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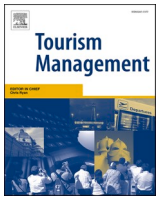

Case study

Control, use and ownership of big data: A reciprocal view of customer big data value in the hospitality and tourism industry

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ABSTRACT

While the large-scale harvesting of consumer data is a common practice in the hospitality and tourism industries, the seemingly unassailable right of companies to collect and share consumer data is not without critics. The purpose of this paper is to explore the nature of data-based value co-creation under varying conditions of consumer control and benefits. Academic and press articles were used to explore the nature of big data value co-creation in a wide range of hospitality, tourism, and other industries. A forward-looking approach was adopted by considering the implications of policy and technology as key mechanisms for sharing the power dynamic regarding the ownership, control and use of personal data. The results suggest that reciprocal big data value creation can be seen as a function of the level of benefit and control afforded to consumers regarding the use of their data. Four types of reciprocal big data value creation are proposed.

1. Introduction

In the 1890s, a photograph of a Rochester teenager named Abigail Roberson was used without her permission in advertisements for the Franklin Mills Flour Company (Greene, 2017; Spears, 2008, pp. 1043–1050). Advertisements showed her image with the headline, "Flour of the Family." On the grounds that her physical likeness was her property and not that of the photograph's owner, Roberson sued Franklin Mills. The case was decided in 1902 by the New York Court of Appeals, with a 4–3 ruling against the plaintiff. In the ruling, Chief Judge Alton Parker wrote "The so-called 'right of privacy' has not as yet found an abiding place in our jurisprudence." The decision was widely unpopular and prompted a public outcry. The next year, the State of New York passed a law recognizing the individual's ownership of (and right to control) his/her name and physical likeness. Many other states enacted similar legislation soon thereafter.

More than a century later, property ownership is once again a topic of significance in the domain of hospitality and tourism marketing. However, the issue is no longer that of the consumer's ownership of his/her physical likeness. Instead, the current debate concerns the right of the consumer to control his/her digital likeness; and despite the gap in time (and cultural norms), the issues that Ms. Roberson faced over 100 years ago are quite similar to the issues that consumers face today regarding the ownership of the demographic, psychographic, and behavioral data that make up their virtual identities.

As was the case in 1890 regarding photographs, the prevailing sentiment regarding data collection in the contemporary marketing environment is that the organization that records a set of data becomes its owner (although the legal basis for this sentiment remains questionable). In many cases, these data are collected without the consent, or even the awareness, of the consumer. The company is then free to extract value from the harvested data without sharing any of the ensuing financial benefits with the individual that (knowingly or unknowingly) provided that information; and while consumers may benefit from improved personalization and convenience, they (like Abigail Roberson) ultimately have neither ownership of their data nor control over how it is used or shared.

Interestingly, while the idea of a company making money off an

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individual's physical likeness without his/her consent would widely be considered as unethical, there has (until recently) been relatively less public awareness and concern regarding the corporate harvesting/use of customers' digital profiles. Likewise, there has been very little academic inquiry into the issues surrounding the ownership and management of consumer data that are routinely collected by tourism and hospitality firms for marketing purposes (Mariani, Baggio, Fuchs, & Höepken, 2018). Accordingly, the purpose of this research is to address this gap in the literature by arguing that tourism, hospitality, and other service organizations should no longer seek to unilaterally dictate the nature of the value that is created from the collection, analysis, and use of consumer data. Moreover, this research argues that the contemporary paradigm of opaque data collection and limited customer control may ultimately be undesirable for all stakeholders involved. Taking a forward-looking view, this paper introduces the notion of reciprocal big data value creation, a description of the situation that arises when consumers and hospitality organizations share the ownership, control and usage of data in such a way as to benefit all parties involved in the transaction.

In defining the notion of reciprocal big data value creation, we first discuss the current state of big data collection and ownership, as well as the issues surrounding the privacy, security, usage, and value of such data. We then conduct a review of the existing literature in this domain. We consider the role that both policy and technology could play in reshaping the nature of big data management and the value that is created from its collection and use. These issues are specifically considered within the domain of tourism and hospitality service provision where large companies have the ability to record (and subsequently analyze) an enormous amount of customer-company and customer-customer interactions prior to, during, and after the consumption process.

2. Literature review

2.1. Big data as a value catalyst

Big data are generated through many sources such as mobile transactions, user generated content, social media, website behavior, etc. The systematic collection of these data provides hospitality companies with powerful tools to (1) gain better insights from observing patterns in consumer interactions and behaviors, (2) develop more effective strategies for improving firm performance (McAfee & Brynjolfsson, 2012; McColl-Kennedy, Zaki, Urmetzer, Neely, & Lemon, 2019) and (3) make more precise predictions to optimize business processes (Malthouse & Li, 2017). Organizations can even collect data in real-time and then use it to enhance the service experience as it unfolds (Lim, Kim, Kim, Kim, & Maglio, 2019).

