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Review

Barriers to access-based consumption in the circular transition: A systematic review

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ABSTRACT

Barriers to access-based consumption (ABC) have been extensively studied in different strands of literature. However, cumulative knowledge is not organized to date, and a comprehensive overview of barriers identified by empirical studies in diverse strands is lacking. Such a picture is essential for laying the ground for further change-oriented research and actual changes in practice. This article reports on the results of a systematic review on barriers to transitioning from ownership- to access-based consumption. The review focuses on the literature strands product-service systems, circular economy, sharing economy, and collaborative consumption. Through open and axial coding of 289 barriers reported in 45 empirical studies, we found 17 themes of barriers concerning consumers, business, and society. The analysis of the barriers reveals four significant insights important for the research and practitioner community: (1) the overall experience of ABC and trust mechanisms need to be better understood; (2) organizational aspects in traditional business need a system change; (3) regulation plays a fundamental role in making ABC work for business, society, and sustainability; and (4) sharing risks and experimentation for new learnings are necessary. These four major insights suggest that consumers need business and government to offer enabling conditions for ABC – spanning from raising awareness and understanding to improving user experience. Furthermore, businesses need governments to create the necessary structures to support ABC offerings – from decreasing risks to increasing incentives. How and which mechanisms can further facilitate circular behaviors is a salient topic for future investigations.

1. Introduction

For decades, researchers have warned that the continued growth of linear production and consumption patterns poses significant threats to a sustainable future (Turner, 2008). In response, a circular transition is the pursuit of an idealized system in which businesses profit from reducing, reusing, and recycling products and materials while decreasing the overall environmental impact (de Jesus and Mendonça, 2018). Among the strategies proposed to achieve circularity, reuse is one of the most resource-efficient ones (Laurenti et al., 2016; Sinha et al., 2016). Furthermore, reuse practices aim to extend products' lifetimes and intensify their use (Tunn et al., 2020). Three variations of reuse models can be distinguished (Tukker, 2015): (1) consumers buying used goods from other consumers; (2) consumers donating used goods to

other consumers, and (3) consumers acquiring services instead of consuming products – access-based consumption (ABC).

The development and widespread adoption of technology such as smartphones has spurred the creation of online marketplaces. These enable private consumers to rent their assets, such as housing, cars, and bikes, to other consumers (Ryu et al., 2018). The phenomenon of consumer-to-consumer (C2C) sharing assets mediated by the internet is a new alternative mode of consumption and business mindset (Frenken and Schor, 2017). In academia, sharing has infiltrated the traditional literature strand of product-service systems (PSS) as well as in the emerging strands circular economy (CE), sharing economy (SE), and collaborative consumption (CC) (Laurenti et al., 2019). Notably, the discussions and dominant perspectives in these strands differ, possibly due to their different origins and developments (Sopjani et al., 2020).

Abbreviations: ABC, Access Based Consumption; CE, Circular Economy; SE, Sharing Economy; PSS, Product Service Systems; CC, Collaborative Consumption; SLR, Systematic Literature Review; C2C, Consumer to Consumer; B2C, Business to Consumer.

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They have evolved both independently *and* partly intertwined to be of importance for understanding and developing access-based consumption. For example, while PSS and CE often have producers and business development in focus, particularly evident in CE literature, the user perspective and consumption as such are the main focus in SE and CC. One of the underlying ideas in both PSS and CE is that value in the market lies in functions rather than products (e.g. Tukker, 2004), which is essential when transitioning from ownership to access. In contrast to the heavy focus on producers, the discussions in SE and CC have a notably larger emphasis on the perspectives of individual consumers and ideological discussions on societal change (Curtis and Lehner, 2019; Trabucchi et al., 2019). However, on a conceptual level, many of the business models which originally characterized SE, CC and PSS have recently been absorbed and diffused by the wider literature on CE. While CE also does encompass a wide range of perspectives, it has recently been criticized for the heavy focus on economic factors for businesses (Kirchherr and van Santen, 2019) and neglect of existing knowledge (Corvellec et al., 2021).

Previous research in the aforementioned literature strands has examined the challenges that can hinder the implementation, function, and acceptance of ABC in diverse forms – e.g. circumstances (Binninger et al., 2015; Benoit et al., 2017), perceptions (Tunn et al., 2019), old habits (Hawlitschek et al., 2018), attitudes (Gullstrand Edbring et al., 2016), culture (Catulli et al., 2013), legislation (Karlsson et al., 2020) and other characteristics of the context of markets (Harding and Schenkel, 2017). Hindrances for implementation, function, and acceptance of ABC are often framed as ‘barriers’ and studied from the perspective of businesses, consumers, or broader societal transitions in these strands. In PSS, for example, consumer barriers have been the subject of study for more than 15 years (see Mont, 2004a). Despite extensive research, a structure and summary of the cumulative knowledge encompassing those four literature strands does not exist to our knowledge.

Consequently, this study aimed to compile and analyze barriers to the transition to ABC reported in the literature strands PSS, CE, SE, and CC. The purpose was to organize cumulative knowledge and provide a comprehensive picture of barriers already defined in extensive research. Such a synthesis of barriers is important for laying the ground for an improved understanding of obstacles. The study also contributes to identifying critical areas needing the development of mechanisms that can overcome persistent barriers.

2. Conceptual framework

Section 2.1 will introduce existing research on the transition from ownership to access, and the different literature streams scrutinized in this study. Previous systematic literature reviews will be discussed in Section 2.2, and lastly, the frame of reference and addressed gaps of this research will be introduced in Section 2.3.

2.1. From ownership to access: opportunities and challenges framed in PSS, CE, SE and CC

From a consumer perspective, ownership of goods has historically represented wealth and status. Consumer behavior research has long described how possessions are an extension of one's, characterizing identity and communicating an image to others, and giving a sense of belonging to a group (Chen, 2009). However, over-consumption has led to considerable environmental effects, from high toxic emissions (IPCC, 2021) to threats to resource availability (Prior et al., 2012). The duality between material affluence and the derived environmental pressure raises the question of maximizing the utility of materials already in the economic system (Korhonen et al., 2018). Several nations have praised the concept of CE as a sustainable way forward (Ghisellini et al., 2016; Bourguignon, 2017). Though there are several different strategies for transitioning towards CE, there is an overall understanding that keeping

material with added-value (i.e. consumer products) circulating in the user-phase for as long as possible is critical (Lieder and Rashid, 2016).

In line with the above, several scholars have pointed to a noticeable shift in consumer behavior, with consumers interested in gaining access to the performance of a product rather than acquiring ownership. Common examples of items include seldom used products, such as do-it-yourself tools (EMF, 2013; Gullstrand Edbring et al., 2016), or products that come with a burden, such as cars (Belk, 2014; Schaefer et al., 2016). The access-based models avoid consumers purchasing products that will be used only a few times. Thus, this behavioral change has the potential to remedy over-consumption and its effects. Some scholars, such as the prominent Walter Stahel, even perceive the sale of performance over product ownership as the divider between the sub-level domain of industrial CE and a top-level domain called performance economy, where manufacturers retain the ownership of products and materials (Stahel, 2019). However, the wide adoption and diffusion of the CE concept seem to have absorbed such differentiation. Instead, in CE literature, the non-transfer of ownership is a change of roles often highlighted as replacing the concept of ‘consumers’, who purchases a product and discards it when it no longer serves its purpose, to ‘users’, who gain access to the performance of a product (e.g. EMF, 2013). This paper uses the terms user and consumer interchangeably, considering that consumers can also refer to a person or organization that uses a product or service.

