

UDC: 330.1

JEL: M31

SOCIO-TECHNOLOGICAL SYSTEM OF SHARING ECONOMY

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For citation: Singh A. 2021. Socio-technological system of sharing economy. *Vestnik of Saint Petersburg University. Management* **20** (2): 192–215. <https://doi.org/10.21638/11701/spbu08.2021.203>

Sharing economy is a system which functions successfully provided that technological and social subsystems complement each other forming an indivisibly combined cohesive structure. The premise of balancing social and technological aspects is proposed in the socio-technological theory. Social issues call for social innovation to fulfil the needs and requirements of the society as well as individual citizens. The goal of this paper is to fill the gap in the extant literature by proposing a comprehensive framework of sharing economy based on the socio-technological theory. This study carried out a systematic literature review of works on sharing economy and socio-technological theory in order to develop a conceptual framework. There were identified different social motives associated with each of the subsystems; interplay between them was established. This study contributes to the increasing research by presenting a holistic view of sharing economy through the theoretical lens of socio-technology keeping society as well as consumer needs and requirements at its focal point.

Keywords: sharing economy, collaborative consumption, socio-technology, contemporary market economy, access-based consumption, technology and society, consumer.

INTRODUCTION

Sharing economy (SE) has gained lot of attention within academic community since its inception as a conceptual term over last decade. Sharing isn't new, and being considered as a pro-social behaviour [Benkler, 2004] people have been sharing for both survival and as an act of kindness to others [Fine, 1980] and is defined as an act of receiving something from others or distributing what is ours to others for their use [Belk, 2007]. People have been sharing their own personal resources such as consumer goods, everyday used items and their skills with their neighbours and friends even when the resources were finite and not abundant as today. But with the popularization of internet

and technological tools among consumers, sharing has seen a paradigm change. A prior acquaintance is no longer a prerequisite for sharing where technological advancement has seen boundaries blur bringing people and communities together. Adoption of SE not only reflects changing consumer behaviour but also the social trend and issues prevalent in society. Consumers aren't the only beneficiaries of SE as it serves society as a whole. Social issues such as sustainability, environmental concern, social economic inequality, unemployment, etc. have ramifications which call for technological solutions and of late SE has been viewed as a green economy. The extant literature has established relationship in between sustainability [Ertz, Leblanc-Proulx, 2018] and environmental concern [Zamani, Sandin, Peters, 2017; Cherry, Pidgeon, 2018] with SE which presents itself as a technological solution to these ever growing socio-economic issues and hence inherently making it a part of socio-technological system [Vojinović, Abbott, 2012].

As the sharing economy is growing so is the research interest in it. Different nomenclatures (e.g. peer-to-peer economy, collaborative economy, collaborative consumption, access-based consumption, the mesh, grassroots economy, product-service system, on-demand economy, gig economy and platform economy) [Botsman, Rogers, 2010; Bardhi, Eckhardt, 2012; Gansky, 2012; Belk, 2014; Botsman, 2014; Kathan, Matzler, Veider, 2016; Martin, Upham, Klapper, 2017; Hazée et al., 2020] have been used by researchers to investigate SE. The different approach to SE definition hassled to disparate conceptualizations and understanding of SE. In conceptualizing SE, researchers investigated it through the lens of technological platform or app (e.g. [Piscicelli, Cooper, Fisher, 2015; Albinsson, Perera, 2012]), or from an empirical perspective (e.g. [Hamari, Sjöklint, Ukkonen, 2016]), or viewing it through different mode of consumption and exchange (e.g. [Bardhi, Eckhardt, 2012]) and of recently the researchers have attempted to combine and comprehend SE as a whole socio-economic system (e.g. [Eckhardt et al., 2019; Gerwe, Silva, 2020]). But what the extant literature haven't acknowledged is that SE is embedded in social order, i.e. it also fulfils the needs and requirements of society, and this has presented a gap that needs to be addressed. Any technology-dependent system which is a part of the socio-economic system should be analysed as a whole system.

The aim of this article is to present holistic view of SE based on socio-technological theory after carrying out systematic literature review. Taking consumer centric and socially focused approach to draw inter-relationship and inter-dependency of all the socio-technological system, the study highlights different social motivations attached with each subsystem in SE and in doing so the study aims to present a systematic framework for future research discourse where SE is looked through the lens of socio-technological system.

The remainder of the paper is divided into following sections: the first one provides methodology and extant literature on SE, the second section provides conceptual delimitation of SE and socio-technological system, the third section presents the socio-technological framework of SE, and in the final section the paper presents conclusion and limitation of the study.

METHODOLOGY OF LITERATURE SEARCH

Systematic literature review was conducted in Scopus database amongst the journals recognized as 4*, 4 and 3 by the Association of Business Schools. Figure 1 illustrates the steps taken while carrying out literature search and review. The author searched title, keywords and abstracts for “Sharing Econom*” and “Sociotechnolog*”. The articles published in referenced academic journals limited to business, management and accounting were selected for further analysis. Following keyword search in Scopus was carried out; TITLE-ABS-KEY (“Sharing Econom*” OR “Sociotechnolog*”) AND (LIMIT-TO (DOCTYPE, “ar”)) AND (LIMIT-TO (SUBJAREA, “BUSI”)) AND (LIMIT-TO (SRCTYPE, “j”)); and the total number of articles that appeared in keyword search was 929. In a simple filtering, 56 number of articles appearing in the journals recognized as 4*, 4 and 3 by the Association of Business Schools were segregated containing new definitions or highlighting specific definitional characteristic of SE. Reviewing the references of these selection, 26 number of articles were further added for analysis. The numbers of articles were limited due to the scope of the study. The majority of papers outside this group weren’t part of the analysis as they only contained explanation regarding what SE is instead of providing any definition or complete relevant conceptual framework. In the next step, the definitions and main features characterizing SE and socio-technology were identified and listed followed by their analysis.

