To Connect Idle Capacity with Users - on Business and Digital Platform Aspects for Sharing Services

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***Abstract*— In this paper we look into the business and service platform settings for a number of sharing services interpreted in a broad sense. It includes offering and renting of unused resources, bike and car pools, car rental, co-working spaces, second hand, and recycling. The objective of the study is to identify and describe requirements and features for an open two sided service platform for sharing services. The data set includes more than 30 sharing economy services and initiatives in Sweden. Primary data is collected from around 20 persons representing cities, local communities, providers of sharing services, technology providers and start-ups. We have also interviewed a few users of sharing services, car pools, bike pools, and co-working spaces in order to get some insight about user experience.. The sharing service should typically consider temporary use of idle capacity, usage of a platform enabling sharing and transaction between any persons in an open setting. We consider sharing of both goods and services. The main findings and research contributions are: i) a more clear definition of sharing services using the model with closed/open sets of both users and resources (providers), ii) identification of key values of a sharing service platform (as compared to values of a product or a rental service), and iii) a list of key features to implement in sharing service platforms.**

Keywords — Sharing economy, Business models, Value proposition, Digital platforms

I. INTRODUCTION

Sharing of goods is an important concept when discussing circular economy and a more sustainably society. In this paper we will present some findings related to both business and platform settings for sharing services. The business of renting goods on a short term basis is totally different from buying and selling goods where the ownership is transferred and this has strong implications on service platforms. A multitude of initiatives and projects are emerging to investigate the sharing economy and other related "economies" in order to understand its key characteristics and potential benefits better. However, confusion still exists around the term "sharing economy". In this paper we start the discussion with a broad definition of sharing services including offering and renting of unused resources, bike and car pools, car rental, co-working spaces, second hand business and recycling. In the analysis we will narrow down the interpretation of "sharing" and focus on a service setting with an open platform where any provider of a resource and any user/renter of resources can connect to and make use of the service platform.

The platform aspects of sharing services and sharing economy have recently been highlighted by some researchers. The authors of [1] consider the sharing economy as an "umbrella construct". Based on an extensive literature review the authors "position the sharing economy as resting on three foundational cores: (1) Access economy, (2) Platform economy, and (3) Community-based economy." For the ongoing study, in this paper, it is interesting to follow their discussion on overlapping cores, especially the overlap of access and platform economies. Key aspects are here "sharing of underutilized assets (material resources or skills) to optimize their use" and "Intermediation of decentralized exchanges among peers through digital platforms"

A discussion of platforms for sharing services can be found in [3], the author proposes a model with four types of sharing platform business models. These include: "The operation and the long-term impacts of these platforms are shaped by both their market orientation (for-profit vs. non-profit) and market structure (peer-to-peer vs. business-to-peer).

The main objective of the study is to identify and describe requirements and features for an open two sided service platform for sharing services. The sharing service should typically consider temporary use of idle capacity, usage of a platform enabling sharing and transaction between any persons in an open setting. Some researchers claim that "true" sharing services only consider sharing of goods and in a C2C setting [2]. In this platform oriented study we relax the requirements and include sharing of both goods and services that can be offered in both B2B and C2C settings. However, we follow the more narrow definition of sharing in [2] and exclude e.g. second hand business, bike and care pools and also car rental.

The paper organized as follows. Section II contains related work with focus on digital platforms, sharing service platforms and business model aspects of the value proposition to end-users. Data collection, cases and analysis approach are briefly described in section III on Methodology. In section IV we present three types of analysis. First, we analyze the different overall business contexts of different services and map these onto generic platform types. Next we look into different forms of value to end-users and compare different types of values for products, rental and sharing services. Last, we present a high level description of features needed for two settings of service platforms, one for rental services and one sharing services. Conclusions are found in section V.

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II. RELATED WORK

A. General about digital platforms and services

The platform is a term used widespread in various disciplines with various meanings. In economics, it is sometimes called the multi-sided market [4], in manufacturing industry the term is coined as production platforms [5], and in information and communication systems it usually refers to technical solutions that support multiple actors to co-create service values [6]. Today, the platform forms the essential part of the ecosystem by taking advantage of digitization through value co-creation by turning the competitors and suppliers into partners [7]. Two sided sharing platform is discussed in [8] including elaboration on the pricing strategies and the openness of the platforms.