The collection of consumer data can also help companies decide how to engage with customers more effectively and how to identify the most valuable customers. For example, hotels can track not only what services customers purchase and use, but also the specific processes by which they navigate through the hotel's website and whether they are influenced by promotional activities or site design. As evidence of the benefits of such data usage, McAfee and Brynjolfsson (2012) found that such data driven companies are 5% more productive than their competitors and up to 6% more profitable.

The ability of firms to collect and analyze large sets of data has introduced new sources of market-based competitive advantages (Kunz et al., 2017). In support of this sentiment, McKinsey and Company contend that "collecting, storing, and mining big data for insights can create significant value for the world economy, enhancing the productivity and competitiveness of companies and the public sector and creating a substantial economic surplus for consumers" (Manyika et al., 2011, p. 1). However, despite such sweeping statements, it is important to recognize that data have no inherent value. In business contexts, data have value only when the information they contain acts as a catalyst for some other financial gain. Accordingly, hospitality firms generate value from data in four ways: advertising, customer relationship management (CRM), marketing research, resale and trading.

In the case of advertising, data sets have value when they can be used to improve targeting (cf Li, Xu, Tang, Wang, & Li, 2018). For example, consider a social media platform such as Instagram or Facebook that collects data on consumer travel preferences through their posts. Such companies can very easily learn that a given consumer enjoys leisure travel when he/she uses travel-related hashtags, posts pictures of recent/past trips, likes other content related to travel, associates with travel groups, etc. Using such information, these data are used to ensure that the right advertising message is sent to the right customers (and on the right device) at the right time.

Data can also be used to develop and/or enhance the efficiency of CRM and customer loyalty platforms (El-Manstrly, 2016), especially in the hospitality industry (Talón-Ballestero et al., 2018). The data collected by CRM platforms allow for (1) a more efficient allocation of resources by reducing transactional friction (potentially lowering marketing costs) and (2) the realization of economic gains as a result of repurchase, up-selling, and cross-selling (Malthouse et al., 2019). For example, in the hospitality industry, having a we blog of every action that different machine IDs record on a hotel's website provides insights about what pages on the site are most engaging. If the machine IDs are connected to an email or physical address, the data become more valuable because the hotel can then send emails to make bookings or close sales. Further, if the email address is matched to other data indicating a potential customer's interests/previous behaviors, emails can then be personalized, which helps increase response and conversion rates.

The third type of value that is associated with big data collection is created when firms use data for marketing research purposes. Malthouse and Li (2017, p. 230) have described social media as "the world's largest focus group," emphasizing the potential for text mining social media data to derive insights regarding customer perceptions of brands. Some organizations have actually launched their own native research environments to leverage this opportunity. For example, both Starbucks (MyStarbucksIdea) and Dell (IdeaStorm) have implemented crowdsourcing platforms that encourage consumers to submit new product ideas and/or provide suggestions to improve service delivery (Hoornaert, Ballings, Malthouse, & Van den Poel, 2017).

Finally, data create value when the collecting organization (e.g., Facebook, Instagram, etc.) either sells or trades its data to another organization (e.g., hotels). Specifically, list brokerages (e.g., Roberts and Berger, 1999) and third-party providers such as Experian, Epsilon, and Acxiom have existed for many years. However, more recent developments such as programmatic ad exchanges have emerged (Zhang et al., 2014) that specifically collect (and sell) vast sets of consumer data to other companies.

In all of the aforementioned contexts, there are significant benefits to the hospitality organization that engages in big data collection. Accordingly, many hospitality organizations invest heavily in platforms designed to generate as much information as possible about their customers. However, we argue that the currently accepted practice of collecting, sharing, and analyzing consumer data without individual consent or awareness is undesirable for at least four reasons.

First, it is important to recognize that governments are increasingly regulating data collection and usage. The introduction of the General Data Protection Regulation (GDPR) in the European Union is a notable example. Likewise, the widely-covered consequences of Cambridge Analytica's intentional efforts to affect the Brexit referendum and the 2016 U.S. presidential elections prompted both the European Parliament and the U.S. Congress (respectively) to review social media data collection policies, including a subpoena of Mark Zuckerberg to testify about Facebook's data use/protection policies. The enhanced scrutiny of data collection/use policies by private companies may produce further regulation.