Table 1 illustrates the publication year of the extracted papers and reflects the exponential growth in number of SE papers.

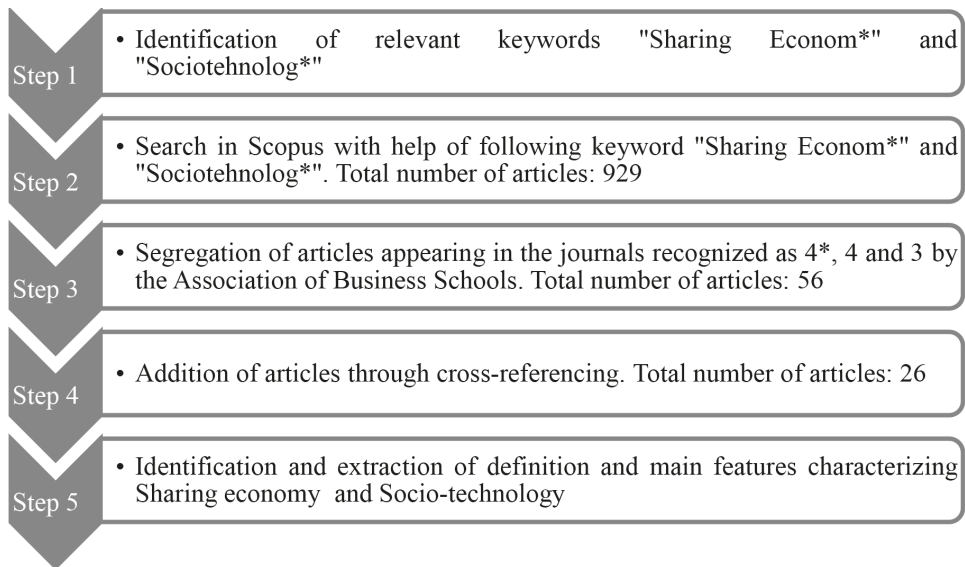


Figure 1. Systematic literature review process for sharing economy and socio-technology definitions

Table 1. Publication year of the extracted papers on sharing economy and socio-technology

Year	Sharing economy/Socio-technology papers		Papers based on socio-technological theory in Business/Management/Accounting journals
	Total number	Used for analysis	
1970–2015	30	21	9
2016	49	9	1
2017	97	10	3
2018	126	11	1
2019	234	16	0
2020	325	9	1
2021	68	6	1

Also, it can be seen that the articles based on the application of socio-technological theory is very much limited in Business, Management and Accounting journals.

DEFINING SHARING ECONOMY

The scientific literature dealing with SE is relatively new, even though the term was first added in oxford dictionary in 2015 [Heo, 2016]. The term sharing economy has its origin in technology enabled interactions in between users on internet [Botsman, Rogers, 2010] having the potential of transitioning the society into post-ownership economy [Belk, 2014]. Though sharing is an act inherent to humanity, what makes SE different is the sharing amongst strangers [Frenken, Schor, 2017]. In order to understand different facets of SE, it's imperative to examine extant literature definition on it (Table 2).

As it can be observed from Table 2, the variation in definition stems from the fact that there's ambiguity in understanding on what constitute sharing. The definitional evolution of SE pre-dominantly revolved around the set of characteristics associated with it at that period of time and as observed by the authors. First, SE offers an alternative to permanent ownership providing access to under-utilized resources [Bardhi, Eckhardt, 2012]. Second, it's an economically motivated (not socially) and technologically mediated transaction in between the participants [Perren, Kozinets, 2018; Eckhardt et al., 2019]. The extant definitions elaborate the conceptualization of SE as an economic system where a customer plays the dual role of provider and user of the assets [Narasimhan et al., 2018]. The mediator (often the service provider or the third party) may or may not own the resources [Ertz, Durif, Arcan, 2016]. The extant literature on SE provides insights to different consumption practices and dimensions associated with it which is presented in Table 3.

Type of sharing economy system. The SE works in three different ways based on resource circulation system; product-service systems, redistribution markets and col-

