to time and space, it becomes important to have space in-house, especially in smaller apartments were waste bins take up room and is not perceived as visually appealing. One argument is emphasized that space, as in bigger apartments, may correlate with the amount of correct waste segregation [$C^2$3-5]. Space in terms of distance, is emphasized in the optimal distance level between home and waste room. Too close is not preferred, as to the smell and the negative associations regarding waste, too far complicates the logistics.

Emotions varies and occurs on different levels (see Meneses, 2010). For instance, some expresses irritation when other users do not follow regulations and waste categorization procedures or the sensory aspects of the room (smell or visual unorder). Other examples are feeling down, questions of where waste ends up or the well-known environmental concerns, while positive are connected to the feeling of contributing to something positive, being part of something greater. These outcomes correspond to how moral disengagement (Juvan & Dolnicar, 2014) may have a role in shaping reasons for justification, such as "others do not do it". A sense of order is also discussed when segregating waste which is linked to accomplishing something [$C^2$6-7].

The amount of effort required to use the body to segregate waste, is mainly emphasized as small efforts, such as opening the door with one hand free, washing hands, or that bad weather discourages visiting the waste room and those that are use related.

Similar to SES1 and research (Barr, 2007; Dahlén & Lagerkvist, 2010; Hornik et al., 1995; Reid et al., 1976), stakeholders (SES2) discuss, space, money and time as resources [$C^2$8]. Smaller and independent stakeholders emphasize resources as time, knowledge and money, while larger organizations, emphasize the streamlining of existing resources. Resources includes a discourse of optimization, or an optimal level of resource spending, such as how frequently collection is made or how much time is spent on the operational activities [$C^2$9]. They are involved in the ongoing evaluation of resource spending and is monitored with a variety of technological solutions and technical systems. As such, optimization is also a discussion of efficiency, which is facilitated by tight collaboration and sharing knowledge including the end user (see Ordoñez et al., 2015) [$C^2$10-11]. The various systems in which stakeholders operate (e.g. machines, employees) are influencing the management actions and the spending of resources. How SES2 sees SES1 motivation and resource-spending is argued to be extrinsic factors, such as economic incentives, gain vs loss, or resources in terms of space. Some emphasize the importance of users saving resources, provide feedback, money or time it takes for users to segregate. This is argued to aid the little extra step to augment appropriate waste segregation. Some stakeholders mention that the earlier waste segregation is learned in life the cheaper the long-term investments will become.

4.3. Understanding impact

The possibility to impact, more importantly, the belief of making an impact (that has an effect on the environment, or that waste taken appropriately care of further on in the recycling process) may have positive effects on waste segregation (Halvorsen, 2012). This is revealed in the SES1 and the theme found. Findings reveal that users both impact and become impacted by various elements in the service ecosystem. Elements that impact refer to situations, stakeholders, information, time, sense of responsibility and observing others. This also opens up for a more engaging waste management approach such as a gamified recycling system (Ertz et al., 2021; Helmefalk & Rosenlund, 2019).

Users emphasize that their ability to impact others by sharing knowledge is only viable when the counter part is willing to listen [$C^3$1-2]. This is similar to theories of self-congruency or and how people with similar views may prefer information with similar views (Confente et al., 2020). To overcome this, an environment of inclusion and openness, may stimulate discussion and in the end waste segregation. They seldom meet neighbors and the direct impact on them is non-existing [$C^3$3-4]. Many emphasize that the ability to impact others is mainly family and friends which are long term and in-depth relations. Other than that, users do not feel an overwhelming impact, regardless if it is the impact on environment or the general people. Instead of making impact on others through dialogue, users exemplify that the act, or sorting correctly, may indirectly impacting others through setting good examples [$C^3$5-6]. Therefore, inclusion and openness by engaging with the neighbors, opens up for a dialogue leading to social belongingness which can improve recycling behavior.

Stakeholders argue that informing users about the long-term effects on the environment, as well as what happens with the waste may justify users with a sense of impact, hence improve waste segregation. Some users themselves argue that knowledge of behavior is argued to have an impact, such as being more engaged the more they know (e.g. Cheng & Wu, 2015). Morals and understanding the consequences when not segregating waste is efficient. [$C^3$7-8]. This is similar to what stakeholders' reason can be important to engage users, such as creating a sense of responsibility in a community (SES1). It seems that there is a distinction between on what level they can impact both timewise and how.