Second, data storage is always associated with a degree of risk. Major data breaches at companies such as Marriott, Equifax, Home Depot, Target, and LabCorp (among many others) have cost both consumers and firms millions of dollars. The increasing risks of data breaches to consumers is evidenced by research from IBM and the Ponemon Institute (Ponemon, 2018) that found that (1) in recent years, the average cost of a data breach has increased 6.4% (to approximately $3.86 million) and (2) both the incidence and cost of such breaches are likely to continue to increase.

Third, data harvesting can ultimately result in an increased incidence of transactional friction. To create value from the data it collects, a firm must sometimes share that data with a third party (e.g., a consultant, partner vendor, advertiser, etc.). However, the sharing of data with third parties introduces further risk to the consumer. As a result, many hospitality supplier partners must now get certification in data security such as: SSAE 16 audit review; PCI, HIPAA or Cloud Security Alliance STAR's report of compliance; and ISO 27001. Cyber insurance is also often required. Requiring such certifications introduces friction into the data transaction, which ultimately increases the cost of sharing data.

Fourth, there are issues related to the ethics of data collection, particularly regarding who ultimately owns the data and for what purposes it can/should be used (Zwitter, 2014). Accordingly, a set of principles is needed to protect the individual rights of those who provide data (knowingly or unknowingly) to firms that seek to profit from its use (Richards and King, 2014). Moving toward the establishment of such principles is particularly important in the hospitality industry where increased consolidation and new forms of competition from the sharing economy have significantly changed the competitive landscape (Lu & Kandampully, 2016). In the following section, the use of big data in the hospitality industry is discussed in more detail with an emphasis on how the extended customer experiences that define the hospitality industry facilitate a connection between big data analytics and the creation of what is defined herein as reciprocal big data value.

2.2. Big data and the hospitality experience

The use of big data analytics is common in the hospitality industry (Mariani et al., 2018). Large lodging companies have the ability to record an enormous number of complex interactions over what is often called an extended consumption experience, often in real time (Buhalis & Sinarta, 2019). During this extended experience, data is collected prior to, during, and after the implementation of the service (Kandampully & Solnet, 2018). Marriott, Disney, and Caesar's Entertainment (among many others) are well known for this type of extended experience management (Kandampully, Zhang, & Jaakkola, 2018). Specifically, these hospitality service providers can record all visits to their websites as well as track which rooms, activities, and culinary options the consumer browses. Such companies can also keep track of which promotional videos are watched and how the consumer engages with virtual tour offerings. Then, during the customer's visit, these data can be paired with actual consumption/behavioral data, including every swipe of the card key in the elevator, room, fitness club, etc. After the experience, hotels can collect post-consumption satisfaction data and use social media postings to determine what changes need to be made in future market offerings.

The hospitality industry represents a unique and appropriate domain for the consideration of the effects of big data collection and usage on consumer behavior for many reasons. First, hospitality firms can collect and analyze these types of data with unprecedented breadth, depth, and speed over a consumption period that often lasts multiple days (Xiang et al., 2015). Second, hospitality service encounters typically involve the interaction of multiple customers with a single service provider. Accordingly, customer-to-customer interaction is critical, as these interactions play a major role in influencing the overall customer experience. Likewise, the role of the firm within this inter-customer relationship is equally important. The firm-customer-customer dynamic suggests the existence of a service experience triad composed of at least two customers plus a provider firm. To successfully build and maintain meaningful customer relationships within the triad, hospitality companies often turn to combining big data with data mining and analytics to understand and predict their customers' behavior and explore opportunities to attract new customers (Mariani et al., 2018). Firms that can successfully implement reciprocal big data value creation may achieve a competitive advantage in the marketplace *vis-à-vis* competitors that continue to take a more unilateral, firm-centric value creation approach. In the following section, these proposals are considered within the context of contemporary perspectives on value creation.

2.3. Conceptualizing reciprocal big data value creation

Reciprocal big data value creation grows from the concept of a reciprocal value proposition (Ballantyne, Frow, Varey, & Payne, 2011). Glaser (2006, p. 445–446) notes that "if participants in the value chain recognize that their objectives are complementary, rather than antagonistic, the process of negotiating a 'deal' can increase the strategic and money value of the relationship for both parties." According to the tenets espoused in the present endeavor, when consumers willingly share data with organizations, both parties will realize enhanced value. Key contributions to this value-creation perspective that have shaped the present research are presented in Table 1.

In recent years, technology has amplified the role of interactions (both transactional and extra-transactional) between customers and firms as the locus of brand value (Gensler, Völckner, Liu-Thompkins, & Wiertz, 2013). Whether by innovating the delivery of goods and services or as the offerings themselves, digital platforms have fundamentally altered the view of innovation and value creation between customers and firms (Ramaswamy and Ozcan, 2016). Concurrent with these technological trends has been an evolution of the view of the customer's role in the value creation process. Rather than being viewed as mere recipients of offerings from firms, customers are now generally viewed as active participants in this process (Prahalad & Ramaswamy, 2004a; 2004b). Ramaswamy and Ozcan (2016) argue that in this digital environment, customers' activities may result in ethical surpluses (Arvidsson, 2005) which transform the meaning of economic surplus from one based on exchange to a function of co-creational experiences.