Table 2. Overview of extant literature definition on sharing economy

Author	Definition
[Felson, Spaeth, 1978, p. 614]	“Those events in which one or more persons consume economic goods or services in the process of engaging in joint activities with one or more others”
[Benkler, 2004, p. 356]	“A class of resources or goods that are amenable to being shared within social sharing systems rather than allocated through markets”
[Lessig, 2008, p. 143]	“Collaborative consumption made by the activities of sharing, exchanging, and rental of resources without owning the goods”
[Botsman, Rogers, 2010, p. xv]	“The rapid explosion in swapping, sharing, bartering, trading and renting being reinvented through the latest technologies and peer-to-peer marketplaces in ways and on a scale never possible before”
[Bardhi, Eckhardt, 2012, p. 881]	“Access-based consumption as transactions that may be market mediated in which no transfer of ownership takes place”
[Lamberton, Rose, 2012, p. 109]	“Marketer-managed systems that provide customers with the opportunity to enjoy product benefits without ownership. Importantly, these systems are characterized by between consumer rivalry for a limited supply of the shared product”
[Heinrichs, 2013, p. 229]	“Economic and social systems that enable shared access to goods, services, data and talent. These systems take a variety of forms but all leverage information technology to empower individuals, corporations, nonprofits and government with information that enables distribution, sharing and reuse of excess capacity in goods and services”
[Belk, 2014, p. 1597]	“People coordinating the acquisition and distribution of a resource for a fee or other compensation”
[Botsman, 2014, p. 24]	“The collaborative economy is a system that activates the untapped value of all kinds of assets through models and marketplaces that enable greater efficiency and access increasingly those assets include skills, utilities, and time”
[Kathan, Matzler, Veider, 2016, p. 663]	“This so-called sharing economy phenomenon is characterized by non-ownership, temporary access, and redistribution of material goods or less tangible assets such as money, space, or time”
[Puschmann, Rainer, 2016, p. 95]	“The use of an object (a physical good or service) whose consumption is split-up into single parts. These parts are collaboratively consumed in C2C networks coordinated through community-based online services or through intermediaries in B2C models”
[Habibi, Kim, Laroche, 2016, p. 277]	“An economic system in which assets or services are shared between private individuals, either for free or for a fee, typically by means of the Internet”
[Hamari, Sjöklint, Ukkonen, 2016, p. 2049]	“The peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services”
[Ertz, Durif, Arcand, 2016, p. 6]	“The set of resource circulation systems, which enable consumers to both ‘obtain’ and ‘provide’, temporarily or permanently, valuable resources or services through direct interaction with other consumers or through a mediator”

Author	Definition
[Frenken, Schor, 2017, p. 4–5]	“Consumers granting each other temporary access to under-utilized physical assets (idle capacity), possibly for money”
[Narasimhan et al., 2018, p. 93]	“The recent phenomenon in which ordinary consumers have begun to act as sellers providing services that were once the exclusive province of ordinary sellers”
[Perren, Kozinets, 2018, p. 21]	“A market that is formed through an intermediating technology platform that facilitates exchange activities among a network of equivalently positioned economic actors”
[Eckhardt et al., 2019, p. 3]	“A scalable socioeconomic system that employs technology-enabled platforms to provide users with temporary access to tangible and intangible resources that may be crowd-sourced”
[Gerwe, Silva, 2020, p. 71]	“A socioeconomic system that allows peers to grant temporary access to their underutilized physical and human assets through online platforms”
[Hazée et al., 2020, p. 4]	“Collaborative consumption involves triadic exchange practices; the digital platform provider does not own the resources or assets being shared and is therefore able to scale up very rapidly; the core service provider is usually a nonprofessional individual; and interactions between actors must occur to ensure service delivery”

Table 3. Features and characteristics associated in defining and conceptualization of sharing economy

Feature	Characteristic
Type of sharing economy system	<ul style="list-style-type: none"> – Product service/access based – Redistribution market – Collaborative lifestyle
Type of exchange	<ul style="list-style-type: none"> – Transaction fee – Subscription fee – Barter/Swap – Free
Type of ownership	<ul style="list-style-type: none"> – Permanent/Redistribution – Long-term access – Short-term access – Temporary access followed by disposition – Mutual use
Type of operating channel	<ul style="list-style-type: none"> – Online – Online platform (major role) – Online platform (facilitator) – Online platform (minor role) – Offline
Type of participants	<ul style="list-style-type: none"> – Resource user (obtainers) – Resource provider – Intermediaries (facilitator)

laborative lifestyles [Botsman, Rogers, 2010]. Product-service system refers to commercial peer-to-peer system where consumers have temporary access to goods and services, redistribution market is the collaborative sharing of resources by the ones who don't need them anymore to the ones who need them and collaborative lifestyle is the mutual exchange of time, space and skills.

Type of exchange and ownership. The transaction occurring on SE platforms are both monetary and non-monetary allowing consumers to get access to resources for permanent or temporary use [Belk, 2010; Bardhi, Eckhardt, 2012; Lamberton, Rose, 2012; Botsman, 2014; Ertz, Durif, Arcand, 2016].

Type of operating channel and participants. Though SE transactions occur primarily on online platforms, but there are certain exchanges for mutual use occurring offline too [Felson, Spaeth, 1978; Ertz, Durif, Arcand, 2016] where SE participants can be both consumers (obtainers and providers) acting with or without the help of intermediaries [Ertz, Durif, Arcand, 2016].

CONCEPTUAL DELINEATION OF SHARING ECONOMY

Definitional analysis of sharing economy. As evident from above, the extant literature on SE provides important insights but it gives a narrow and conventional perspective of SE. Analysing the SE definition presented in Table 2 yields the researchers approach towards SE either being consumer centric, technology focused or both (Table 4).

An important facet of the SE definitional analysis reveals its evolution over time; from being a joint activity or consumption in between individuals [Felson, Spaeth, 1978]