B. Sharing economy and platforms

Here we will refer to three different aspects of platforms and sharing economy; case studies on sharing in different sectors, about openness and features, and capabilities of sharing service platforms. Papers [9][10][11] all contributed to the case analysis of sharing economy where the main focus was on digital platform and its impact on revolutionize the interaction of the tourism industry and hotel and travel booking business. Others have done a similar case study on city transportation and red-herring in different countries [12].

Some recent research has discussed the openness of the digital sharing platforms [13]. Open modalities of collaborative digital platforms are discussed in [14]. Technical knowledge and data governance openness are not certain in many cases as the case study suggests that a majority of the platforms prevent collaboration with other actors in cross platform [15]. Furthermore, the knowledge sharing and data ownership among platform is pointed as an open research question of platform economy within sharing economy framework that requires attention [2]. Additionally, the analytical framework to conceptualize the sharing economy platform in terms of people, planet and prosperity is coined as an essential research problem to address. In [16] it is discussed how digital platform changes the traditional trust network of friends and family based close circle trust to trust on a platform centric network. In [17] definitions and drivers of sharing economy are discussed both from a macro-economic as well as from a micro-economic perspective. The authors proposed a framework for sharing economy including processes and service components of relevance for sharing service platforms, see Table I.

TABLE I. EXAMPLES OF PROCESSES IN FRAMEWORK FOR THE SHARING ECONOMY, FROM [17]

Consumer processes	Intermediary processes
Information	Listing
Access	Contracting
Payment	Billing
Usage	Fulfillment
Rating	Rating

An interesting proposal to classify service platforms is presented in [24] using well-known actors as examples; Google search, Paypal, Facebook, eBay, Intel, Apple Iphones and Microsoft. The authors describe a typology of service platforms with four quadrants; describing if the provider has control (or not) of customers and control (or not) of assets.

A recent review on digital platforms for sharing economy [18] provides a thorough view on sharing economy and digital platforms. The authors have reviewed many papers that cover sharing economy, business model and technical challenges. The one key finding of the review is that there are not many papers that have merged the economic, social and technological aspects. Also, the nature of sharing platform and its impact on socio-economic perspective is also not well studied. Another key contribution is the analysis and description of the roles and affordances of sharing economy platforms see Table II.

TABLE II. EXAMPLES OF FEATURES OF A SHARING ECONOMY MEDIATOR (FROM [18])

Features	Description
Generating flexibility	The provision of rapid, dynamic access. Resources, work, or labor can be accessed on-demand, and participants can contribute in different roles.
Match-Making	Participants are brought together based on their needs or what they can provide. The platform optimizes this process through algorithmic or digitally-supported filtering, evaluation, and searching.
Extending Reach	The depth of access provided by the platform, in terms of scale, distance, and heterogeneity of resources and peers. Participants can reach more resources, more distant resources, and resources which were previously inaccessible or idle.
Managing Transactions	The mediator handles the logistics of the transactions, either by holding currency, providing security, recordkeeping, or providing a workspace for the completion of a task.
Trust building	The mediator establishes a system of legitimacy, encouraging participants' confidence in each other, and in the process of mediation itself.
Facilitate collectivity	The mediator encourages and benefits from collective action. Participation in the sharing economy (SE) is entangled with larger social movements, the mediator builds off of the social capital of communities, neighborhoods, etc.

C. *Values and value propositions*

The value proposition for customers is usually not in the focus of the platform theory. Papers focus on higher level strategic issues for platform providers or in a B2B context, see e.g. a typical paper [19]. Platform theory literature is usually about a few core strategies related aspects like: network effects, pricing strategies, interchange fee, single- or multi-homing, coopetition or competition strategies.

However, there are some papers on platform theory where different types of values and value proposition are discussed. The value proposition concept is discussed, and different ways to categorize values and value propositions can be found for different applications like mobile banking [20], online banking and bill payments [21], and m-commerce for newspapers [23]. All these papers present different sets of values, examples are; efficiency, time saving, convenience, instant reaction, safety, location independence, ease of use. Most of these sets of values are similar to those relevant for sharing economy.

III. METHODOLOGY

A. *Data collection*

We have collected both primary and secondary data, the data set is more less the same as the one presented in [25]. It includes description of more than 30 services and initiatives within the area of sharing services, bike and car pools, car rental, co-working spaces, second hand and recycling, table III. Primary data is collected from around 20 persons representing cities, local communities, providers of sharing services, technology providers. In table III interviews were made with representatives for actors marked in bold letters. Questions were about these topics; "How do you offer your service?" and "What is included in the service platform?"