This thinking is in line with the service-dominant logic of marketing (Vargo and Lusch, 2004) in which consumers are viewed as operant resources capable of causing benefit by directly acting on other resources (either operand or operant) to create benefit as co-producers of services (Constantin & Lusch, 1994). According to this perspective, value creation is enabled through the integration of activities such as relationship building, communication and customer knowledge improvement (Ballantyne & Varey, 2006).

Others go even further, conceptualizing the role of firms not as one that delivers value to customers, but rather as one that supports customers in their own value-generating processes (e.g., Grönroos, 2006). That is, the customer is actually in the dominant position in the value creation process. Grönroos and Voima (2013) argue that the prevailing view of value as emerging through co-creative experience has left the concept vaguely assigned to an all-encompassing process without a clear distinction between the role of service providers and customers in this process (Grönroos, 2008, 2011; Grönroos & Ravald, 2011). Because value is the result of a co-production, value cannot be defined exclusively as value-in-use (customer perspective) or value-in-exchange (firm perspective). Ultimately, Grönroos and Voima (2013) reconcile competing notions of value by focusing specifically on value to the customer (Grönroos, 2008; Heinonen; et al. 2010; Helkkula; et al., 2012; Holbrook, 2006; Strandvik et al., 2012). The firm's role in the co-creative process is as a facilitator of the creation of potential value for the customer.

Our conceptualization of reciprocal big data value mirrors these perspectives. As Ramaswamy (2011, p. 195) observes, "co-creation is

Table 1
Key concepts of value creation.

Author(s)	Focus	Key Takeaways
Vargo and Lusch (2004)	Illuminate the evolution of marketing thought toward a new dominant logic (i.e., moving away from the exchange of tangible goods towards the exchange of intangibles, specialized skills and knowledge, and processes).	- All economies are services economies (i.e., services are becoming more apparent in the economy as specialization increases and as less of what is exchanged fits the dominant manufactured-output classification system of economic activity). - The customer is always a co-producer (i.e., in using a product, the customer is continuing the marketing, consumption, and value-creation and delivery processes). - The enterprise can only make value propositions (i.e., the consumer must determine value and participate in creating it through the process of coproduction). - A service-centered view is customer oriented and relational (i.e., customers need services that satisfy their needs, and service provision is maximized through an iterative learning process on the part pf both the enterprise and the customer).
Parahalad and Ramaswamy (2004a)	Understand the process of value co-creation through its key building blocks: dialogue, access, risk assessment and transparency–the DART Model of value co-creation.	Recognizes that the role of the customer in the industrial system has changed from isolated to connected, from unaware to informed, from passive to active. In the conventional value creation process, products and services contained value, and the market exchanged this value, from the producer to the consumer. Value creation occurred outside the markets. In contrast, in value co-creation consumers engage in both the processes of defining and creating value. The co-creation process depends largely on the individuals. Each person's uniqueness affects the co-creation process as well as the co-creation experience.
Parahalad and Ramaswamy (2004b)	Discuss how the concept of a market is undergoing change and transforming the nature of the relationship between the consumer and the firm.	- The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences. Informed, networked, empowered, and active consumers are increasingly co-creating value with the firm. - Argues that we need to create an experiential environment within which individual patients (consumers) can create unique personalized experiences. Thus, *products can be commoditized but co-creation experiences cannot be*. - The firm and the consumer are both collaborators and competitors - collaborators in co-creating value and competitors for the extraction of economic value (p. 11).
Grönroos (2012)	Develop a value co-creation logic and a conceptual model of value co-creation in services as an alternative schema to *S*-D logic which was described as metaphorical in its construction and thus limits focused empirical analysis.	- Value co-creation is a joint activity by parties involved in direct interactions, aiming at contributing to the value that emerges for one or both parties. - Value creation is a process through which the customer becomes better off (or worse off) in some respect or which increases the customer's well-being (p. 1521). - The value-formation process includes three distinct sub-processes: (1) *the firm acts alone* and facilitates the customer's creation of value-in-use; (2) *the customer acts alone* by integrating available resources in a process that is closed to the firm thus experiencing the resources and creating value-in-use for him- or herself; and (3) *the firm and the customer act together* in a merged, coordinated, dialogical, and interactive process that creates value for the customer (and for the firm as well). Using the strictly analytical meaning of the expression, they *co-create value* (pp. 1522–1523).
Grönroos and Voima (2013)	Define value co-creation and value creation with a focus on the roles of the customer and the firm in value creation, as well as on the scope, locus, and nature of different phases of value creation, then analyzing co-creation as a function of their interaction.	- Argues that both the firm's and the customer's actions can be categorized by spheres (provider, joint, customer), and their interactions are either direct or indirect, leading to different forms of value creation and co-creation. - Value creation refers to customers' creation of value-in-use; co-creation is a function of interaction. - They present a structure for analyzing the customer's value creation and the service provider's value facilitation and co-creation opportunities. - Value creation during usage is a longitudinal, dynamic, experiential process that may include both construction and destruction of phases in different social and physical (as well as temporal and spatial settings) where the user is the one experiencing the process in an individual or social context. - Firm creates potential value that the customer can transform to value-in-use or real value (p. 139).
Ramaswamy and Ozcan (2014)	Highlight how setting strategy has become a joint process of co-creative discovery, as enterprises devise and develop new opportunities together with customers, partners and other stakeholders.	- Reviews the evolution of value creation in the field of strategy from 1960, up to the point of co-creation in 1990s. Accumulated intellectual resources (core competence), financial and physical resources are equally critical. - Resources can be expanded if the resources of others are creatively leveraged through alliances and joint ventures. - The process of value creation is shifting away from a firm- and product-centric approach to an individual-stakeholder and experience-based perspective. - Global resource leverage using engagement platforms is enabling the transformation to this new value creation perspective, oriented towards co-