Table 4. Approaches to sharing economy definition

Author	Keyword	Consumer centric	Technology focused
[Felson, Spaeth, 1978; Benkler, 2004; Lessig, 2008; Bardhi, Eckhardt, 2012; Lamberton, Rose; 2012; Belk, 2014; Botsman, 2014; Kathan, Matzler, Veider, 2016; Frenken, Schor, 2017; Narasimhan et al., 2018]	<ul style="list-style-type: none"> - Joint activities - Social sharing systems - Sharing, exchanging, and rental of resources without owning the goods - Access-based consumption; benefits without ownership; collaborative economy 	Yes	No
[Botsman, Rogers, 2010; Hamari, Sjolint, Ukkonen, 2016; Perren, Kozinets, 2018]	<ul style="list-style-type: none"> - Sharing, bartering, trading and renting through peer-to-peer marketplaces - Intermediating technology platform 	No	Yes
[Heinrichs, 2013; Puschmann, Rainer, 2016; Habibi, Kim, Laroche, 2016; Ertz, Durif, Arcand, 2016; Eckhardt et al., 2019; Gerwe, Silva, 2020; Hazée et al., 2020]	<ul style="list-style-type: none"> - Information technology to empower individuals to share - Community-based online services; individuals sharing through internet - Resource circulation systems; scalable socioeconomic system 	Yes	Yes

to economically motivated sharing amongst consumers [Eckhardt et al., 2019]. Although in their recent definition of SE researchers have acknowledged it as a socioeconomic system, but what they've missed is the interplay in between the role of society, individual social beings, the firms and its employees. In understanding the SE phenomenon, researchers focused on what drives consumer to participate in SE taking consumer centric and technologically focused approach and in the process identifying relevant constructs associated with it (Table 5).

Table 5. Antecedents associated with SE adoption

SE adoption driver	Positive influence	Negative influence
Intrinsic drive	<ul style="list-style-type: none"> – Trust [Möhlmann, 2015] – Social belonging [Tussyadiah, Pesonen, 2016] – Ownership [Botsman, Rogers, 2010] – Enjoyment [Hamari, Sjöklint, Ukkonen, 2016] – Personal reputation [Anthony, Smith, Williamson, 2009] – Financial rewards [Lee et al., 2018] – Attitude [Johnson, Mun, Chae, 2016] – Consumption utility [Ertz et al., 2018] – The social media [Ikkala, Lampinen, 2015] 	<ul style="list-style-type: none"> – Privacy and security issue [Krasnova et al., 2010] – Egoism [Perren, Stewart, Satornino, 2019] – Authenticity [Lundberg, Ziakas, 2018] – Possessiveness, Materialism [Parguel, Lunardo, Benoit-Moreau, 2017]
Extrinsic drive	<ul style="list-style-type: none"> – Environmental concern [Zamani, Sandin, Peters, 2017] – Sustainability [Piscicelli, Cooper, Fisher, 2015; Ertz, Leblanc-Proulx, 2018] – Online platform (quality) [Zervas, Proserpio, Byers, 2017] 	<ul style="list-style-type: none"> – Availability [Decrop et al., 2018] – Prestige [Boateng, Kosiba, Okoe, 2019] – Contamination [Baek, Oh, 2021]

The Table 5 provides an overview of researchers' perspective in dealing with SE phenomenon and investigating it in isolated stance of either consumer centric [Möhlmann, 2015; Tussyadiah, Pesonen, 2016] or technology focused [Lee et al., 2018] or viewing it as a business model [Botsman, 2014] having certain impact on economy.

Intrinsic drive vs. extrinsic drive. Consumers' intrinsic drives (e.g. financial rewards, consumption utility, materialism, etc.) are their internal motivations to use or reject any product or services whereas their extrinsic drives (e.g. environmental concern, sustainability, availability, etc.) are the external factors influencing in their consumption decision making process.

Positive influence vs. negative influence. Positive influences (e.g. trust, social belonging, etc.) are the factors that propels consumer to use any particular product or service whereas negative influence (e.g. contamination, privacy and security issues, etc.) are the factors that inhibit consumer from using any product or service.

Predominantly researchers worked on benefit/risk model to investigate SE, consumption choices and the business environment associated with it. The Table 5 also

presents certain characteristics associated with SE from the consumer viewpoint which highlights its significance as a technologically embedded social system but in a fragmented way. That left a gap in research from the holistic viewpoint where the socio-economic system is itself integrated with social needs and various elements associated with it. If technology and other factors associated with consumption choices are embedded in social order, then both the consumer and social factors should be a part of the analysis of any technology dependent system. Therefore, the research focuses on bringing a holistic view of SE in conceptualizing the interplay in between various elements associated with it. In this regard, the conceptualization of SE takes socio-technological approach combining the elements of SE in a one whole integrated framework.

Socio-technology and its relationship with sharing economy. Any technology dependent system which is embedded in socio-economic order should be a part of the analysis as a whole system. This is what the extant literature on socio-technology signifies that. The aim of socio-technology is to engineer socio-systems using social science research and to examine their result and execution. Socio-technology can be seen as design, moderation and continuation of the system. It's a coherent network of relationship that encompasses the individual, society and institutions associated with it. But before going further into the detail on what socio-technology entails, an overview of its conceptual evolution is necessary to understand its concept and its relationship with SE. Analysis of the Table 6 reveals the evolution of socio-technology as concept overtime.

The Table 6 presents the conceptual evolution of socio-technology; from the study of human and machine interaction to the study of processes in which the social and