Not only companies can provide consumers with access to products, but also other consumers. While sharing in itself is nothing new, the phenomenon of consumers granting access to their private assets to other consumers, often strangers, via the internet has been framed as the sharing economy (Belk, 2014). The pivotal work by Botsman and Rogers (2011) defined the sharing economy (SE) as an economic model based on sharing underutilized assets from physical spaces to skills and stuff for monetary or non-monetary benefits. Furthermore, Botsman and Rogers also argued that even though the SE primarily concerns C2C marketplaces, it holds equal opportunity in the business-to-customer (B2C) models. Technological development in internet connectivity and increased usage of mobile devices has spurred C2C marketplaces such as Airbnb and Uber, for example. Such marketplaces can be defined as two- or more-sided peer-to-peer online platforms through which people collaboratively provide and use capacity-constrained assets and resources (Wirtz et al., 2019). While there is a variety in marketplaces, two commonalities have been identified in practices: temporary access to consumer goods and services, and their reliance on the internet (Belk, 2014).

There are ongoing debates in the literature about the promises and paradoxes concerning a transition from traditional linear consumption to innovative and sustainable alternatives such as ABC. Frenken and Schor (2017) argued that establishing reuse and sharing practices both creates business opportunities and adds social value by increasing social interactions in communities. Botsman and Rogers (2011) claimed that alternatives to individual ownership could build social capital through fostering trust and reciprocity between strangers. In contrast, Martin (2016) criticized the recent development (or diluting) of SE, meaning that commercialization has shaped the concept to conform with current regimes and strengthened structural inequalities. Belk (2014) conveyed that, as an activity, sharing is closely bonded with our perceptions of ownership and our ideals of acceptable human behavior. Experiencing unity and an aggregate sense of self was identified as a critical reason for participating in sharing practices. This debate emphasizes the multi-faceted complexity of the transition to ABC.

From a producer perspective, there is a noticeable shift with firms moving from pure product providers to including services. According to statistics from the European Commission, roughly two-thirds of the EU GDP consists of services, with 90% of job creation being related to services. Moreover, the manufacturing companies are tightly intertwined with and dependent on service providers (European Commission, 2015). Offerings of integrated products and services are commonly labeled

Product Service Systems (PSS). A wide range of business models falls into this description. Although there is no single definition of PSS (Baines, H. W. Lightfoot, et al., 2007), three distinct types can be identified: product-oriented, use-oriented, and result-oriented PSS (Tukker, 2004, 2015; Nudurupati et al., 2016). The idea behind product-oriented PSS is that the provider ensures that a specified product can be utilized (i.e. guarantee uptime through a service agreement); in contrast, the ownership of the product is transferred to the customer. Contrastingly, through use-oriented PSS, ownership is retained by the PSS provider, who in turn grants the customer to use the product for its intended function. Lastly, in results-oriented PSS, the rationale is that a provider sells results rather than products or functions.

The literature on PSS describes how firms bundle products and services into integrated offerings. By focusing on customer needs rather than products, PSS has a high potential for sustainable offerings, though this is not guaranteed (Barquet et al., 2016). While some authors argue a reduced environmental impact in the very definition of PSS (e.g. Mont, 2001; Brandstötter et al., 2003) others leave it unmentioned (e.g. Manzini and Vezzoli, 2003). Through a systematic literature review, Barquet et al. (2016) suggested five factors that define a sustainable PSS business model: design principles for the environment, identifying economic value for all stakeholders, promoting behavioral changes for consumers and providers, indicating actions towards social wellbeing, and nurture innovation throughout the value chain.

To some extent, the literature on PSS is disorganized. In their systematic literature review, Nudurupati et al. (2016) found that literature on PSS and servitization lacks three points: First, numerous studies are conceptual with limited practicality. Second, there are relatively few empirical studies, and often the findings relate to a single case study based on the insights of a limited number of senior managers. Third, the dynamics are often insufficiently studied in these organizations because data is collected post-event for most cases. This scattering emphasizes the need to synthesize knowledge with a broader approach.

Following a larger confusion of definitions, several scholars in each respective literature strand of CE, SE, PSS, and CC have tried drawing boundaries between the different concepts (e.g. Kirchherr et al., 2017; Becker-Leifhold and Iran, 2018; Curtis and Lehner, 2019). For example, Curtis and Lehner (2019) argue that sharing economy should be limited to tangible items and C2C relations, while intangible services and B2C business models are more suited for the label of PSS. For this study, we divert the focus from the differences and instead underline a commonality, i.e. non-transfer of ownership by giving access (Baines et al., 2007; Curtis and Lehner, 2019).

2.2. Previous systematic reviews

Reviewing previous systematic studies on barriers for a more circular society, we observed that there are interesting similarities between areas of CE, PSS, SE, and CC, as well as a vast number of different discourses and terminologies (Sopjani et al., 2020). However, although these areas arguably offer insights on the same topic, most research is delimited and focuses on a narrower subset of the interwoven literature.

For instance, the systematic literature review (SLR) by Galvão et al. (2018) examined barriers to CE in 195 papers and found that the most frequent obstacles could be categorized as technological, policy and regulatory, financial and economic, managerial, performance indicator, customer, and social issues respectively. While these categories intuitively resonate well with the CE literature, the study offers little insight into how the categorization and identification of barriers were made.

While most papers do not highlight which barriers are the most crucial, an SLR by de Jesus and Mendonça (2018) found that the most prevalent barriers in CE literature relate to technology. Their study was not limited only to CE as it included industrial ecology, industrial symbiosis, and eco-industrial parks which may impact the results. In contrast, Govindan and Hasanagic (2018) identified the main drivers, practices, and barriers for implementing circular economy with a focus

on supply chain management through a systematic literature review. They propose a multi-perspective framework categorizing barriers into the stakeholder groups of consumers, society, organizations, suppliers, and government. From their results, it is evident that the governmental perspective has the maximum positive impact on the implementation of the circular economy in supply chains among various stakeholders. Specifically, the circular economy can be promoted through laws, policies, and risk reduction (through tax levies), and strict governance. Even though their framework acknowledges multiple perspectives, the focus on supply chain management impacts the study's external validity. For example, surprisingly, barriers to refurbishment received great attention; conversely, the authors did not consider sharing economy, collaborative consumption, or product-service systems.

As opposed to many other studies on barriers, Kirchherr et al. (2018) deployed a well-defined method for identifying categories of barriers to the circular economy, which is further confirmed using empirical data from various experts. Their study concludes in four major categories of barriers: culture, market, regulation, and technology-related barriers. In addition, these barriers are illustrated with dependencies between them, but without defining the most important ones.

The study of Clemente et al. (2018) aimed at investigating discussions on the public policy and regulation within the PSS literature to extract the main themes and characteristics. Their findings are that the dominant barriers relate to either the challenging cultural shift from a dominant logic of product ownership, or, a lack of knowledge about the PSS concept for customers. Based on their results, the authors argued that public policies are required to overcome barriers to the implementation and diffusion of PSS, such as corporate, cultural, and regulatory barriers.