(*continued on next page*)

Table 1 (*continued*)

Author(s)	Focus	Key Takeaways
		creation of experience-based value (i.e., value that is unique to individuals, personally and collectively (p.9)). - The new watchwords for strategy should be ‘‘engage and discover’’ not ‘‘command and cascade’’ (p. 10).
Ramaswamy and Ozcan (2016)	Discuss the concept of co-creational enterprises as a nexus of co-creational platforms of engagements, and elaborate upon the organizational practice of brand value co-creation in a digitalized world; and present an integrative framework of brand value co-creation, wherein the logic of joint agential experiential creation is proposed.	- The service-dominant (SD) logic of marketing (Vargo and Lusch, 2004) where consumers are seen not only as operand resources (resources on which an operation or act is performed), but following Constantin and Lusch (1994), operant resources (resources capable of causing benefit by directly acting on other resources, either operand or operant, to create benefit) in co-production of service. - There is a lack of an explicit recognition of individual human beings as “experiencers,” (i.e., as having conscious agential experiences), in defining the nature of innovation in joint creation of value. - Brand value co-creation is a hybrid state of affairs in the interplay of joint agency of experiential co-creators within the assemblage structure of brand engagement platforms. - Co-creational brand innovation means focusing on how brand engagement platforms afford environments that actualize valuable brand outcomes in domains of co-creational brand experiences (p. 99).
Ramaswamy and Ozcan (2018)	Develop a novel conceptualization of “co-creation.” Introduce the concept of value-in-interactional creation which entails a multiplicity of interactive system-environments among persons and material entities (e.g., devices), afforded by technological platforms enhanced by digital technologies (p. 196).	Co-creation is defined as the enactment of an interactional creation across interactive system-environments (afforded by interactive platforms), entailing agenting engagements and structuring organizations (p. 200). Distinguish the concept of co-creation from the site of its application in the activity system (i.e., production, exchange, or use of goods and services). Interactional creation entails tapping into capabilities that might exist as potentialities and mobilizing them through interactive platforms.

the process by which mutual value is expanded together.” In general, from a conceptual point of view, reciprocal value creation happens always when there is a co-creation of value (e.g., Grönroos, 2012; Grönroos & Voima, 2013; Prahalad & Ramaswamy, 2004a, 2004b; Ramaswamy and Ozcan, 2014, 2016, 2018; Vargo and Lusch, 2004, 2008, 2011, 2016). Reciprocal big data value is not simply an increase in value-in-use of the firm’s services (though use of a customer’s data by the firm may enhance the customer’s value-in-use), nor is it simply incremental value-in-exchange for the firm (though use of customer data may result in additional revenue). Rather, it represents both of these, as well as the potential value-in-use for external parties which may accrue back to the firm and/or customer (Malthouse et al., 2019). It is ancillary value – not part of the central value proposition, but created as a by-product of the exchange between customer and firm. Accordingly, it becomes essential to examine (1) the degree to which firms allow customers to control how their data are used and (2) the value that is returned to those consumers that are willing to engage in the co-creation process.