Table 6. Conceptual evolution of socio-technology

Author	Definition
[Emery, Trist, 1960, p. 85–86]	“The reciprocal interrelationship between humans and machines; fostering relationship in such a way that efficiency and humanity would not contradict each other any longer”
[Bostrom, Heinen, 1977, p. 14]	“A framework in which an information system consists of two subsystems: the technical and the social”
[Trist, 1981, p. 24]	“Social and technical system should be considered together, and also the dynamic and reciprocal interrelationships between those two domains”
[Ropohl, 1982, p. 527]	“A systems model describing both social and technical phenomena, persons and machines, the technization of society and the socialization of technology”
[Farmer, 1995, p. 95]	“A grouping of social engineering and management science”
[Bijker, 1997, p. 274]	“Society is not determined by technology, nor is technology determined by society. Both emerge as two sides of the socio-technical coin”
[Bunge, 1998, p. 297]	“The study of processes on the intersection of society and technology”
[Vojinović, Abbott, 2012, p. 164]	“The study of processes in which the social and the technical are indivisibly combined”

technical are indivisibly combined. As evident from above, the application of socio-technological concept has been limited to industrial study and social reforms whereas its application in socio-economic environment has never been investigated or applied. In fact, the concept of the socio-technical system was created in the context of industrial worker studies [Emery, Trist, 1960]. Initially the concept was established to understand the interrelationship in between human and machines which over the period evolved to take a much broader context involving society, the individuals within it, the associated firms and their technology. It's even more relevant in the context of SE as it merges the social aspect and the technical aspect, an indivisible combination of social engineering and management science [Farmer, 1995; Vojinović, Abbott, 2012]. Thus, as W. Bijker wrote: "Society is not determined by technology, nor is technology determined by society. Both emerge as two sides of the socio-technical coin" [Bijker, 1997, p. 274]. In fact, the model of socio-technological system signifies the development of technologies catering the needs of society and its impact. Every technological invention brings a change in society or results from it. In understanding the complexity of the system rather than analyzing it in separated aspects, R. Bostrom and J. Heinen [Bostrom, Heinen, 1977] presented a framework (Figure 2) to analyze the socio-technological system. The given framework presents the interaction and interrelationship in between social (people and structure) and technical (technology and process) systems associated within an organization.

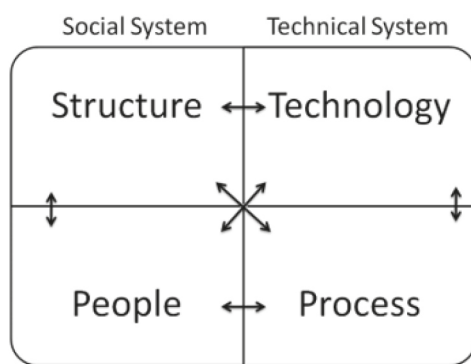


Figure 2. Socio-technical system

Source: [Bostrom, Heinen, 1977, p. 14].

Though the framework was presented within an organizational setting and as extant literatures on it earlier theorized, the basic deduction on social structure (on a much broader scale) was brought upon by much more recent definition of socio-technology given by the researchers. This socio-technological framework forms the foundation of the SE conceptual framework presented in the next section.

Introduction to socio-technological framework of sharing economy. Drawing on the socio-technological theory, this conceptual paper views SE as a socio-technological system. Before moving ahead it's imperative to define SE in the socio-technological

context, in that the study proposes the following definition after critically analyzing the extant literature definition through different perspective: An indivisibly combined socio-technological economic system addressing the needs and requirements of the society and its consumers. Socio-technology strives to achieve social innovation through the creation of technologies to solve social problems. In SE perspective, it's a technologically mediated socio-technological system enabling the access to under-utilized assets, both tangible and intangible, to consumers and organizations granting common or exclusive usage on a temporary or permanent basis for sustainable resource efficiency and optimization. Following the socio-technological theory, sharing economy is viewed as a technologically embedded socio-economic system comprising of social and technical system. The social subsystem concerns with consumers (the individuals participating in the SE) and the society taking human and social perspective whereas the technical subsystem focuses on the SE firm (their role and responsibilities), technology (platform and app) and the employees (the process involved). For the socio-technological SE system to work properly, both the subsystem should complement each other forming an indivisibly combined interrelationship in between them.

Table 7 presents the individual constituents and the elements (factors) associated with the socio-technological SE system.

Table 7. Socio-technological system of sharing economy

Social system		Technical system	
Subsystem	Aspect	Subsystem	Aspect
Consumer (prosumer)	<ul style="list-style-type: none"> – Consumption needs and requirements, affordability – Social relationship and interaction (social belonging and personal reputation) – Societal responsibility 	SE firm	<ul style="list-style-type: none"> – Business model – Technology (online) – CSR (corporate social responsibility)
Society	<ul style="list-style-type: none"> – Social economic inequality – Sustainable development and consumptions – Environmental concern 	SE firm employees (and the process)	<ul style="list-style-type: none"> – Facilitating the process – Relationship management (feedback and reviews) – Awareness (social and economic)

The following section elaborates the two systems social and technical followed by their interrelationship.

Social system. Social system takes human and social perspective to achieve its goal. It deals with the unresolved issues prevalent in society and the well-being of the individuals in it apart from addressing the negative effects of globalization and industrialization which has become conspicuous. How do you balance the needs and requirements of a consumer while addressing the social needs of the society and vice versa? The advance-

ment in information society has seen changes in the needs and requirements where consumer is more susceptible to the current socio-economic dynamics.

Consumer. Consumers are considered as a part of socio-technological system for two specific reasons; first, it's their need and requirement that's being addressed through the creation of technology and second, consumers are essentially "prosumers" where they simultaneously consume and produce the goods and services (e.g. carpooling) and hence essentially making them institutional actors [Ritzer, Jurgenson, 2010].