In SEC2, stakeholders contemplate on various goals for participating in the project, where some are interested by the outcome's impact from the project which is linked to behavioral data, but also general curiosity and excitement by participating [$C^3$9-12]. They argue the relevance of their specific niche to contributing to the project. While some stakeholders are interested in whether it is possible to generalize the findings from the project for future impact, other highlight the sense of belonging and that communication among stakeholders is a way of making impact on SEC1. While communication is important for making impact in SEC2, the relation of power is also emphasized, such as collaboration that makes an impact on some stakeholders but not all. It illustrates the nonsymmetrical relationships in the service ecosystem. Stakeholders highlight the time-related process during the project and that earlier someone is involved in a project, the more impact they will have.

4.4. Dynamic and time-related engagement

Engagement and co-creation of value is essentially revealed as the collaboration with someone or something to achieve a desired goal. Engagement is related to the meaning or purpose of the waste activity. Value, meaning or purpose of recycling, signifying there are different layers of value (e.g. saving space at home, saving food, environment) similar to the reasons for (not) recycling (Chu & Chiu, 2003; Howenstine, 1993). Moreover, co-creating value is also creating opportunities for each other (to recycle, to collaborate, to provide feedback) [$C^4$1-4]. Engagement and perceived value are hence multidimensional among other concepts and becomes imbued by how close or far in time it is conferred. Utilitarian values are mentioned when discussing the co-creation of the ongoing waste segregation, but hedonic ones when declaring the long-term reason for segregating waste (e.g. important

with distance, time efficiency, time of collection, clean functional space) but that when discussing the effects of it long term, emotional attributes are emphasized [C⁴5-8].

Regarding the perception of SEC1, the closest stakeholder in SEC2 that engages in co-creation of value, are the landlord and waste management company. The users emphasize external stakeholders going beyond SEC2 that are engaged in recycling are politicians, activists, home owner's association, environmental organizations, WHO and many more, which is reveals that some stakeholders that are within SEC2, are still unnoticed by users. Regarding who is engaged, there is no consensus among users in the SEC1, for instance, older users mention that younger ones are not as engaged, while younger answer the opposite [C⁴9-10]. These aspects of 'blame' may be linked to theories of co-destruction and moral disengagement may play a role for understanding these differences better (see Mele et al., 2018; Wu et al., 2021).

Stakeholders in SEC2, pinpoint that both co-creation of value is strictly dependent on the collaboration among users and stakeholders in the service ecosystem. Many of these dependencies are unwritten contracts such as users keeping clean after them. Both the users and stakeholders are required to fulfill the purpose of the house. The use is not in isolation. The unwritten contracts are compared to as social responsibility [C⁴11-13]. It is when all do their part, the system works, hence becomes engaging for all parties. On a similar note, stakeholders emphasize on social belongingness in order to work together to increase engagement. Solutions that have been emphasized to overcome these issues are feedback, social pressure and local relevance, also discussed in see Knickmeyer (2020). Other solutions are mentioned as creating a positive narrative may increase engagement (fight for a better earth). The collective or time-related effects of being many is what some users

deem as important [C⁴14-15].

Similar to past literature (Behnam et al., 2021; Frempong et al., 2020; Hollebeek et al., 2019b) and previous themes, both users and stakeholders agree that knowledge is linked to the level co-creation and engagement in recycling. Stakeholders emphasize that the level of knowledge varies among users, which may explain why engagement is also irregular among the population. A solution is not to take knowledge for granted but to repeatedly share knowledge. Stakeholders highlight the dangers of 'relaxation', namely that it is difficult to maintain user engagement. It is an ongoing issue and that it is not sufficient to implement strategies and projects, without maintaining them [C⁴16-18]. Engagement is not only portrayed in terms of investing resources or actual behavior, but also the consequences of *not* engaging, acting, by passivism. (e.g. consequences for the environment, plastics in nature, how animals are affected). This is often overlooked, when conferring waste, especially the *consequences of disengagement*.