Becker-Leifhold et al. (2018) used a thorough approach in their systematic review of barriers and drivers to collaborative consumption to analyze barriers experienced simultaneously by consumers and businesses. While their approach is inspiring, their study is focused on the sharing of clothing. Notably, the organizational barriers listed are based on only two references, suggesting that further research is required on this perspective.

2.3. Frame of reference and addressed gaps

Transitioning from ownership-based to access-based models offers vast opportunities for increasing the material utilization efficiency; however, it presents complex challenges for both consumers and businesses (Tunn et al., 2020). While established firms need to change their business models and strategies radically, private consumers must rethink their linear consumption patterns (Bardhi and Eckhardt, 2012; Lawson et al., 2016). In order to incentivize, enable and regulate a circular transition, social norms must be questioned (Mont, 2004a), and new regulations formed (Clemente et al., 2018). As shown in the previous section, multiple perspectives can be utilized to capture and categorize different barriers and stakeholders in this transition. We find that several existing barrier categorizations are naturally influenced by the nature and type of the studies (e.g. an SLR of PSS in the maritime industry is unlikely to share categories with a case study on clothes sharing). Consequently, in this study, we build upon previous SLRs and explore the broader perspectives of business, consumer, society, and multi-stakeholder to capture a wide range of barriers. Here, 'consumer barriers' refers to factors, circumstances, or feelings that inhibit consumers (current and potential users) from adopting ABC in specific instances; for example past experiences or intrinsic attitudes, and including matters of trust, perception of benefits, or consumers' needs. The perspective 'business barriers' contains the obstacles or hindrances that make it difficult for companies to develop or operate services for ABC; these may include companies' culture and management or technical challenges. The perspective 'societal barriers' refers to the social context characteristics that hinder ABC services from working well; regulations, infrastructure, and social norms are examples of this. Lastly,

the group 'multi-stakeholder barriers' covered obstacles or hindrances that affect more than one stakeholder (i.e. users, companies, and society); these may include risks, resources, knowledge, and costs.

Although previous studies on barriers hold valuable insights, cumulative knowledge is not organized to date. Notably, several other systematic reviews have offered categorizations and analyses of barriers. However, those studies employed a different scope by either limiting themselves to a particular research paradigm (e.g. SE or PSS) or, focus on a specific industry (e.g. clothing) or even material. To date, cross-sectoral studies regarding the circular transition are still in short supply (Stumpf et al., 2021). Our approach to addressing these gaps is twofold: firstly, to systematically map the wide range of studies on barriers, as demonstrated in a previous article (Sopjani et al., 2020); secondly, our analysis takes on a broader perspective, disregarding the different paradigms and focusing on the commonality of ABC to gain valuable insight from multiple perspectives. In addition, barriers were studied concerning overarching stakeholder groups, namely consumers, businesses, and society.

3. Methods

3.1. Data source

This study conducted a systematic literature review to analyze empirical studies on barriers to ABC. Barriers to ABC refer to factors that hinder the implementation, use, or operation of services for ABC. The systematic review departed from a systematic mapping study encompassing the CE, SE, CC, and PSS fields conducted by the same authors of the present article (Sopjani et al., 2020). We tested several different search strings in Scopus while developing the protocol for the mapping study. First, we established an understanding of the keyword 'barrier' and synonymous keywords (e.g. hinder, obstacle, inhibitor, hurdle, challenge). Second, we discussed different streams of literature and scanned the results of search strings in the database regarding the domain fields: PSS, CE, SE, CC. Third, we verified duplicates when combining related keywords (collaborative consumption, sharing economy, sustainable, sustainability, product-service systems (or PSS), circular economy, and servitization) were used together with 'barrier' and its synonyms. Fourth, we produced a network to visualize the co-occurrence of terms and how they are interconnected. This experimentation led to insights concerning how the keywords were interrelated, and words to avoid. For example, 'sustainable product-service-systems' was initially considered, but was regarded as a small subset of a much larger stream of literature that might be relevant. Furthermore, the abbreviation 'PSS' is not limited to Product-Service-Systems, but many other uses which create false positives.

The final search string resulted in: (TITLE-ABS-KEY ("circular economy" OR ("product-service system") OR "sharing economy" OR "collaborative consumption") AND TITLE-ABS-KEY (barrier OR hinder OR obstacle OR inhibitor OR limitation OR hurdle)) AND (LIMIT-TO (LANGUAGE, "English")). This string resulted in 527 publications.

The systematic mapping classified the 527 studies into research paradigms (CE, SE, CC, and PSS), type of circular strategy (recycling, remanufacturing, component/product reuse, and access-based consumption), country, sector/industry/product, and research approach and method. The mapping study also indicated whether barriers were:

- i the focus of the studies*;
- ii only mentioned in the abstract;
- iii empirically identified by the analysis*;
- iv identified through a literature review;
- v predefined/known/assumed;
- vi indirectly mentioned;
- vii and a level of confidence, describing how confident they were with the classification of each abstract on a Likert scale from

1—shallow to 5—very high confidence. Low confidence levels indicate that we (Sopjani et al., 2020) had to infer or sometimes make qualified guesses because the information they sought was not always apparent in the abstracts.

3.2. Selection of studies

The asterisk in the list above indicates the criteria that were a part of filter for selecting the material for review in the present study. This filter restrained the 527 studies to only publications relevant to answer the research questions (RQs):

- RQ1 What barriers to ABC have been empirically identified and reported in the literature streams PSS, CE, SE, CC?
- RQ2 What theme of barriers are more prominent?
- RQ3 What areas need further attention for the research and practitioner community to develop solutions towards overcoming barriers?

Furthermore, we decided to include only journal articles reviewed with a level of confidence above 2 (i.e. 3, 4, and 5) to improve the sample's quality. Thus, the filtering resulted in 50 journal articles for full-text reading. While no selection was done based on geographical context, it is relevant to highlight that the United States ($n = 10$) and European Union ($n = 10$) were well represented in the dataset, followed by China ($n = 4$) and the United Kingdom ($n = 4$), and lastly Brazil ($n = 3$), South Korea ($n = 1$), and Taiwan ($n = 1$). The remaining studies were either cross country analysis ($n = 3$) or unspecified.

3.3. Data preparation

The necessary bibliographic information of the 50 articles (title, authors, journal, DOI, etc.) was copied from the systematic mapping database to a shared online sheet. Each row of the sheet had the information from one journal article. The encountered barriers were added into a new row below each respective article during the reading of full texts. In five articles, the results and discussion sections did not describe any barriers to ABC; thus, they were excluded from the review. A total of 289 barriers were found in the 45 studies.

3.4. Data analysis

The next step was to perform qualitative data analysis to create a synthesis of the 289 extracted barriers. We applied a grounded theory inspired approach comprising open coding and axial coding (Martin and Turner, 1986; Corbin and Strauss, 2008). First, we read through the data and created tentative labels summarizing each entry (open coding). Then, we identified meaningful semantic relationships among the open codes to form themes to group the barriers (axial coding). We created a table where all barriers were sorted into the themes we had defined, to see which barriers relate to which theme and whether one barrier belonged to several themes. The data analysis process resulted in 17 themes.