The socioeconomic dynamics have changed consumers' consumption behaviour, their needs and requirements. The readily available information (both online and offline) has made present day consumers more smart where the intrinsic and extrinsic value of the product and services offered are evaluated in terms of their usage value. Technological advancements have rapidly changed consumers' consumption behaviour from private ownership to access based with temporary or shared rights [Bardhi, Eckhardt, 2012; Eckhardt et al., 2019]. Owning a product is no longer a driving factor in consumer purchase intention; far from being satisfying value-enhancing motive [Botsman, Rogers, 2010]. Instead of buying an expensive product for only a few time usages (affordability), consumers are willing to share as they see financial incentives in it [Lee et al., 2018]. It's not only their personal needs and requirements that are driving consumers towards SE but also a change in perception towards their own societal responsibility and well-being of fellow members which essentially makes them a part of socio-technological system. For them, SE presents an alternative choice towards ethical consumption fulfilling their societal obligation. Being part of SE also gives them an opportunity to have long lasting positive interpersonal relationship as individuals living in society have innate desire for belongingness and relationship [Baumeister, Leary, 1995]. It's an emotional need to be an accepted part of a group which enhances their personal reputation. Apart from that, being part of a social structure gives them an opportunity to interact with other like-minded people and care for one another (e.g. Couch Surfing).

Proposition 1. The change in consumption behaviour and attitude towards social issues has led consumers to adopt sharing economy. Consumers are the part of socio-technological system as it's their need and requirement that needs to be fulfilled while presenting a technological solution.

Society. Society is inherently considered as a part of socio-technological system as they present the social needs and requirements that need to be addressed by the creation of technological solutions. In any modern society, social economic inequality (unequal distribution of income and assets) is a major concern which calls for economic reforms [Stiglitz, 2012]. The unequal distribution of wealth within the members of society and the current globalization has seen resources distributed unevenly affecting consumers globally. Not all products and services are accessible to certain members in a particular society. For them, SE presents an opportunity to have access to those products which are financially out of reach. As a partial solution to social economic inequality, SE bridges the gap in between the ones who have and who have not. The income inequality isn't the only major concern within a social structure but sustainable development of resources

(for both economic and social development) as not to cause harm in the future [Brundtland, 1987]. The sharing economy presents a more sustainable alternative to the current linear economy in which resource flows in one direction of manufacture, use and discard. Such form of economy creates waste and puts burden on the finite resources present on earth. For example, the increased demand for cobalt for electric vehicles is already putting a question over its sustainable supply in the future [Forbes, 2019]. Sustainability is a social concern within society for a better resourceful future ahead, which calls for innovative sustainable solution that can be sustained without declining the human per capita well-being [Piscicelli, Cooper, Fisher, 2015]. Protecting the environment is another societal concern growing louder day-by-day. The ever increasing air pollution caused by green-house gases, water and soil contamination due to industrial waste and clearing of forest for industrial purposes has put a strain on the environment and are one of the leading causes of bio-diversity loss [UN environment, 2019]. Because of degrading environment, many societies are now concerned with their economic development model and are moving towards green economy where SE presents an amicable solution [Zamani, Sandin, Peters, 2017; Cherry, Pidgeon, 2018].

Proposition 2. Societal concerns and issues call for social innovation which is answered by sharing economy firms through the development of technological solution.

Technical system. Technical system takes technological and process centric approach to achieve its goal. It facilitates the creation of technologies and processes that meets the need and requirement prevalent in society while addressing the consumers.

Sharing economy firm (technology and business model). SE firms are considered as a part of socio-technological system as they facilitate the creation of technologies and processes that addresses the needs and requirements of society in general and individuals (consumers) in particular. Past decade financial crisis saw rise in unemployment which decreased the purchasing power of consumers and made people resort to alternative mode of consumption. The shift in consumption pattern saw the inception of SE business model and firms that addressed the needs and requirements of the consumers prevalent at that time. SE firms are essentially a part of socio-technological system as they acknowledge the needs of society (economic inequality, sustainability and environmental concern) by the development of social technological apps and websites that addresses their concerns. SE firms' are technology dependent with their success relying on the ubiquity of internet [Cohen, Kietzmann, 2014] connecting people who have resources to share with the ones who don't have. With the social technological app getting more secure, easy to use and transparent; exchange or access of assets is no longer limited to people prior acquaintance with one another [Schor, Fitzmaurice, 2015] and the SE platform essentially performing a match-making service. Even though the social economic inequality cannot be fully addressed but at least the SE platforms gives an opportunity to the consumers (and individuals) to get access to some of the expensive products and services via sharing. As the SE firms don't produce any resources but solely relies on the existing resources being shared through its technological platform; it addresses the sustainability concern prevalent in society. With more people sharing, it puts fewer bur-

dens on environment too. For example, an independent study conducted by BlaBlaCar (a carpooling service provider) showed how carpooling saves more than 1.6 million tons of CO₂ per year [BlaBlaCar Blog, 2019]. Even though SE firms are profit making institutions but one of their prime concerns is the social issues prevalent in society. While most of the traditional firms based on linear economy model take CSR activities (corporate social responsibility) as part of imposed regulatory guidelines, SE firms essentially performs those activities in general and, hence fulfilling their societal commitment.

Proposition 3. Sharing economy firms addresses the needs and requirements of society and consumers by presenting a technological solution.

Sharing economy firm employees (and the process). SE firm employees are essentially a part of socio-technological system as they are responsible for implementing the business model and facilitating the process involved in SE. A business model is an abstract representation of business activities (and process) which a firm decides in how they do business [Massa, Tucci, Afuah, 2017]. SE is a technologically mediated socio-economic system which facilitates access to under-utilised goods and services. The SE platform acts as a mediator in between resource owner and the resource user, essentially carrying out matchmaking in return for transaction fee (e.g. AirBnB, BlaBlaCar, YouDo, etc.). For the smooth functioning of the technological SE platform and its process, a firm requires employees (engineers, technicians, administrators, etc.) which essentially make them a part of socio-technological system. SE firm employees play major role apart from simply developing and maintaining the website (and app) as sometimes they act as a direct mediator in transaction settlement which comes to them through feedback (reviews) and complaints. Another dimension of SE firm employees work portfolio (in concern with socio-technological system) is raising social and economic awareness. Through different channels (such as social media, blog post, firm website, etc.) they highlight various social and economic issues (e.g. sustainability, environment, economic inequality, etc.) prevalent in society.