5. Concluding remarks and implications

To understand engagement within a service ecosystem in a recycling context, and how stakeholders, with the household as a focal point, engage with each other; findings reveal that households and surrounding stakeholders engage in recycling through *channeling information, managing different resources, understanding impact and by dynamic and time-related engagement*. Findings have been conceptualized with the conclusions from above (Fig. 3).

Firstly, the service ecosystem contains several layers of goals, desires and outcomes (value) depending on the positioning in the service ecosystem. Information and learning are hence spread throughout the
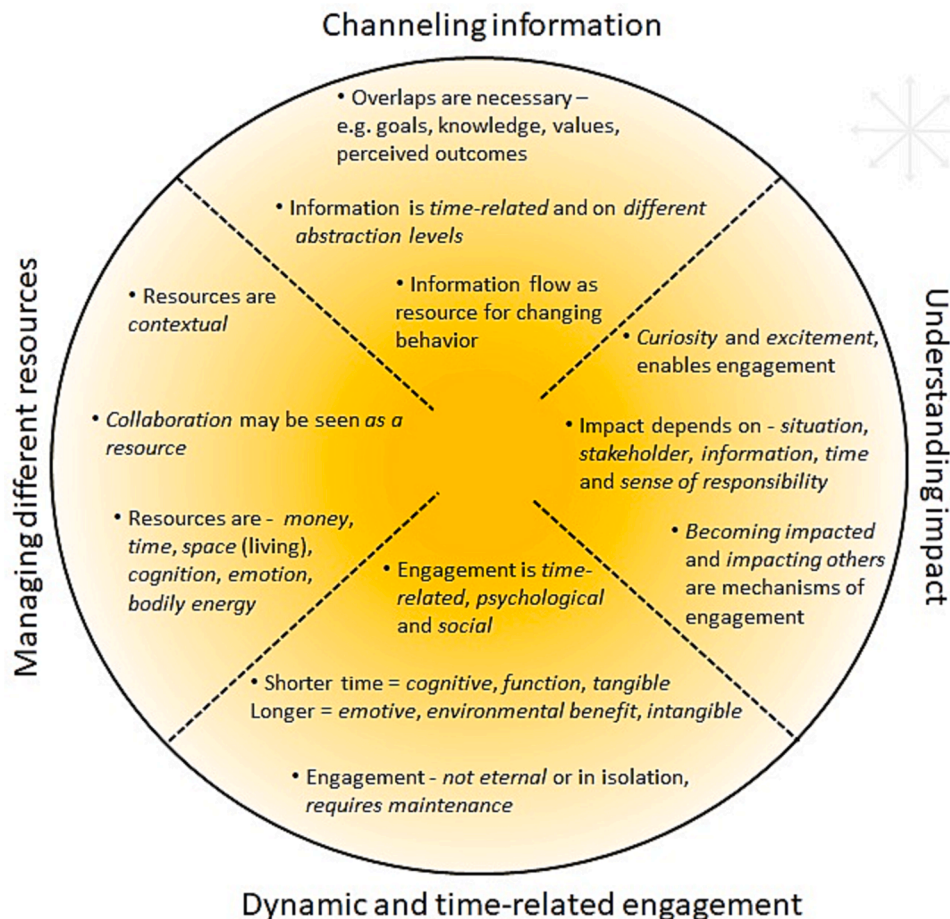

Fig. 3. Understanding the mechanisms of engagement in the service ecosystem.

ecosystem, overlapping goals, desires and perceived outcomes. Information is time-related, and varies in the level of abstraction linked to functional practicalities, or more longstanding, such as long-term effects from various activities. For households it may be the perceived benefit for the environment, for the stakeholders it may be knowledge that will be used in other contexts. Similar to Flint et al. (2014), the information flows through the service ecosystem and may be seen as a resource for change in behavior (e.g. sort correctly).

Secondly, resources are portrayed and emphasized differently depending where in the service ecosystem the stakeholder is. Resources that engage is everything from money, time, space, cognition, emotion, bodily energy to even encompass knowledge, collaboration and other stakeholders.