Finally, the themes were further grouped into the perspectives introduced in this article: 'consumer barriers', 'business barriers', 'societal barriers', and 'multi-stakeholder barriers'. A summary of the research methodology applied in this article is shown in Fig. 1.

3.5. Supporting information

In order to ensure transparency, three files provide supplementary materials for the present article. Supporting information I (text file) describes the articles reviewed concerning their research context and the number of barriers found in each article, the number of themes that the barriers were grouped to, and the literature stream to which the articles were classified. Supporting information II (spreadsheet file) encloses the

Data source – Mapping study (Sopjani et al., 2020)

STEP	DESCRIPTION	Resulting # of articles
Search string entered in Scopus	(TITLE-ABS-KEY (“circular economy” OR (“product-service system”) OR “sharing economy” OR “collaborative consumption”) AND TITLE-ABS-KEY (barrier OR hinder OR obstacle OR inhibitor OR limitation OR hurdle)) AND (LIMIT-TO (LANGUAGE, “English”))	527
Exclusion criteria	i. Off-topic (i.e. false positives) ii. Abstract not available	387 380
Present study		
STEP	DESCRIPTION	Resulting # of articles
Selection of studies	Selection criteria: a. Journal article on access-based consumption (C2C, B2C or B2B) b. Barriers are the focus of the study and were identified empirically c. Level of confidence 3-5	50
Data preparation	Full-text reading and extraction of barriers from the sections results and discussion	45
Qualitative data analysis	Performing open coding, axial coding and selective coding in the data	289 barriers 17 themes 4 perspectives

Fig. 1. Illustration of steps taken in the study.

		Barriers	Articles
USER	USER1. Consumers' needs and expectations are not met by the ABC offering	33	17
	USER2. Users do not consider ABC	32	17
	USER3. Financial benefits of ABC offerings are low	30	18
	USER4. Users have a poor social experience from ABC offerings	18	13
	USER5. Users do not trust other users	15	12
	USER6. Users do not trust the ABC provider	12	10
BUSINESS	BUS1. Business configuration, organisational structure and culture inappropriate for ABC offerings	58	21
	BUS2. Partnerships, cooperation and engagement among stakeholders insufficient for ABC	31	15
	BUS3. Product design, material or technology inappropriate for ABC offerings	13	10
SOCIETY	SOC1. Regulation or governance system does not support ABC offerings	25	18
	SOC2. Infrastructure unsuitable to support ABC offerings	17	13
	SOC3. Prestige of ownership	14	7
	SOC4. Social norms not compatible with ABC	11	8
MULTI	MULTI1. Presence of risk and uncertainty concerns	78	29
	MULTI2. Lack of resources, knowledge or skills	39	23
	MULTI3. Incentives or convenience of ABC offerings are small	34	19
	MULTI4. The costs and effort outweigh the benefits	29	15

Fig. 2. Themes developed during the data analysis, the number of barriers that the themes summaries, and the number of source articles. The data used to produce this figure is found in supplementary material III accompanying this manuscript.

bibliographic details of the 50 papers reviewed, the barriers extracted, and annotations made during the full-text reading. Finally, supporting information III (spreadsheet file) holds a relational matrix showing the barriers grouped into the themes and the data used to plot all the charts and tables of this publication.

4. Results

4.1. Synthesis of the barriers

This study identified 289 barriers extracted from 45 articles. These barriers were further assigned in 17 themes using the coding process described in Section 3.4. Each of the 17 themes was further grouped into the perspectives: consumer barriers (six themes), business barriers (three themes), societal barriers (four themes), and multi-stakeholder barriers (four themes).

Fig. 2 shows a list of the 17 themes in decreasing order of the number of articles and barriers that compose the respective theme. The designator at the beginning of a theme name indicates the group that a theme belongs. When looking at Fig. 2, keep in mind that one barrier could be assigned to more than one theme, as explained in the method section. Moreover, several articles had multiple barriers that were grouped in the same theme, i.e., a barrier could have appeared more than once in an article. All the barriers that composed each theme are found in Supplementary material III, ensuring traceability to each source.

The subsections below describe the themes grouped in the four perspectives.

4.2. Consumer barriers

The themes grouped in the perspective ‘consumer barriers’ refer to factors, circumstances, or feelings that inhibit consumers (current and potential users) from adopting ABC in specific instances; these may have been caused by past experiences or intrinsic attitudes and include matters of trust, perception of benefits or consumers’ needs, see Table 1.

4.3. Business barriers

The perspective ‘business barriers’ contains the obstacles or hindrances that make it difficult for companies to develop or operate services for ABC; these may include companies’ culture and management or technical challenges, see Table 2.

4.4. Societal barriers

The perspective ‘societal barriers’ refers to the social context characteristics that hinder ABC services from working well; regulations, infrastructure, and social norms are examples of this, see Table 3.

4.5. Multi-stakeholder barriers

Lastly, the group ‘multi-stakeholder barriers’ covered obstacles or hindrances that affect more than one stakeholder (i.e. users, companies, and society); these may include risks, resources, knowledge, and costs, see Table 4.

Table 1
Identified themes of barriers hindering consumers from participating in ABC.