For this study we have also interviewed a few users of sharing services, car pools, bike pools and co-working spaces in order to get some insight about user experience.

TABLE III. CASES USED IN THE ANALYSIS (FROM [25])

Service	**Sharing economy**	**Second hand economy**	**Product service economy**	**On demand economy**
Klädoteket		X	X	
Ebay, Blocket.se		X		
Återbruket		X		
Fritidsbanken		X	X	
SunFleet, ZipCar			X	
Ubike,UCF, EU-bike			X	
Trakoja, GoTo10			X	
Hoffice	X			
Delbar, **Hygglo**	X			
Garageplatsen	X			
GrowGothenburg	X			
One roof two gen...	X			
samåkning.se	X			
Time village	X			X
Yepstr, Instajobs	X			X

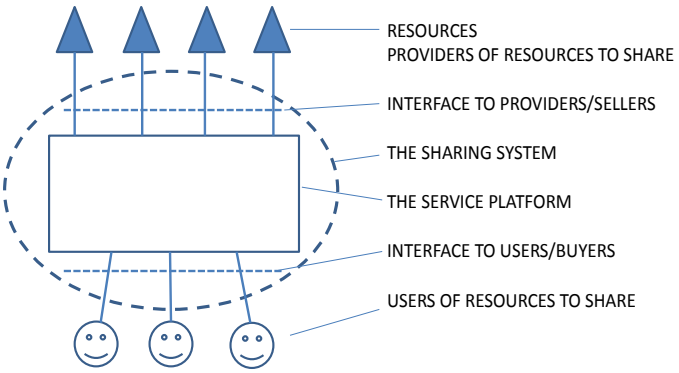

Fig. 1. The overall platform model with actors and interfaces to resources (those who rent out/sellers) and to users (buyers /renters).

B. *Analysis*

The analysis consists of three parts: First we analyze the different overall business contexts of different services and map these onto generic platform types. Here we make use of the framework proposed in [2] and [22] in order to structure different sharing and rental services. Key concepts here were temporary use and idle capacity. A key aspect in the analysis in the present paper is to look into the openness of the platform, i.e. if any resource can be offered and if any user can use the offered resource.

Next, we look into the values and value proposition associated with products, rental services and sharing services respectively. Here, we make use of the findings of papers presented in section II.C.

Finally, we present a high-level description of features needed for two settings of service platforms, one for rental services and one sharing services. This result is based on what can be found in existing platform literature, own test of webpages and on our interviews with providers of sharing services and/or digital platforms.

C. *A platform model*

Here we will introduce the simple graphical representation of the platform entities that we use in the analysis in the next section. The key concept is the service platform connecting resources (providers) and users. Related to the service platform are also the interfaces and the interaction with providers and users. Figure1 illustrates the general model with open interfaces on two sides. As will be seen in the analysis section two other forms may exist.

IV. ANALYSIS

In this section, we present an analysis in three steps. First, we analyze the different overall business contexts of different services and map these onto generic platform types. Next, we look into the interaction between different actors and the related information and values. Finally, we present a high-level description of features needed for two settings of service platforms, one for rental services and one sharing services.

A. *Mapping of services onto generic platform types*

In the analysis we use the framework proposed in [2] where, as mentioned above, the key concepts are temporary use of resources and idle capacity. The term "temporary use" is useful in order to distinguish second-hand shopping and business from the temporary sharing of goods. In the same way the term "idle capacity" highlights the fact that sharing is about a resource temporary made available whereas car rental, bike pools, carpools, co-working spaces etc all are about temporary use of a resource intended to be rented out.

If we adopt this reasoning with the observation of open and closed sets of users and resources, then we are able to make a four-field mapping of different services, see figure 2. An open set of users mean that anyone can use the service, e.g. car rental, an open bike pool or a sharing service. A closed set of users include cases like private carpools, sharing of common assets within an organization. An open set of resources includes typical sharing services abut also recycling. A closed set of resources mean that the resource pool is not open for contribution from external actors. Car rentals and bike pools are typical examples.

Hence, we can make a four field mapping of different services offering sharing, renting, second -hand or re-use type of services. As in [25] we claim that "true" sharing requires a two sided platform open for any offered resource and any user. According to this reasoning rental services and car/bike pools are "one sided", the resources are closed and exist within the service. When both the resources and users are within a closed community we can speak about a closed service.