Thirdly, become impacted and making impact, and its relation to waste segregation in the service ecosystem is complex, constitutes several elements, such as situations, stakeholders, information, time, sense of responsibility and observing others. Encouraging communities where belongingness, information and dialogues may be created are suggested where it is lacking locally. Stakeholders perceive their relevance in terms of their specific knowledge, resources and perceived output, but reveals that their engagement is also founded on curiosity and excitement.

Lastly, engagement is facilitated on a time-related, psychological and social level. This is similar to Osborne et al. (2013) in that value in public contexts have different dimensions that need to be accounted for. We both confirmed (Hollebeek et al., 2019a; Sharma et al., 2020) and revealed that engagement is a multi-layered, complex and may be portrayed differently depending if aspect of time or abstractness is included. For instance, when practical and everyday tasks are conducted, small and detailed functional properties are of importance for engagement, such as saving (cognitive-bodily) resources when sorting waste, distance to bin, weight of waste and living space to sort waste. However, when considering hedonic and emotional aspects, visions of the future or non-tangible elements are emphasized as important for engagement.

5.1. Practical policy implications

There are several practical and policy implications from the study as the presented service perspective can be used as a new lens for waste management, recognizing the relation between all actors involved in waste management including the households. These recommendations are presented in the following list and discussed further below:

- Take time to understand the values and interests of stakeholders
- Social factors as these are important for engagement
- Give quick feedback about the impacts of recycling
- Promote a sense of community by further involving stakeholders and households in the recycling system

As it is easy to focus one actor's resources to the isolated activities, our findings show that shared to the nodes of one's project, the intangible values are shared more often than first assumed.

Understanding the network and potential those that will get affected by one's activities may provide clearer guidance on what activities are actually meaningful to pursue. Not only are resources of value such as, people wanting to invest time and bodily energy, but also value, which can be similar or diverge in the ecosystem (Aal et al., 2016). By understanding why and how stakeholders engage in activities, it can be easier to find synergies.

Understanding interaction and benefit as value co-creation may provide a well needed perspective on how and what can be achieved. Understanding that engagement is an active process and that it is required for actually solving waste segregation without penalizing users, value co-creation may be viable in how practitioners and homeowners align needs, wants and long-term effects in the public sector. This is particularly true for waste management and recycling systems that are highly dependent on the engagement and knowledge of the citizens that use it, such as those that require instructions, information and effort to use. This highlights the importance of social factors when optimizing such systems for the user, rather than only technical approaches which are often easier to solve (Luo et al., 2020).

One recommendation, is that users and stakeholders recognize the importance on providing quick feedback, as people do need to comprehend and understand long term effects, the same thing signifies for knowing one does make an impact, regardless which stakeholder. As the study shows how they become impacted, but more importantly, how they perceive they make impact on other stakeholders and beyond.

While users and stakeholders recognize that recycling is interdependent and not an isolated entity, as for now, recycling activities in SES1 is perceived to be practically done in isolation. To overcome the mentioned and facilitate feeling of belongingness, community driven interventions are recommended in line with previous research about the importance of informal sectors (Tong et al., 2021). These can be information, narratives, feedback solutions, or other playful activities. The main task is to increase feeling of belongingness, showcasing and increasing the feeling of impact which is argued to impact waste segregation behavior.

To increase stakeholder engagement, it is central to involve them early on, having the ability to align their own goals, and making impact. While some stakeholders emphasized objective numbers such as number of visits or meetings as an indication for engagement, more research is needed to define how stakeholders, organization and managers perceive their engagement within the service ecosystem. Developing waste management with a stakeholder perspective provides rigor and long-term benefits for the system and in the long run society as a whole.