3. A typology of reciprocal big data value creation

Firms make decisions regarding how consumer data are collected, the types of data that are collected and how these data will be used (e.g., direct marketing, partner advertising, sales to list brokerages, etc.). Such decisions result in customers being granted either a high or low degree of control/ownership over their data. High levels of data control/ownership are characterized by (1) transparency in the data collection process and (2) the inclusion of a mechanism that allows consumers to make decisions regarding whether and how their personal data are collected and utilized by the firm. Conversely, low levels of data control/ownership are characterized by a knowledge asymmetry between the firm and the customer regarding both the types of data that are collected and how they are used. Additionally, such systems provide little to no collection/use transparency and employ no formal system that would allow consumers to opt out of (or otherwise control) the processes through which their data are collected and used.

In addition to controlling the collection, ownership and use of data, firms also control the level of benefit that accrues to the consumer when personal data are collected and the extent to which individuals are compensated/rewarded for the use of their data. Firms that provide high levels of customer benefits employ formal systems that allow customers to “monetize” their data. In such systems, firms provide a financially based benefit to their customers in exchange for the use of their data. Such benefits may come in the form of cash payments, loyalty points, cryptocurrency, discounts on future purchases, complementary amenities, or any other benefit that could be ascribed a monetary value. At the other end of the spectrum, firms that provide low levels of customer benefit do not reward customers for the use of their data.

As shown in Fig. 1, when firm and customer level of data control/ownership and the corresponding benefit are considered together, a typological structure emerges that can be used to describe four types of reciprocal big data value creation. Using this typological structure, the nature of big data value reciprocation is described as Machiavellian, Orwellian, Faustian, or Jeffersonian.

In considering Fig. 1, it is important to note that the terms used in the matrix do not describe firms, but rather the types of value that are created as a result of varying value creation strategies *employed by firms*. Certainly, some of the adjectives have, to varying degrees, a pejorative connotation. However, this paper is written in the spirit of a recent Washington Post (2019) editorial that explains how the contemporary “privacy regime is broken.” In the article, the authors emphasize that: If companies can continue to have their way with user data as long as they tell users first, consumers will continue to accept the unacceptable: If they want to reap the benefits of these products, this is the price they will have to pay. But this is not a price consumers should have to pay. It is time for something new. Legislators must establish expectations of companies that go beyond advising consumers that they will be exploiting their personal information.

Given the pointed language used in this description of the contemporary data collection environment, it is quite clear that there are some firms that are engaging in data value creation strategies that are not in the consumer’s best interest in terms of control, benefits, and security. As a result, a normative evaluation of each type of big data value creation proposed in the matrix is perhaps unavoidable. Under such an evaluation, the least desirable types of reciprocal big value creation policies (from a consumer standpoint) are those that award low control/ownership to the consumer/user and minimal (or no) benefits (i.e., Machiavellian value), whereas big data value creation strategies’ that

seek to maximize user benefits and control/ownership are more favorable to consumers (i.e., Jeffersonian value).

3.1. Machiavellian big data value

Machiavellian value is characterized by low control/ownership of personal data, the use of which by the collecting firm results in minimal value to the consumer. The term Machiavellian is an adjective defined as "characterized as subtle or unscrupulous, cunning, deception expediency, or dishonesty" (dictionary.com, 2018c). The word is an eponym derived from the name and written works of Italian chancellor Niccolo Machiavelli. Machiavelli's *The Prince* (see Machiavelli & Wootton, 1995) was published as a treatise on the nature of power, control, and human behavior in the nation state. However, because many of the principles espoused in *The Prince* advocate unethical manipulation and oppression of the governed, the term Machiavellian has a pejorative connotation that implies unethical or unscrupulous behavior in the advancement of a cause. Accordingly, from a data collection and usage standpoint, the term Machiavellian value can be used to describe the type of big data value that is created when firms (1) covertly collect and use data without disclosing such practices to customers and (2) use that information without passing along a share of the resultant benefits. As an example, consider Cambridge Analytica's pursuit of value where data were intentionally collected and subsequently sold to achieve political and economic goals (i.e., create value) without the knowledge of those who provided the data or the intent to benefit them.

3.2. Orwellian big data value

Like Machiavellian big data value, Orwellian big data value is also characterized by consumers being given a relatively low level of control over their personal data. However, like the fictitious Big Brother of Orwell's *1984* (Orwell, 1949), the collected data is (ostensibly) used to better the lives of the individual from which it is collected. In Orwell's dystopian future, the personal data of the citizens of Oceania were collected without their consent, and mass surveillance of behavior was ubiquitous. However, the collection of these data was implemented by the ruling party (Ingsoc) as part of a strategy based on the maxim that "ignorance is strength" (p. 40). Accordingly, Ingsoc used the mandatory mass collection of personal data to empower various vague and opaque ministries devoted to truth, peace, plenty, etc. To create its vision for a social utopia.