Proposition 4. SE firm employees are responsible for the implementation of the business model, facilitation of the technologically mediated sharing process and raising social awareness (impact of sharing) which essentially makes them a part of socio-technological system.

For a socio-technological system to work properly it's all system and sub-system should interact and complement each other maintaining a symbiotic relationship. Tables 8 and 9 demonstrate and summarize how each element in a sub-system uses technology to fulfil their social motives.

One of the most important aspect of the following table is that it portrays how each sub-system within socio-technology are interlinked with one another having a common ground in terms of social motivation and technology dependency. Consumers which are inherently a part of society and society comprising of people with shared values, beliefs and concerns. Same goes with a firm comprising of employees having same vision and mission. Both social and technical systems interact with each other to achieve their goal and aim.

Table 8. Tapestry of socio-technological interplay

Sharing economy service	Social system		Technical system	
	Consumer (prosumer)	Society	Sharing economy firm	Sharing economy firm employees
Accommodation sharing (e.g. AirBnB, Vrbo-HomeAway)	Finding and sharing cost-effective rental accommodation to interact with people from different community to learn new culture and tradition while travelling <i>Social motive: social belonging</i>	Emphasis on bringing people from different community together <i>Social motive: social well-being</i>	Online platform creation to connect and facilitate access to cost-effective accommodation amongst users <i>Social motive: social trust, social belonging</i>	Generating trust creating features for transparency and accountability. Feedback, reviews and online rating system to generate trust amongst users <i>Social motive: social trust, relationship management</i>
Ride sharing/Car-sharing (e.g. Uber, BlaBlaCar)	Sharing and travelling with likeminded folks, interaction with strangers and finding cost-effective way to travel <i>Social motive: social belonging</i>	Emphasis on reduction of environmental pollution through decrease in greenhouse gas emission from vehicles <i>Social motive: environmental concern</i>	Connecting likeminded travelers through online platform and app, providing cost-effective way to travel while promoting environmental awareness <i>Social motive: environmental concern</i>	Generating trust creating features for transparency and accountability. Feedback, reviews and online rating system to generate trust amongst users <i>Social motive: social trust, relationship management</i>
Short term rental commodities (e.g. Rent the Runway, Avito.ru, Turo)	Sharing and renting commodities to fulfil others need and requirements for ethical consumption and gaining access to expensive goods and services <i>Social motive: sharing goods and services, societal responsibility</i>	Emphasis on waste reduction through optimum utilization of resources and providing equitable access to goods and services for everyone <i>Social motive: sustainability, social economic inequality</i>	Facilitation and creation of redistribution market through online platform and app <i>Social motive: Sustainability, Access to expensive goods and services for everyone</i>	Ensuring security and transparency of transaction while facilitating value co-creation <i>Social motive: Social trust, Relationship management</i>

Sharing economy service	Social system		Technical system	
	Consumer (prosumer)	Society	Sharing economy firm	Sharing economy firm employees
Collaborative lifestyle (e.g. CouchSurfing.com, MealSharing, NeighbourGoods, YouDo.com, TaskRabbit)	Communicating and interacting with people from different community and country, storytelling and sharing their experiences, knowledge and skill sharing by performing tasks for others <i>Social motive:</i> societal responsibility, personal reputation, social belonging	Emphasis on bringing community together, caring for other people and decreasing unemployment <i>Social motive:</i> social well-being	Creation of community and gig platform to facilitate interaction amongst users <i>Social motive:</i> social trust, decreasing unemployment, social belonging	Online community engagement through social media and websites <i>Social motive:</i> social trust, relationship management

Table 9. Socio-technological relationship

System	Sub-system	Social motive	Medium	Aspect	Example
Social system	Consumer (prosumer)	Sharing (goods and services)	SE firm website and apps	Fulfilling others need and requirements	Fon (sharing your Wi-Fi bandwidth), Stashbee (sharing under-utilized space), etc.
		Social belonging	SE firm online community forum, website, social media pages	Communication and interaction, storytelling	Couchsurfing.com, BlaBlaCar, etc. (where like-minded people meet, interact and travel with each other)
		Personal reputation	Worldwideweb, Web 4.0	Knowledge sharing	VLC media player, Linux, Wikipedia, etc. (contributing into open source software programs, sharing expertise, knowledge and information)
		Societal responsibility	SE firm platform	Ethical consumption, Caring for others	Care.com (child, parent, pet care), MealSharing, Neighborsgoods (sharing your items with neighbours and friends), etc.
	Society	Social economic inequality	SE firm platform, website and apps	Access to expensive goods and services	Rent the Runway (sharing high end designer fashion clothes), Turo (sharing high end luxury cars such as Ferrari, Lamborghini, McLaren, etc.), Vrbo (High end vacation rental), etc.
		Social well-being	SE firm platform, website and apps	Bringing community together	AirBnB (sharing accommodation), Neighbor (sharing storage space), etc.
		Environmental concern	SE firm online blogs and websites, social media pages	Raising awareness, carbon footprint reduction	BlaBlaCar blog on carbon emission, Lime (bicycle sharing, reduction of toxic gas emission), etc.
		Sustainability	SE firm platform	Redistribution market	Avito.ru (sharing under-utilized resources), Poshmark (online p2p clothing marketplace), etc.