5.2. Limitation and future research

While the project provided rich and qualitative insights, less can be said for the generalizability for the type of study. As previously mentioned, the mechanisms of engagements overlap, are contextual and can depend on the stakeholders and the individual, hence fit qualitative research, especially when examining larger ecosystems. At the same time, these mechanisms have an immense opportunity to be quantified and examined furtherer. A first suggestion may be to examine how the discussed values and benefits align among stakeholders and households, and the impact it has on the level of household/stakeholder engagement on a local, national and global context. A way to proceed is to examine the context of this study and to compare how stakeholders and households perceive the mechanisms of engagement in other countries with other legal systems, cultures or processes. By already using the findings and Fig. 3, more and additional insights may be gained. Secondly, future research is recommended to examine the mechanisms that are not necessarily contributing to engagement, but rather the autonyms of it, namely how households and stakeholders justify their 'lack of engagement', disengagement or passivity in the explored ecosystems. Moreover, future research may be also to study the mechanisms in terms of identifying for why stakeholders may not share knowledge, learn or integrate resources with others. Lastly, as findings show that the perception of time and level of abstractness seem to have impact on engagement, future research is recommended to explore this avenue.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: [Joacim Rosenlund reports financial support was provided by The

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Data availability

Data has been partly provided in the appendices.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.wasman.2023.01.030.

References

Aal, K., Di Pietro, L., Edvardsson, B., Renzi, M.F., Mugion, R.G., 2016. Innovation in service ecosystems: an empirical study of the integration of values, brands, service systems and experience rooms. J. Serv. Manag.

Akaka, M.A., Vargo, S.L., 2015. Extending the context of service: from encounters to ecosystems. J. Serv. Mark.

Akaka, M.A., Vargo, S.L., Lusch, R.F., 2012. An exploration of networks in value cocreation: A service-ecosystems view. In *Special issue–Toward a better understanding of the role of value in markets and marketing*. Emerald Group Publishing Limited.

Alexander, M.J., Jaakkola, E., Hollebeek, L.D., 2018. Zooming out: actor engagement beyond the dyadic. J. Serv. Manag.

Attride-Stirling, J., 2001. Thematic networks: an analytic tool for qualitative research. Qual. Res. 1 (3), 385–405.

Barr, S., 2007. Factors influencing environmental attitudes and behaviors: A UK case study of household waste management. Environ. Behav. 39 (4), 435–473.

Behnam, M., Hollebeek, L.D., Clark, M.K., Farabi, R., 2021. Exploring customer engagement in the product vs. service context. J. Retail. Consum. Serv. 60, 102456.

Brandão, M., Lazarevic, D., Finnveden, G., 2020. Prospects for the circular economy and conclusions. In: Handbook of the Circular Economy. Edward Elgar Publishing, pp. 505–514.

Brodie, R.J., Hollebeek, L.D., Jurić, B., Ilić, A., 2011. Customer engagement: Conceptual domain, fundamental propositions, and implications for research. J. Serv. Res. 14 (3), 252–271.

Brodie, R.J., Fehrer, J.A., Jaakkola, E., Conduit, J., 2019. Actor engagement in networks: Defining the conceptual domain. J. Serv. Res. 22 (2), 173–188.

Buhalis, D., Andreu, L., Gnoth, J., 2020. The dark side of the sharing economy: balancing value co-creation and value co-destruction. Psychol. Mark. 37 (5), 689–704.

Callaway, S.K., Dobrzykowski, D.D., 2009. Service-oriented entrepreneurship: service-dominant logic in green design and healthcare. Serv. Sci. 1 (4), 225–240.

CGRi. (2022). *The Circularity Gap Report | Sweden 2022*. https://www.circularity-gap.world/sweden.

Chandler, J.D., Lusch, R.F., 2015. Service systems: a broadened framework and research agenda on value propositions, engagement, and service experience. J. Serv. Res. 18 (1), 6–22.

Cheng, T.-M., Wu, H.C., 2015. How do environmental knowledge, environmental sensitivity, and place attachment affect environmentally responsible behavior? An integrated approach for sustainable island tourism. J. Sustain. Tour. 23 (4), 557–576.

Chu, P.Y., Chiu, J.F., 2003. Factors influencing household waste recycling behavior: Test of an integrated model 1. J. Appl. Soc. Psychol. 33 (3), 604–626.

Confente, I., Scarpi, D., Russo, I., 2020. Marketing a new generation of bio-plastics products for a circular economy: The role of green self-identity, self-congruity, and perceived value. J. Bus. Res. 112, 431–439.

Dahlén, L., Lagerkvist, A., 2010. Evaluation of recycling programmes in household waste collection systems. Waste Manag. Res. 28 (7), 577–586.