Although Orwell wrote about Big Brother and Ingsoc ironically, presumably to express his disdain for state sanctioned abuse of power, surveillance, and civil liberties, the metaphor holds true when data are collected without consumers' permission and the ensuing benefits are distributed without their input. In Oceania, there was no control over data collection and, although the collected data were supposed to bring benefits to the country's citizens, the organization that controlled the data also controlled the individual-level benefits of its use. Thus, firms that do not allow customers to control the collection and use of personal data can be said to engage in Orwellian data value creation when the resultant benefits are unilaterally dictated by the firm.

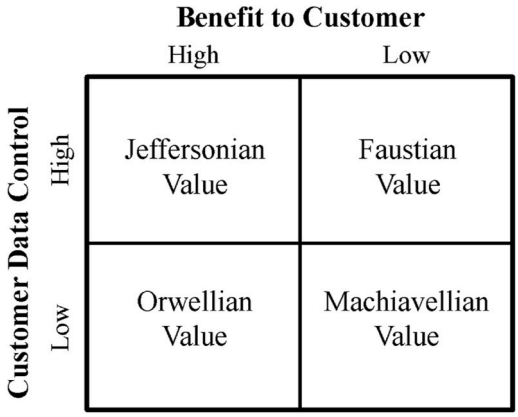

Fig. 1. Typology of big data value reciprocation.

3.3. Faustian big data value

Faustian data value can be seen as the opposite of Orwellian data value. That is, firms that use data to create Faustian value provide consumers with relatively high levels of control over the types of personal data that are collected; however, they provide minimal levels of return to the consumer in exchange for the use of these data. The German legend of Johann Georg Faust, popularized in Goethe's *Faust* (see Goethe & MacIntyre, 1957), tells the story of a successful and well respected intellectual (Faust) who, despite his accomplishments, is dissatisfied with his life. In seeking to alleviate his depression, Faust sells his soul to the devil in exchange for power, knowledge, and pleasure. While this bargain remedies Faust's dissatisfaction with his (short term) earthly life, the price is paid when, according to the legend, he becomes the devil's eternal slave in the afterlife.

The legend of Faust has given rise to the term Faustian, which is used to refer to a situation in which a person or organization exchanges their integrity for short term gains in power, knowledge, or wealth (dictionary.com, 2018a). Accordingly, firms that create Faustian data value allow their customers to make choices about how their data will be used (just as Faust was given a choice in his negotiation with the devil), however the long term gains that accrue as a result of the use of this data go to the company, and not to the individual that provided the data. For example, software and other technology applications that require consumers to accept lengthy and legally-complex user agreements as a precondition of use could be said to create Faustian value when the acceptance of such an agreement means that data control (or some other right) is given away as a condition of the agreement.

3.4. Jeffersonian big data value

Whereas the three previous forms of big data value are characterized by either low control/ownership or low benefit (or both in the case of Machiavellian value), Jeffersonian value can be seen as an idyllic state where firms not only allow consumers to control how personal data are collected and used, they also provide significant benefits in exchange for the use of that data. In this context, the term Jeffersonian is defined as an adjective used to describe an organization or policy that is in alignment with the political principles of Thomas Jefferson "especially those stressing minimum control by the central government [or company]" and "the inalienable rights of the individual [or customer]" (dictionary.com, 2018b). Accordingly, as a metaphor for the creation of big data value, the term Jeffersonian would apply to a big data collection strategy that seeks to create value by turning over control/ownership of that data to the individual consumer. Likewise, a Jeffersonian big data value creation strategy would acknowledge (1) the "inalienable right" of the consumer to retain ownership of his/her data and (2) his/her right to share in any reward (monetary or otherwise) that resulted from its use for marketing purposes.

As an example of this type of value creation, consider Microsoft's (reported) Bali project (Hamilton, 2019). In a recent white paper, researchers at Microsoft (Gurevich, Hudis, & Wing, 2014) coined the term "inverse privacy" that addresses the issues that arise when some party (person, organization, government, etc.) has access to an individual's data, but he/or she does not. A ZDNet account of the initiative (Foley, 2019) describes Bali (also referred to as the "inverseprivacyproject") as a "new personal data bank which puts users in control of all data collected about them … The bank will enable users to store all data (raw and inferred) generated by them. It will allow the user to visualize, manage, control, share and monetize the data" (Hamilton, 2019). As discussed in

the following sections, the present research suggests that the ideas associated with increasing control/ownership of data that can be monetized are highly desirable from a consumer standpoint.

4. Discussion: moving toward reciprocal big data value creation

As evidenced in the preceding discussion, a shift in the current way of managerial thinking is needed to realize the possibility of achieving a competitive advantage by giving consumers the right to reap some of the benefits of using their personal data. As follows, we consider both technological and regulatory solutions to facilitate the creation of reciprocal big data value.