THEME	DESCRIPTION	REFERENCES
USER1 Consumers’ needs and expectations are not met by the ABC offering	Capability of the ABC offer to fulfill the consumers’ needs and meet their expectations. This includes low enjoyment levels when interacting with other users due to missing tools to enhance social presence, lacking convenience, accessibility concerns, conflict between users, poor user interfaces, and missing expected functionality.	Ye et al. (2019); Sabitzer et al. (2018); Amasawa et al. (2018); Coreynen et al. (2018); Miller et al. (2018); Lee et al. (2018); Birinci et al. (2018); Hazée et al. (2017); Santana J. & Parigi P. (2015); Lampinen et al. (2015); Armstrong et al. (2015); Wang X. & Durugbo C. (2013); Catulli et al. (2013); Shaheen et al. (2012); Martinez et al. (2010); Mont et al. (2006b); Mont O. (2004b)
USER2 Users do not consider ABC	Socio-economic and structural factors contributing to a preference or acceptance of ownership over ABC. Factors include family upbringing, age, fashion, resistance to change, lack of awareness, materialism, and geographical location.	Raihanian Mashhadi A. et al. (2019); Amasawa et al. (2018); Coreynen et al. (2018); Akyelken et al. (2018); Miller et al. (2018); Hazée et al. (2017); Dickinson et al. (2017); Pappas N. (2017); Pagoropoulos et al. (2017a); Barnes & Mattsson (2016); Johnson et al. (2016); Pedersen E.R.G. & Netter S. (2015); Armstrong et al. (2015); Shaheen et al. (2012); Mont et al. (2006b); Mont O. (2004a); Mont O. (2004b)
USER3 Financial benefits of ABC offerings are low	Certain types of ABC offers are not financially worthy because of high monthly costs (e.g. leasing) or lack of monetary incentives. Some studies point to factual lower interest rates in purchasing and high insurance costs, others to an unfounded perception of higher cost in services or lack of sufficient savings.	Raihanian Mashhadi A. et al. (2019); Park et al. (2019); Amasawa et al. (2018); Müller S.C. & Welpel I.M. (2018); Tussyadiah I.P. & Pesonen J. (2018); Miller et al. (2018); Pagoropoulos et al. (2017b); Dickinson et al. (2017); Pappas N. (2017); Barnes & Mattsson (2016); Armstrong et al. (2015); Barquet et al. (2013); Catulli et al. (2013); Shaheen et al. (2012); Shih L.H. & Chou T.Y. (2011); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)
USER4 Users have a poor social experience from ABC offerings	Low social interaction and lack of sense of community on C2C sharing platforms. This includes uncooperative and selfish behavior, low user engagement, and unsatisfying social interactions.	Ye et al. (2019); Sabitzer et al. (2018); Tjaden et al. (2018); Tussyadiah I.P. & Pesonen J. (2018); Miller et al. (2018); Wentrup et al. (2018); Hazée et al. (2017); Dickinson et al. (2017); Barnes & Mattsson (2016); Lampinen et al. (2015); Armstrong et al. (2015); Catulli et al. (2013); Shaheen et al. (2012)
USER5 Users do not trust other users	Distrust among strangers, concerns about privacy and safety, discrimination, and fear of sharing. Studies highlight conflicts in sharing communities, cases of ethnic discrimination in carpool sharing, and the lack of trust in C2C accommodation platforms.	Ye et al. (2019); Sabitzer et al. (2018); Tjaden et al. (2018); Tussyadiah I.P. & Pesonen J. (2018); Wentrup et al. (2018); Hazée et al. (2017); Dickinson et al. (2017); Pappas N. (2017); Lampinen et al. (2015); Catulli et al. (2013); Shaheen et al. (2012); Mont et al. (2006b)
USER6 Users do not trust the ABC provider	Users and potential users express distrust against the service provider. This relates to general distrust in new businesses and novel business models, reliability concerns, lacking information and guarantees, as well as poor experiences when providers respond to issues and exceptional cases.	Ye et al. (2019); Miller et al. (2018); Sousa-Zomer T.T. & Cauchick Miguel P.A. (2016); Lee et al. (2018); Wentrup et al. (2018); Hazée et al. (2017); Pagoropoulos et al. (2017a); Barnes & Mattsson (2016); Armstrong et al. (2015); Mont et al. (2006b)

5. Discussion

This literature review of barriers to ABC in the circular transition has identified 17 themes relating to the perspective of various stakeholders. In Section 4, we provided a detailed description of the 17 themes. Section 5.1. builds on this to highlight key insights and knowledge gaps needing consideration to develop actionable mechanisms to overcome the barriers summarized in the themes. Section 5.2 closes by discussing some of the limitations of the study on the sample, data, and method used.

5.1. Towards solutions: key insights and knowledge gaps

A summary of our analysis is shown in Table 5, highlighting areas needing attention to develop actionable solutions and their connections with the themes of barriers compiled in this article.

5.1.1. The overall experience of ABC and trust mechanisms need to be better understood

Several user barriers relate to traditional aspects that affect the purchase of goods: price, functionality, expectations, and experiences from consumption; this is especially seen in USER1-USER4. Providing consumers with access to functions is arguably similar to traditional purchases in that customer demands need to be met. However, the actual consumption experience through ABC services needs to be understood further, judging by the many barriers related to trust. Naturally, a lack of trust between users is unique to ABC, and it puts requirements on, e.g., platforms for sharing. Furthermore, users' lack of trust for providers is also a barrier, though it is not revealed if it is typical for ABC but could be for any purchase or consumption. However, the relationship between businesses and consumers is changing, and the interactions are increasing. Consequently, aspects strongly linked to relations, such as establishing trust, are likely of utmost criticality when designing ABC offerings.

Impediments of the overall user experience were also evident in the set of barriers grouped in the themes USER4–6, BUS3 and SOC2–4. They suggest that challenges concerning the tangible and intangible aspects of access-based offerings exist. Poor social interaction and lack of sense of community (recurrent barriers grouped into the USER4 theme) appear to affect platform functionalities and physical and virtual infrastructure to support offerings. The design of platforms is met with barriers in accessibility, usage, safety, connection, local payments, and managerial issues, e.g. labor-intensive activities. We can see limitations for repairability and reconditioning due to material design as critical in enabling multiple uses by multiple users successfully in terms of physical products.

Impediments of the overall user experience can also be explained by other findings such as distrust among strangers, concerns about privacy and safety, discrimination, and fear of sharing, all contributing to the overall user experience that in many ways results in skepticism and unreliability toward new business models and service quality guarantee. However, it is also evident that these impediments are also associated with wired human behavior towards consumption as a means of owning things, as suggested by the results. For example, the prestige of ownership embedded in materialist cultural norms and independence, desire to own stuff, emotional and personal attachment to things, including the memorable experiences with certain products, bond people's values towards possessions. In some ways, this explains the result that social norms are generally incompatible with the ideas of access-based models as suggested by resistance to change, subjective norms towards sharing, lack of engagement, and societal orientation towards hyper-consumption stimulated by planned obsolescence and corporate propaganda, including lobbying. Thus, values regarding make-consume-waste are legitimized instead of keeping materials in circulation while meeting societal needs. Consequently, the current way that society organizes economic activities inhibits establishing legitimacy not only for

Table 2

Identified themes of barriers hindering businesses from participating in ABC.

THEME	DESCRIPTION	REFERENCES
BUS1 Business configuration, organizational structure, and culture inappropriate	A limited capability of a firm to shift its current business logic towards developing ABC offerings and the organizational challenges in scaling. This includes a low priority of sustainability, a product-oriented attitude, internal resistance and unawareness, uncertainties in planning, and the burdensome customer relationship that ABC may entail.	Ma et al. (2019); Ma et al. (2018); Coreynen et al. (2018); Miller et al. (2018); Sousa-Zomer T.T. & Cauchick Miguel P.A. (2018); Lee et al. (2018); Li et al. (2018); Wentrup et al. (2018); Pagoropoulos et al. (2017b); Sousa-Zomer T. T. & Cauchick-Miguel P. A. (2017); Pagoropoulos et al. (2017a); Barnes & Mattsson (2016); Santana J. & Parigi P. (2015); Pedersen E.R.G. & Netter S. (2015); Wang X. & Durugbo C. (2013); Barquet et al. (2013); Chirumalla K. (2013); Martinez et al. (2010); Mont et al. (2006a); Mont et al. (2006b); Mont O. (2004b)
BUS2 Partnerships, cooperation and engagement among stakeholders insufficient for ABC	Challenges in orchestrating the surrounding ecosystem and value network that the organization depends on in order to create and deliver ABC. Examples include non-cooperative local governments, a lack of openness, confidentiality, information gaps, knowledge gaps, and coordination issues in partnerships.	Ma et al. (2018); Miller et al. (2018); Li et al. (2018); Pagoropoulos et al. (2017a); Brauckmann S. (2017); Sousa-Zomer T.T. & Cauchick-Miguel P.A. (2017); Pagoropoulos et al. (2017b); Barnes & Mattsson (2016); Pedersen E.R.G. & Netter S. (2015); Wang X. & Durugbo C. (2013); Chirumalla K. (2013); Shaheen et al. (2012); Martinez et al. (2010); Mont et al. (2006a); Mont O. (2004b)
BUS3 Product design, material or technology inappropriate for ABC offerings	Current limitations of physical goods and available technology. This includes unsuitable product design and material choices for repairability and reconditioning, and a lack of technological infrastructure to implement the ABC offering.	Müller S.C. & Welpel I.M. (2018); Coreynen et al. (2018); Dickinson et al. (2017); Barnes & Mattsson (2016); Armstrong et al. (2015); Chirumalla K. (2013); Martinez et al. (2010); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)

access-based models but any other attempt to make our society sustainable in the long run.