Ertz, M., Favier, R., Robinot, É., Sun, S., 2021. To waste or not to waste? Empirical study of waste minimization behavior. Waste Manag. 131, 443–452.

FitzPatrick, M., Davey, J., Muller, L., Davey, H., 2013. Value-creating assets in tourism management: Applying marketing's service-dominant logic in the hotel industry. Tour. Manag. 36, 86–98.

Flint, D.J., Lusch, R.F., Vargo, S.L., 2014. The supply chain management of shopper marketing as viewed through a service ecosystem lens. Int. J. Phys. Distrib. Logist. Manag.

Frempong, J., Chai, J., Ampaw, E.M., Amofah, D.O., Ansong, K.W., 2020. The relationship among customer operant resources, online value co-creation and electronic-word-of-mouth in solid waste management marketing. J. Clean. Prod. 248, 119228.

Hage, O., Sandberg, K., Söderholm, P., Berglund, C., 2018. The regional heterogeneity of household recycling: A spatial-econometric analysis of Swedish plastic packing waste. Lett. Spat. Resour. Sci. 11 (3), 245–267.

Halldorsson, A., Vural, C.A., Wehner, J., 2019. Logistics service triad for household waste: consumers as co-producers of sustainability. Int. J. Phys. Distrib. Logist. Manag.

Halvorsen, B., 2012. Effects of norms and policy incentives on household recycling: An international comparison. Resour. Conserv. Recycl. 67, 18–26.

Hardyman, W., Daunt, K.L., Kitchener, M., 2015. Value co-creation through patient engagement in health care: a micro-level approach and research agenda. Public Manag. Rev. 17 (1), 90–107.

Harrysson, J., Strandman, J., 2018. Ökad återvinning med en ny design av miljöhus. In.

Helmefalk, M., Rosenlund, J., 2019. Make waste fun again! A gamification approach to recycling. In: Interactivity, Game Creation, Design, Learning, and Innovation. Springer, pp. 415–426.

Hollebeek, L.D., Sprott, D.E., Andreassen, T.W., Costley, C., Klaus, P., Kuppelwieser, V., Karahasanovic, A., Taguchi, T., Islam, J.U., Rather, R.A., 2019a. Customer engagement in evolving technological environments: synopsis and guiding propositions. Eur. J. Mark.

Hollebeek, L.D., Srivastava, R.K., Chen, T., 2019b. SD logic–informed customer engagement: integrative framework, revised fundamental propositions, and application to CRM. J. Acad. Mark. Sci. 47 (1), 161–185.

Hoornweg, D., & Bhada-Tata, P. (2012). What a waste: a global review of solid waste management.

Hornik, J., Cherian, J., Madansky, M., Narayana, C., 1995. Determinants of recycling behavior: A synthesis of research results. J. Socio-Econ. 24 (1), 105–127.

Howenstine, E., 1993. Market segmentation for recycling. Environ. Behav. 25 (1), 86–102.

Jaakkola, E., Alexander, M., 2014. The role of customer engagement behavior in value co-creation: a service system perspective. J. Serv. Res. 17 (3), 247–261.

Juvan, E., Dolnicar, S., 2014. The attitude–behaviour gap in sustainable tourism. Ann. Tour. Res. 48, 76–95.

Kaza, S., Yao, L., Bhada-Tata, P., Van Woerden, F., 2018. What a waste 2.0: a global snapshot of solid waste management to 2050. World Bank Publications.

Knickmeyer, D., 2020. Social factors influencing household waste separation: A literature review on good practices to improve the recycling performance of urban areas. J. Clean. Prod. 245, 118605.

Koskela-Huotari, K., Vargo, S.L., 2016. Institutions as resource context. J. Serv. Theory Pract.

Lacoste, S., 2016. Sustainable value co-creation in business networks. Ind. Mark. Manag. 52, 151–162.

Leeabai, N., Areeprasert, C., Khaobang, C., Viriyapanitchakij, N., Bussa, B., Dilinazi, D., Takahashi, F., 2021. The effects of color preference and noticeability of trash bins on waste collection performance and waste-sorting behaviors. Waste Manag. 121, 153–163.