B. *Exchange and values for sharing services*

In this subsection, we look into the specific values that can be identified for sharing services, and hence the corresponding features that need to be part of a service platform. As a starting point, we look the value proposition of an offered product or service. The value proposition is one of the key elements in commonly used business model definitions e.g. [26][27]. One way to describe the value proposition is: *What can the service (product) offer that is new and unique compared to what's available on the market today?*

To answer this we can make a list of different characteristics, for a product this can typically include quality (style, finish, safety, robustness, life time), performance and price. Also usability, ease of use and convenience are associated with a product but are also important for a service. Other aspects can be support, guarantees and maintenance services. The value proposition for a product is about the product itself, e.g. what it can do and what it looks like. Capabilities are about features, performance and safety. Quality is about reliability, robustness, life time but also support.

When you rent something from a classical renting service (a car, a bike, a flat) capabilities and quality may also be important. However, other aspects would be even more important, e.g. how big selection you can choose from, availability of items to rent, and the simplicity of the process to rent, pay, pick up and return the goods. For a renting service where individual share their resources the value proposition may be a little bit different.

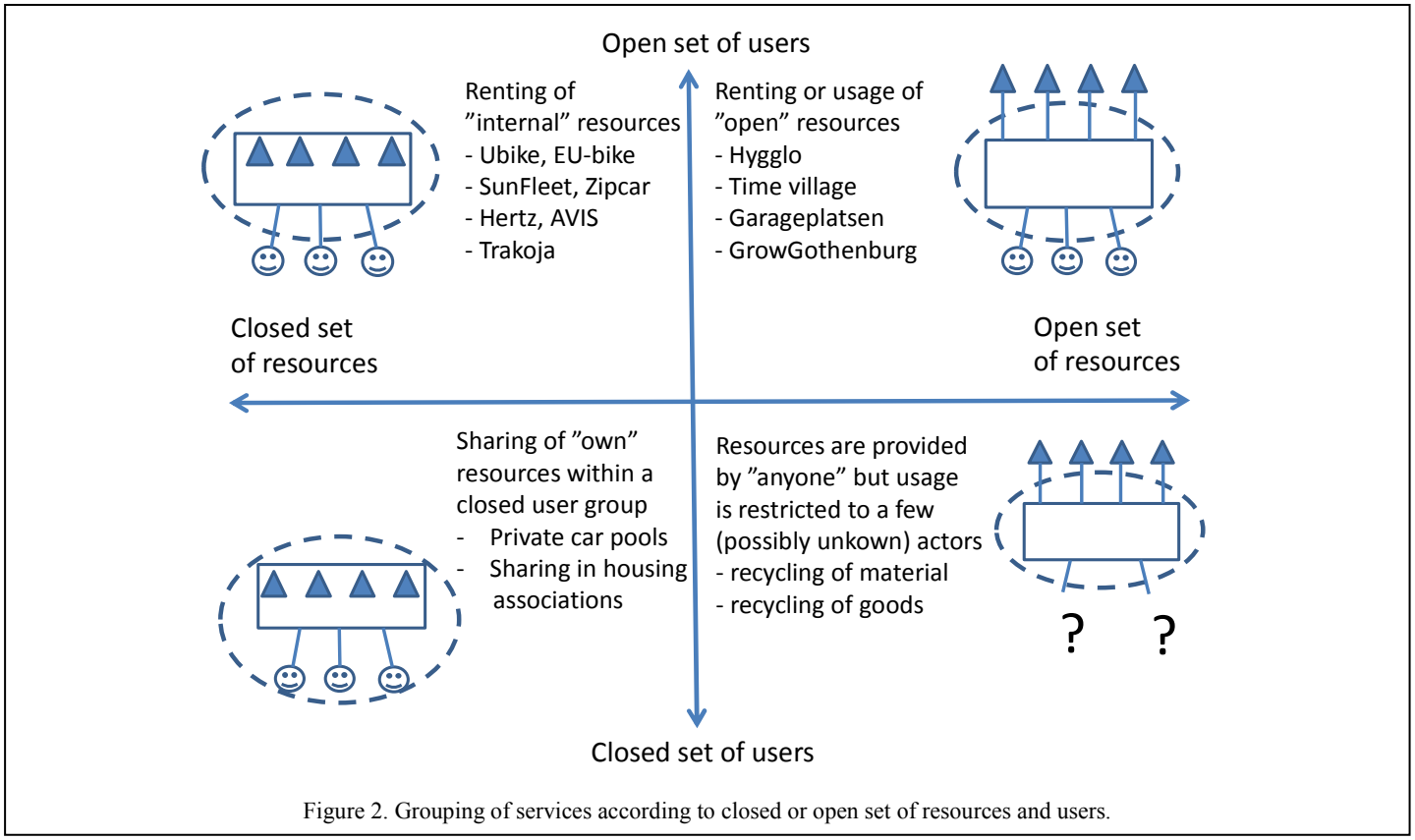

Figure 2. Grouping of services according to closed or open set of resources and users.

From a user perspective it is not only the item to rent that is important but also the availability and simplicity in the renting process. Also knowledge about whom to rent from is important. From the provider side it also important to know who will use his or hers car, bike or home. Hence, it may be that it is NOT the "rented resource" itself that is the only key factor of importance when making a decision. Simplicity, trust, trustworthiness and secure transactions may be equally important.

All this has implications on the design and features of the sharing or renting service. Besides features to ensure trust and security, e.g. rating and secure payments, you can include logistics, support to set up agreement and insurances.

C. Comparison of features in two service platforms

Based on existing platform literature, own test of webpages and on interviews with providers of sharing services we present a short list of features. In Table IV we can compare the sharing type of services with common rental services.

In short, we can say that a platform for sharing service is two-sided whereas a rental service platform can be called single-sided handling users only. A sharing service needs to connect idle capacity with needs, i.e. to connect potential providers with potential users. Hence, the service platform needs to interact with both providers and users. Moreover, this needs to be done both before and after the actual usage (rental) of the resource. We can also see that same features are related to the fact that you make business with strangers. Examples are rating, identification and payment that is delayed until the goods is returned.