We also find it interesting that users not only value the performance of the offering (e.g. product performance, convenience, or accessibility) but also social aspects, as the barriers grouped in USER1 affect those grouped under USER4. Extensive research shows that social factors are an essential driver for ABC (e.g. Belk (2014)). Moreover, traditional elements of owning and status of ownership are essential to consider, not being associated with the physical goods in ABC, but possibly to consumer behavior.

In Section 4.2., we can note that barriers found in some of the earliest studies, e.g. costs, technical difficulties, and user resistance (e.g. Mont (2004b) and Mont et al. (2006a)) are present even today in later studies (e.g. Amasawa et al. (2018) and Raihanian Mashhadi et al. (2019)) although underlying reasons vary across studies. For example, resistance concerns matters of acceptance, normative ways of consumption,

Table 3
Identified themes of barriers hindering societal adoption of ABC.

THEME	DESCRIPTION	REFERENCES
SOC1 Regulation or governance system does not support ABC offerings	National and local governance frameworks that conflict with ABC either because the current ones are not in line with ABC requirements, or, because local governments cannot regulate and support ABC. This includes lacking provision of and/or reimbursement of services, such as clear delineations of liability, rental taxes, taxation on such services, and tax laws. Furthermore, prevailing regulatory, political, and technical frameworks favor protecting traditional industries, creating barriers to entry for new ABC offerings and inability to integrate with local cities.	Ma et al. (2018); Sabitzer et al. (2018); Müller S.C. & Welpel I.M. (2018); Hong S. & Lee S. (2018); Akyelken et al. (2018); Miller et al. (2018); Paik et al. (2018); Li et al. (2018); Brauckmann S. (2017); Sousa-Zomer T.T. & Cauchick-Miguel P.A. (2017); Pagoropoulos et al. (2017a); Barnes & Mattsson (2016); Barquet et al. (2013); Catulli et al. (2013); Shaheen et al. (2012); Mont et al. (2006a); Mont O. (2004a)
SOC2 Infrastructure unsuitable to support ABC offerings	ABC offerings are inhibited by inadequate or underdeveloped physical and digital infrastructure. In turn, this creates issues in accessibility, usage, safety, connectivity, local payments, supply, and management.	Ma et al. (2019); Ma et al. (2018); Miller et al. (2018); Li et al. (2018); Brauckmann S. (2017); Sousa-Zomer T.T. & Cauchick-Miguel P.A. (2017); Barnes & Mattsson (2016); Pedersen E.R.G. & Netter S. (2015); Shaheen et al. (2012); Mont et al. (2006b); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)
SOC3 Prestige of ownership	Consumer preferences to buy products over services. Underlying reasons include a sense of ownership, a desire to own things, emotional meanings, personal attachment, memorable experiences, social bonding over possessions, and lacking product usage information in ABC relating to hygiene, longevity, and safety.	Park et al. (2019); Barnes & Mattsson (2016); Johnson et al. (2016); Armstrong et al. (2015); Catulli et al. (2013); Shaheen et al. (2012); Mont O. (2004b)
SOC4 Social norms not compatible with ABC	ABC is met with resistance in how societal values are organized around hyper-consumption, planned obsolescence, corporate propaganda, and lobbying. This includes negative social influence, lack of engagement, and challenges in establishing the legitimacy of ABC.	Raihanian Mashhadi A. et al. (2019); Ma et al. (2018); Barnes & Mattsson (2016); Johnson et al. (2016); Pedersen E.R.G. & Netter S. (2015); Shaheen et al. (2012); Mont O. (2004a)

preferences, or values. The fact that similar barriers are seen in studies more than 15 years apart implies that there are still barriers experienced by various stakeholders including business actors, user actors, and political actors, in coordinating and arranging support systems to enable viable operations of access-based solutions preferable to society. Mont (2004b) already in 2004, predicted increasing complexity of the life-cycle concept at the supply chain level.

Table 4
Identified themes of barriers for ABC affecting multiple stakeholders.

THEME	DESCRIPTION	REFERENCES
MULTI1 Presence of risk and uncertainty concerns	Real and perceived risks and uncertainties for users or service providers. For users, this includes misbehavior towards the rented product, threats in physical interaction, privacy, hygiene, and safety concerns in online payment. For providers, this includes confidentiality, low demand for services, unclear pricing and revenue streams, dependency on stakeholders, uncertainties in value networks, and unclear business operations.	Park et al. (2019); Ma et al. (2019); Ma et al. (2018); Tjaden et al. (2018); Tussyadiah I.P. & Pesonen J. (2018); Miller et al. (2018); Sousa-Zomer T.T. & Cauchick Miguel P.A. (2018); Lee et al. (2018); Li et al. (2018); Pagoropoulos et al. (2017a); Hazée et al. (2017); Brauckmann S. (2017); Pappas N. (2017); Pagoropoulos et al. (2017b); Barnes & Mattsson (2016); Santana J. & Parigi P. (2015); Lampinen et al. (2015); Pedersen E.R.G. & Netter S. (2015); Armstrong et al. (2015); Wang X. & Durugbo C. (2013); Barquet et al. (2013); Chirumalla K. (2013); Catulli et al. (2013); Shaheen et al. (2012); Shih L.H. & Chou T.Y. (2011); Mont et al. (2006b); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)
MULTI2 Lack of resources, knowledge or skills	Users, businesses, and authorities do not have the required resources, knowledge and skills to require to facilitate ABC. This includes awareness, know-how, competencies, understanding of dependencies on local authority, lacking resources and capacity of businesses and local authorities, establishing new revenue streams, and knowledge about consumer behavior and market potential.	Müller S.C. & Welpel I.M. (2018); Tussyadiah I.P. & Pesonen J. (2018); Coreynen et al. (2018); Akyelken et al. (2018); Miller et al. (2018); Sousa-Zomer T.T. & Cauchick Miguel P.A. (2018); Li et al. (2018); Wentrup et al. (2018); Pagoropoulos et al. (2017b); Hazée et al. (2017); Sousa-Zomer T.T. & Cauchick-Miguel P.A. (2017); Dickinson et al. (2017); Barnes & Mattsson (2016); Johnson et al. (2016); Pedersen E.R.G. & Netter S. (2015); Armstrong et al. (2015); Barquet et al. (2013); Chirumalla K. (2013); Shaheen et al. (2012); Mont et al. (2006b); Mont et al. (2006a); Mont O. (2004b)
MULTI3 Incentives or convenience of ABC offerings are small	Lacking incentives and lesser convenience compared with ownership. For users, this includes product unavailability, and lacking monetary incentives from participation in ABC. From a provider perspective, this reflects a low support from authorities, geographical distances adding to complexities in logistics, and lacking incentives to take back products.	Ma et al. (2019); Amasawa et al. (2018); Müller S.C. & Welpel I.M. (2018); Akyelken et al. (2018); Miller et al. (2018); Sousa-Zomer T.T. & Cauchick Miguel P.A. (2018); Li et al. (2018); Hazée et al. (2017); Brauckmann S. (2017); Sousa-Zomer T.T. & Cauchick-Miguel P.A. (2017); Joo J.-H. (2017); Pagoropoulos et al. (2017a); Barnes & Mattsson (2016); Pedersen E.R.G. & Netter S. (2015); Armstrong et al. (2015); Shaheen et al. (2012); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)