Li, M., & Tuunanen, T. (2020). Actors' dynamic value co-creation and co-destruction behavior in service systems: A structured literature review.

Lieder, F., Griffiths, T. L., M Huys, Q. J., & Goodman, N. D. (2018). The anchoring bias reflects rational use of cognitive resources. Psychonomic Bull. Rev. 25(1), 322–349.

Liu, Y., Sun, C., Xia, B., Cui, C., Coffey, V., 2018. Impact of community engagement on public acceptance towards waste-to-energy incineration projects: Empirical evidence from China. Waste Manag. 76, 431–442.

Luo, H., Zhao, L., Zhang, Z., 2020. The impacts of social interaction-based factors on household waste-related behaviors. Waste Manag. 118, 270–280.

Malinauskaite, J., Jouhara, H., Czajczyńska, D., Stanchev, P., Katsou, E., Rostkowski, P., Thorne, R.J., Colon, J., Ponsá, S., Al-Mansour, F., 2017. Municipal solid waste management and waste-to-energy in the context of a circular economy and energy recycling in Europe. Energy 141, 2013–2044.

Mele, C., Nenonen, S., Pels, J., Storbacka, K., Nariswari, A., Kaartemo, V., 2018. Shaping service ecosystems: exploring the dark side of agency. J. Serv. Manag.

Meneses, G.D., 2010. Refuting fear in heuristics and in recycling promotion. J. Bus. Res. 63 (2), 104–110.

Michel, S., Brown, S.W., Gallan, A.S., 2008. An expanded and strategic view of discontinuous innovations: deploying a service-dominant logic. J. Acad. Mark. Sci. 36 (1), 54–66.

Mwanza, B.G., Mbohwa, C., Telukdarie, A., 2018. Levers influencing sustainable waste recovery at households level: a review. Procedia Manuf. 21, 615–622.

Ordoñez, I., Harder, R., Nikitas, A., Rahe, U., 2015. Waste sorting in apartments: integrating the perspective of the user. J. Clean. Prod. 106, 669–679.

Osborne, S.P., Radnor, Z., Nasi, G., 2013. A new theory for public service management? Toward a (public) service-dominant approach. Am. Rev. Public Adm. 43 (2), 135–158.

Oztekin, C., Teksöz, G., Pamuk, S., Sahin, E., Kilic, D.S., 2017. Gender perspective on the factors predicting recycling behavior: Implications from the theory of planned behavior. Waste Manag. 62, 290–302.

Pegels, A., Castañeda, J.L., Humphreys, C., Kötter, C., Negre, M., Weidner, C., Kutzner, F., 2022. Aligning recycling behaviors and the recycling system–Towards a full cycle of materials and behavioral methods. Waste Manag. 138, 1–7.

Pei, Z., 2019. Roles of neighborhood ties, community attachment and local identity in residents' household waste recycling intention. J. Clean. Prod. 241, 118217.

Petrescu, M., 2019. From marketing to public value: towards a theory of public service ecosystems. Public Manag. Rev. 21 (11), 1733–1752.

Pinna, R., De Simone, S., Cicotto, G., Malik, A., 2020. Beyond organisational support: Exploring the supportive role of co-workers and supervisors in a multi-actor service ecosystem. J. Bus. Res. 121, 524–534.

Plass, J. L., Moreno, R., & Brünken, R. (2010). Cognitive load theory.

Ragossnig, A.M., Schneider, D.R., 2019. Circular economy, recycling and end-of-waste In (Vol. 37, 109–111).

Reed, M., Curzon, R., 2015. Stakeholder mapping for the governance of biosecurity: a literature review. J. Integr. Environ. Sci. 12 (1), 15–38.

Reid, D.H., Luyben, P.D., Rawers, R.J., Bailey, J.S., 1976. Newspaper recycling behavior: The effects of prompting and proximity of containers. Environ. Behav. 8 (3), 471–482.

Rowley, T.J., 1997. Moving beyond dyadic ties: A network theory of stakeholder influences. Acad. Manag. Rev. 22 (4), 887–910.