TABLE IV. FEATURES OF SERVICE PLATFORMS FOR TWO SERVICES

Features of service platform	**Rental type of platform**	**Sharing type of platform**
Registration of user (renter)	X	X
Registration of provider	-	X
Announcing resource	X	X
Announcing needs	-	X
To search for resources	X	X
To book a resource	X	X
Payment and billing	X	X
Support to set up agreements	-	X
Insurance for user	Optional	Optional
Insurance for provider	-	Optional
Pick up and return service	Optional	Optional
Rating of provider	-	Optional
Rating of user	-	Optional

V. CONCLUSIONS

In this paper we look into the business and service platform settings for a number of sharing services. The objective is to identify and describe requirements and features for an open two sided service platform for sharing services. We start the discussion with a broad definition of sharing services including offering and renting of unused resources, bike and car pools, car rental, co-working spaces, second hand business and recycling. In the analysis we will narrow down the interpretation of "sharing" and focus on a service setting with an open platform where any provider of a resource and any user/renter of resources can connect to and make use of the service platform.

The main findings and contributions in the paper are: i) more clear definition of sharing services using the model with closed/open sets of both users and resources (providers) ii) identification of key values of a sharing service platform (as compared to values of a product or a rental service iii) linked to the two sided nature of the sharing service a list of proposed features to implement in sharing services platforms.

The sharing service should typically consider temporary use of idle capacity, usage of a platform enabling sharing and transactions between any persons in an open setting. Hence, commercial rental services, bike & car pools or co-ownership and resource sharing in closed communities cannot be included in open platform concepts with any provider and any user.

When it comes to values a key finding is that is not only the item/product to rent that is important but also the availability and simplicity in the renting process. Also knowledge about whom to rent from is important and also the provider wants to know who will use his or hers car, bike or home. Hence, it may it is not only the "rented resource" itself that is the key factor but also simplicity, trust and secure transactions may be equally important when making a decision.

Hence, the platform needs to provide features that support all the aspects that are of importance for renting and renting out goods. In order to illustrate this in our analysis we compare features for a rental service with a sharing service. For a rental service all resources are internal and known, no external resources can connect to the rental service. For a sharing service all providers of resources are unknown and make use of the platform in order to announce, offer and rent out their own resources. Finally we just want to highlight that the business of renting goods on a short term basis is totally different from buying and selling goods where the ownership is transferred. Hence, the need for trust and knowledge about the other party is lower compared to the renting case. For a common buying-selling transaction the parties agree on price and other conditions and then usually no more information is needed.

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