System	Sub-system	Social motive	Medium	Aspect	Example
Technical system	SE firm	Job creation	SE firm platform	Decreasing unemployment	Gig platform such as YouDo.com, TaskRabbit, Fiverr, Rover, SitterCity, etc. (providing additional source of income, part-time job and freelancing)
		Social trust	Online rating system, Online feedback and review	Transparency and accountability	Online rating left by Uber users after using the service, Secure payment gateway for online transaction, etc.
	SE firm employees	Relationship management	SE firm online community forum, website, social media pages	Customer engagement and value co-creation, feedback and reviews	Online community forum (on Facebook, Vk.com, firm's website, etc.) to interact with consumers (BlaBlaCar, Avito.ru, BelkaCar, etc.)

CONCLUSION

The study aimed to bridge the gap in extant literature by considering SE as a socio-technological system after analyzing different approaches taken by previous researchers and in doing that it put society as a focal point while categorizing different facets of SE. The research paper viewed SE as a two inter-linked and inter-dependent system (social system and technical system) based on socio-technological theory further categorizing them into four subsystems [Bostrom, Heinen, 1977; Vojinović, Abbott, 2012]; consumer (prosumer), society, SE firm and SE firm employees. And in doing so, the study conceptualized SE as a socio-technological system embedded into economic system with society as its main focal point highlighting different social motives and aspects of each subsystem (such as societal responsibility, social inequality, well-being, sustainability, environmental concern, etc.) that makes them an integral part of the system. The first subsystem, consumers (prosumer) play an important role in the socio-technological system as they are the provider and obtainers of the resources. It's their needs and requirement that's being addressed through the creation of technological solution. Consumers are driven by their social motive (social belonging, societal responsibility and personal reputation) in their adoption of SE. The second subsystem, society plays the role of institutional actor. It calls for social innovation through technological development to address the issues prevalent in society such as social economic inequality, social well-being, sustainability and environmental concern. It also lays down guidelines for ethical and sustainable consumption. The third subsystem, SE firm plays the role of solution provider to the needs and requirements of consumer and society. The fourth subsystem, SE firm employees ensures the design, development and maintenance of the technological solution. They play an important role in generating social trust and managing relationship amongst users.

Theoretically, the study contributes to the extant literature on SE by presenting and highlighting the four systems associated with it and proposing the categorisation based on socio-technological theory. The current study expands understanding on SE where social issues are discussed such as waste reduction (food wastage), social responsibilities, sustainability and environmental issues [Harvey et al., 2019; Mazzucchelli et al., 2020; Minami, Ramos, Bortoluzzo, 2021]. The contribution of this study extends into the field of socio-technology where until now its application was very much limited to social engineering. Managerially, the study highlights the social needs and requirements of the consumer and society which a firm can focus through different organizational department (specific product development, marketing and service initiative, etc.). Despite the above mentioned contributions to extant literature on SE and management, this study has limitations as it was pre-dominantly performed on the articles selected from Scopus top ranked journals (4*, 4 and 3) from ABS list. Due to this some potentially relevant articles might have been overlooked while carrying out the analysis. However, the quality and scope of the selected articles assures strong research underpinning of the analysis. This study opens future research direction: first, should the society lay down

institutional framework to regulate SE firms; second, how should SE firms' best connect with consumers (prosumers) in terms of their needs and requirements; third, what's the role of SE firm employees in customer experience journey? Diverting from traditional beliefs, this study presents new opportunity to view SE from a different perspective, to develop new frameworks and ask new questions.

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Received: March 12, 2021

Accepted: May 6, 2021

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СОЦИАЛЬНО-ТЕХНОЛОГИЧЕСКАЯ СИСТЕМА ЭКОНОМИКИ СОВМЕСТНОГО ПОТРЕБЛЕНИЯ

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Для цитирования: Singh A. 2021. Socio-technological system of sharing economy. *Вестник Санкт-Петербургского университета. Менеджмент* 20 (2): 192–215.
<http://doi.org/10.21638/11701/spbu08.2021.203>

Экономика совместного потребления — это система, успешное функционирование которой зависит от двух подсистем: технологической и социальной, причем обе подсистемы должны дополнять друг друга, образуя неразрывно объединенную сплоченную структуру. Именно это предполагается в рамках социально-технологической теории, которая базируется на предпосылке сбалансированности социальных и технологических аспектов. Для решения социальных проблем необходимы социальные инновации, которые позволят удовлетворить нужды и потребности как всего общества, так и отдельных граждан. Цель статьи заключается в том, чтобы восполнить пробел в существующей литературе, предложив целостное видение экономики совместного потребления, основанное на социально-технологической теории. В результате проведенного систематического обзора исследований в таких областях, как экономика совместного потребления и социально-технологическая теория, автором предложена концептуальная основа экономики совместного потребления, базирующаяся на социально-технологической теории, выявлены различные социальные мотивы, связанные с каждой подсистемой, и установлено взаимодействие между ними. Экономика совместного потребления представлена сквозь

теоретическую призму социальных технологий, фокусируясь при этом на потребностях и требованиях общества и потребителей.

Ключевые слова: экономика совместного использования, совместное потребление, социальные технологии, современная рыночная экономика, потребление на основе доступа, технологии и общество, потребитель.

Статья поступила в редакцию 12 марта 2021 г.

Статья рекомендована в печать 6 мая 2021 г.

Контактная информация

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