Schröder, P., Vergragt, P., Brown, H.S., Dendler, L., Gorenflo, N., Matus, K., Quist, J., Rupprecht, C.D., Tukker, A., Wennersten, R., 2019. Advancing sustainable consumption and production in cities-A transdisciplinary research and stakeholder engagement framework to address consumption-based emissions and impacts. J. Clean. Prod. 213, 114–125.

Sezer, A.A., Bosch-Sijtsema, P., 2020. Actor-to-actor tensions influencing waste management in building refurbishment projects: a service ecosystem perspective. Int. J. Constr. Manag. 1–10.

Sharma, P., Jain, K., Kingshott, R.P., Ueno, A., 2020. Customer engagement and relationships in multi-actor service ecosystems. In: In, Vol. 121. Elsevier, pp. 487–494.

Shaw, G., Bailey, A., Williams, A., 2011. Aspects of service-dominant logic and its implications for tourism management: Examples from the hotel industry. Tour. Manag. 32 (2), 207–214.

Shrum, L., Lowrey, T.M., McCarty, J.A., 1994. Recycling as a marketing problem: A framework for strategy development. Psychol. Mark. 11 (4), 393–416.

Siltaloppi, J., Koskela-Huotari, K., Vargo, S.L., 2016. Institutional complexity as a driver for innovation in service ecosystems. Serv. Sci. 8 (3), 333–343.

Solaimani, S., Guldemond, N., Bouwman, H., 2013. Dynamic stakeholder interaction analysis: Innovative smart living design cases. Electron. Mark. 23 (4), 317–328.

Sorkun, M.F., 2018. How do social norms influence recycling behavior in a collectivistic society? A case study from Turkey. Waste Manag. 80, 359–370.

Sörme, L., Voxberg, E., Rosenlund, J., Jensen, S., Augustsson, A., 2019. Coloured plastic bags for Kerbside collection of waste from households—to improve waste Recycling. Recycling 4 (2), 20.

Stoeva, K., Alriksson, S., 2017. Influence of recycling programmes on waste separation behaviour. Waste Manag. 68, 732–741.

Swedish-Waste-Management-Association. (2016). *Vad slänger hushållen i soppåsen?* Avfall-Sverige. https://www.avfallsverige.se/kunskapsbanken/rapporter/rapportera/article/vad-slanger-hushallen-i-soppasen/.

Tong, Y.D., Huynh, T.D.X., Khong, T.D., 2021. Understanding the role of informal sector for sustainable development of municipal solid waste management system: A case study in Vietnam. Waste Manag. 124, 118–127.

Tong, X., Nikolic, I., Dijkhuizen, B., van den Hoven, M., Minderhoud, M., Wäckerlin, N., Wang, T., Tao, D., 2018. Behaviour change in post-consumer recycling: applying agent-based modelling in social experiment. J. Clean. Prod. 187, 1006–1013.

Vargo, S.L., Akaka, M.A., Vaughan, C.M., 2017. Conceptualizing value: a service-ecosystem view. J. Creat. Value 3 (2), 117–124.

Vargo, S.L., Koskela-Huotari, K., Vink, J., 2020. Service-dominant logic: foundations and applications. The Routledge handbook of service research insights and ideas 3–23.

Vargo, S.L., Lusch, R.F., 2004. The four service marketing myths: remnants of a goods-based, manufacturing model. J. Serv. Res. 6 (4), 324–335.

Vargo, S.L., Lusch, R.F., 2016. Institutions and axioms: an extension and update of service-dominant logic. J. Acad. Mark. Sci. 44 (1), 5–23.

Wan, C., Shen, G.Q., Choi, S., 2017. Experiential and instrumental attitudes: Interaction effect of attitude and subjective norm on recycling intention. J. Environ. Psychol. 50, 69–79.

Werner, K., Griese, K.-M., Hogg, J., 2017. Service dominant logic as a new fundamental framework for analyzing event sustainability: A case study from the German meetings industry. J. Conv. Event Tour.

Wu, J., Font, X., Liu, J., 2021. Tourists' pro-environmental behaviors: Moral obligation or disengagement? J. Travel Res. 60 (4), 735–748.

Zarghami, S. A., & Dumrak, J. (2020). Reimaging stakeholder analysis in project management: network theory and fuzzy logic applications. *Engineering, Construction and Architectural Management.*