(continued on next page)

Table 4 (continued)

THEME	DESCRIPTION	REFERENCES
MULTI4 The costs and effort outweigh the benefits	The value proposition of ABC is considered low in relation to cost in several sectors. For example, studies suggest that C2C accommodation delivers insufficient savings, car-sharing does not provide time savings, and PSS entails higher costs for certain companies. Furthermore, there are general complexities concerning accessibility, transactions, market understanding, and product usage making ABC unfeasible.	Ye et al. (2019); Tussyadiah I.P. & Pesonen J. (2018); Coreynen et al. (2018); Miller et al. (2018); Lee et al. (2018); Hazée et al. (2017); Joo J.-H. (2017); Pappas N. (2017); Barnes & Mattsson (2016); Armstrong et al. (2015); Shaheen et al. (2012); Mont et al. (2006b); Mont et al. (2006a); Mont O. (2004a); Mont O. (2004b)

5.1.2. Organizational aspects in traditional business need a system change

The theme BUS1. includes several barriers that show the importance of changing deliverables to market and how business is done. The priority of profit over sustainability, product-oriented attitude, internal resistance due to employee unawareness of the potential value of services, and planning uncertainties are a few examples of common organizational barriers (Mont, 2004b; Martinez et al., 2010; Pagoropoulos et al., 2017a, 2017b; Coreynen et al., 2018; Ma et al., 2019). The themes of business barriers also mirror the consumer barriers as in both BUS2, addressing that relations between business and consumers need changes, and BUS3, addressing what is delivered to consumers. Both BUS1 and BUS2 reveal the criticality of working with cultural aspects of firms and of consumption, as well as the necessity of embracing the business ecosystem perspective or, in more general terms, adopting a system perspective. For instance, Pagoropoulos et al. (2017a) described how a collaborative network of stakeholders delivers PSS in the maritime industry. However, in doing so, the orchestrators are faced with the challenge of slow internal processes of individual partners in the network being cumulative, impairing the overall value delivery. Barriers related to organizational aspects appearing in many papers may also be significant for developing future research on the CE. The emphasis in existing CE research concerns the physical resource systems of manufacturers, whereas the role played by business form and organizational culture is a salient area needing further investigation.

Barriers included in BUS3 are what could be said to be expected, as accessing products and consuming value puts new requirements on physical goods compared to owning assets (e.g. design for reparability, reconditioning, or remanufacturing). Concerning this, it is also interesting that relatively few barriers relate to technology or design. Contrastingly, the findings from the SLR by de Jesus and Mendonca (2018) showed technological barriers to be the most prevailing. These differences arguably highlight that the challenges look different depending on "how you cut the cake" and that the contextualization matters as we are focusing on ABC research.

5.1.3. Regulation plays a fundamental role in making ABC work for business, society, and sustainability

The themes related to society and institutions (SOC1-SOC4) comprise barriers covering an extensive scenery of changes needed and reveal the necessity of working on really diverse issues for making ABC work for business, society, and sustainability. An illustration of this is that SOC1 highlights the necessity to adopt a regulation to new consumption patterns. At a national level, the results suggest that barriers relate mainly to a lack of state policies and legislation regarding the provision of and/or reimbursement of services, such as clear delineations of liability, rental taxes, taxation on such services, and tax laws (Mont et al., 2006a; Shaheen et al., 2012; Barnes and Mattsson,

2016; Miller et al., 2018). In addition, unsuitable regulatory frameworks for the use of infrastructure were also reported in studies about mobility or energy services (Müller and Welp, 2018), housing (Brauckmann, 2017), and industrial operations (Pagoropoulos et al., 2017a). Ultimately, it seems that conflicts between prevailing regulatory, political, and technical frameworks in favor of protecting traditional industries create barriers to entry for new ABC offerings; furthermore, these protections also conflict with the goals of sustainable consumption (Mont, 2004a; Hong and Lee, 2018; Paik et al., 2018). At the same time, SOC4 underlines the necessity to work with social norms related to a sustainable consumption model, suggesting that ABC is met with resistance in the way societal values are organized around hyper-consumption, planned obsolescence, and corporate propaganda as well as lobbying (Barnes and Mattsson, 2016), which contradict the goals of sustainable consumption (Mont, 2004a; Barnes and Mattsson, 2016). Although regulations and social norms are diverse issues, they can also be tightly connected, one leading to the other and vice versa. Nevertheless, again, barriers within one theme are mixed forms of regulations that concern national, regional, and even local regulations and hindrances for realizing ABC services and offering them to consumers.

As with business and consumer barriers, this category of barriers strongly relates to other themes and categories. For example, the prestige of ownership is mirrored in consumer-related barriers and social norms-related barriers, which is not only a societal issue but certainly a consumer and a business issue.

5.1.4. Sharing risks and experimentation for new learnings are necessary

We find that two of the most recurrent barriers found across the reviewed literature related to the themes MULTI1–2 and BUS1. Here, MULT1 describes an inherent risk-taking behavior underlying the access-based model between the business actor and user actor. Risk and uncertainties are clearly barriers of significant criticality, even if we cannot say that these are the most pressing out of our analysis. Regardless, it is not a surprising barrier theme as new concepts, primarily when covering so many diverse aspects as business ecosystems, physical goods, norms, culture, consumer behavior, etc., entail risks and uncertainties by nature. Physical damage and misbehavior towards accessed or shared products creates risks for any party involved in ABC transactions. This risk is notable in products such as bicycles, cars, baby and nursery products, and clothing. The explanations for such behavior vary across the literature reviewed, e.g. product obsolescence, the short life-cycle of products, the durability of design, trust in others and the business offers, possibly creating unclarity between all parties, i.e. uncertainty in conducting such business operations or user uncertainty in engaging in such practice. Besides, ABC includes even more actors with new and changing roles. Consequently, complexity rises in parallel with increasing uncertainties and risks. An interesting question to raise is who is liable and who "owns" the risk. In other words, addressing the issue of risk-taking may also require unlearning the roles and responsibilities associated with linear production and consumption.

MULTI2 contains barriers that could have been an even bigger group – many of the other themes relate to lack of resources, knowledge, and skills (such as USER2, BUS3, and SOC2). However, the barriers associated with this theme directly emphasized lack of resources, knowledge, and skills. Several barriers relate directly to consumers' willingness, attitudes, cultural behavior in the society, etc., also linked to knowledge since "not knowing how to" rules out "willing to". Clearly, transitioning towards ABC comprises learning in many systems and by many different stakeholders.

BUS1 describes a critical challenge in organizing for access based-models on the business side. An explanation stems from business-as-usual practices where organizations are product-oriented and hence also specialized in the sales of products as compared to being service-oriented and understanding the nature of service design, which is pointed out by the results, e.g. business logic, scaling up, planning, and new requirements and relationships between producers and consumers.

Table 5

Relationship (marked X) between themes of barriers and areas needing further development for solutions.

Themes	Areas for further development Overall experience of ABC and trust mechanisms need to be better understood	Organizational aspects in traditional business need a system change	Regulation plays a fundamental role in making ABC work for business, society, and sustainability	Sharing risks and experimentation for new learnings are necessary
USER1. Consumers' needs and expectations are not met by the ABC offering	X			X
USER2. Users do not consider ABC	X			X
USER3. Financial benefits of ABC offerings are low	X			X
USER4. Users have a poor social experience from ABC offerings	X			
USER5. Users do not trust other users	X			
USER6. Users do not trust the ABC provider	X			
BUS1. Business configuration, organizational structure, and culture inappropriate for ABC offerings		X		X
BUS2. Partnerships, cooperation and engagement among stakeholders insufficient for ABC		X		X
BUS3. Product design, material or technology inappropriate for ABC offerings	X	X		
SOC1. Regulation or governance system does not support ABC offerings			X	X
SOC2. Infrastructure unsuitable to support ABC offerings	X		X	
SOC3. Prestige of ownership	X		X	
SOC4. Social norms not compatible with ABC	X		X	
MULTI1. Presence of risk and uncertainty concerns				X
MULTI2. Lack of resources, knowledge or skills				X
MULTI3. Incentives or convenience of ABC offerings are small				X
MULTI4. The costs and effort outweigh the benefits				X

Despite being less prevalent in the number of barriers grouped, the themes MULTI3, USER1–3, BUS2, MULTI4, and SOC1 are also associated with an inherent lack of resources. These are mainly related to monetary resources: providing and offering the best viable solutions desirable by all stakeholders involved in the design, implementation, and delivery of access-based models. The inherent lack of resources is evident as pointed by the results, e.g. lack of awareness and knowledge, lack of capacities or competencies, and know-how for businesses due to insufficient funding. Furthermore, there is an explicit dependency on stakeholders, such as local authorities, which altogether is reflected in the lack of incentives to motivate participation and improvement of access-based offerings that would meet the needs and expectations of the consumers. These jeopardize the overall experience of such solutions as evidenced in the literature, e.g. low enjoyment, social presence, poor user interfaces, inconvenience, and inaccessibility. It appears that there are relatively high costs associated with the organization, logistics, insurance, and management of access-based services, which are then also reflected in the cost for users. In sum, as it stands, the services' total operational costs might exceed the total derived benefits of having present such services in our society. An explanation could also be the fundamental nature of economic activity today predominantly organized around competition and not cooperation as hinted by the results as well, e.g. non-cooperative local governments, a lack of openness, coordination, and knowledge sharing issues in partnerships. In other words, ABC solutions face the risk of being too costly if there are no regulatory structures or incentives to support them coming into effect.

Our findings call for meaningful ways of sharing the risks among stakeholders, and the need for collaborative experimentation of ABC

offerings to develop novel knowledge for both users and ABC providers. Furthermore, many barriers affect multiple stakeholders calling for joint actions between users, businesses, and society.

5.2. Limitations of the study

5.2.1. Sample and data

Most of the studies in our sample size were about PSS for B2C. Users were the most frequent unit of analysis, whereas the sectors were mainly mobility, manufacturing and heavy industry, accommodation, clothing, and energy services. Many other industries were not represented in this sample; thus, the general representativeness of the findings is limited. Most of the studies were interdisciplinary, with a majority of them mixed in theoretical character and the research design. We find a noticeable weakness concerning the generalizability of empirical findings across the whole sample due to methodological limitations, i.e. case studies or small sample size of a study, and theory-informed, namely by business and management research. The massive dominance of qualitative design studies is challenging concerning deriving robust conclusions when doing an SLR. Furthermore, the dataset is heavily influenced by studies in the European Union and the United States due to the abundance of studies from these regions. Future research could, for example, isolate studies from specific geographical contexts to give more precise policy implications for specific regions. Notably, the present data with high variability in the level of analysis and representation of studies in diverse contexts can arguably be interpreted as an early phase of systemic implementation. Despite (or possibly due to) the rich variation in theory, research design, and focus areas, the analysis of the

barriers is exciting and essential for understanding the area for both researchers and practitioners.

5.2.2. Method

The methodology used in this study also carries intrinsic limitations. First, the data sample (papers) depended on the keywords adopted to retrieve papers from the Scopus database. There may be other relevant studies on barriers not captured in our search. Secondly, the scope was limited to articles indexed in Scopus. The gray literature may also have essential studies, mainly directed to practitioners. Third, the results of the qualitative analysis may be influenced by the subjectivity of the researchers.

Our identified themes are one way of illustrating a full picture but could have been divided in another way – some themes mirror each other (e.g. USER1 and BUS3) while others are overlapping; the themes relate mainly to one stakeholder, but all could from a system perspective be said to be a multi-stakeholder theme. Furthermore, the barriers could have been analyzed from different angles resulting in other themes and perspectives. Moreover, computational techniques such as text mining may cluster the barriers more objectively. Finally, although we compiled and summarized the solutions proposed by the studies to overcome the barriers, systematic review studies focused on the solutions are encouraged.

6. Conclusion

Barriers to the development, implementation, and functional operation of ABC models have been studied by researchers for over two decades. It has been investigated mainly in PSS studies and recently in the emerging literature stream SE and CC. By reviewing existing scattered knowledge, this article integrated the findings of empirical studies in these four research fields. As a result, we provide a comprehensive picture of barriers to a transition to ABC, which we believe is critical for developing the research in the area and building ground for actual changes in practice.

We extracted 289 barriers from 45 articles. These barriers were analyzed and summarized in 17 themes. The five most prominent themes found were: (i) presence of risk and uncertainty concerns, relating to multiple stakeholders; (ii) business configurations, organizational structure and culture inappropriate for ABC success, relating specifically to businesses; (iii) lack of resources, knowledge, or skills, relating to multiple stakeholders; (iv) incentives or convenience of ABC offerings are small, relating to multiple stakeholders; and (v) consumers' needs and expectations are not met by the ABC offering, specifically relating to users.

The analysis performed in this article pointed to four main lessons for the research and practitioner community: (1) the overall experience of ABC and trust mechanisms need to be better understood; (2) organizational aspects in traditional business need a system change; (3) regulation plays a fundamental role in making ABC work for business, society, and sustainability; and (4) sharing risks and experimentation for new learnings are necessary. The analysis of the barriers also exposed a hierarchical need between consumers, businesses, and governments to consider when devising solutions. Consumers need business and government to offer enabling conditions for ABC – spanning raising awareness and understanding to improve user experience. Businesses need governments to create the necessary structures to support ABC offerings – from decreasing risks to increasing incentives. Finally, future research should gather experiences from ongoing experiments, identify best practices and define viable mechanisms to further facilitate circular behaviors.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence

the work reported in this paper.

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Supplementary materials

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