4.1. Reciprocal big data value creation via technology

Progress in technology has led to a fourth industrial revolution (i.e., Industry 4.0), which is expected to create a fully integrated and more efficient technological ecosystem (Lee, Bagheri, & Kao, 2015; Muller, Kiel, & Voigt, 2018). The internet of things (IoT), cloud storage and cloud computing, big data and analytics, autonomous robots, augmented reality and many other physical and digital developments will increasingly be used to collect data on mobile devices, applications, websites, IoT devices, and so on (Mariani & Borghi, 2019); and while collecting such data might be intended for improving the quality of products and services (and ostensibly, the overall quality of life of consumers), there are many questions that remain to resolved concerning the privacy, security, authenticity, ownership, and control of these data.

In the existing ecosystem, consumers rely on companies to protect their privacy and security (Davidson, De Filippi, & Potts, 2016; Gupta, 2017). However, private information is often revealed both intentionally (e.g., selling users' data to a third party) and unintentionally (e.g., technological glitches, security breaches, etc.) (Hildenbrand, 2018; Weissman, 2018). Additionally, there is often a lack of transparency in how consumers' data are used within a given platform (and beyond) by the collecting organizations; and many companies force users to agree to their terms and conditions, leaving them no choice but to accept them in order to use their services (Schechner, 2018).

Many of the aforementioned privacy and security problems arise from issues pertaining to data ownership, use, and control. In general, personal data (emails, activities on social media platforms, cloud storages, IoT devices, and so on) are stored, owned and controlled by the companies that provide these services (Davidson et al., 2016; Huckle, Bhattacharya, White, & Beloff, 2016; Kizildag et al., 2019), forcing consumers to trust technological service providers with their personal information (Gupta, 2017). Further, these companies are allowed to reap the benefits of using their customers' data, even when the privacy and security of these data are not guaranteed. Accordingly the requisite trust inherent to most co-creational systems is conspicuously absent in the contemporary Industry 4.0 ecosystem. To level the benefit/control playing filed, a system is needed in which personal data is owned by the individuals, not the collecting organizations.

One possible solution to these issues of trust is distributed ledger technology. Distributed ledger technology (DLT) can provide an infrastructure for solving big data storage, ownership and control issues, thereby facilitating the creation of reciprocal big data value within the context of Industry 4.0 (Hofmann & Rüsch, 2017; Huckle et al., 2016; Lamba, Singh, Balvinder, Dutta, & Rela, 2017). Distributed ledger technology provides immutable, tamper-proof data storage and management systems (Gupta, 2017; Rauchs et al., 2018), and have several key advantages over the current systems of data ownership, management and control.

One major benefit of distributed ledger technology is that it eliminates the need for establishing trust between transacting parties (Crosby, Pattanayak, Verma, & Kalyanaraman, 2016; Dogru, Mody, & Leonardi, 2018). Duplicate copies of records of transactions on a distributed ledger network are simultaneously shared with participating agents, which shifts the network to a decentralized platform (Benčić & Žarko, 2018). Also, the records cannot be changed or manipulated internally, nor can the network be breached as data are stored in many computers and the transactions are encrypted by unique cryptographic signatures (Rauchs et al., 2018). Such a network could only be breached if all the computers within the network were accessed at the same time, which is unlikely (and impossible at a certain scale) (Crosby et al., 2016; Gupta, 2017).

Distributed ledger technology also eliminates the need for intermediaries to establish trust because transactions are processed and verified within the network (Maull, Godsiff, Mulligan, Brown, & Kewell, 2017). Thus, the involvement of third-party arbitrators, such as banks and governments to verify or authorize transactions is not needed in a distributed ledger platform. The elimination of intermediaries from the process streamlines the process and significantly reduces transaction time and costs.

Although several systems, such as hashgraph, tangle, and sidechain technologies have been developed utilizing distributed ledger technology, the most widely-utilized technology in this context is blockchain technology (Benčić & Žarko, 2018; El Ioini & Pahl, 2018). Blockchain is a digital platform that chronologically records transactions (e.g., sending and receiving money, paying for products and services, booking a hotel room or a flight, etc.) via distributed ledgers within a network (Crosby et al., 2016; Gupta, 2017). In the blockchain ecosystem, data providers (e.g., users or consumers) own their personal information and can share it with data requesters in exchange for a monetary benefit (Dogru et al., 2018; Lynch, 2018; Peters & Panayi, 2016) such as cryptocurrency, crypto token or fiat currency. Thus, when companies need data, all they need to do is make a request within the blockchain. The request for data, the subsequent collection, and resultant monetary transaction associated with the data exchange are then executed through smart contracts. In such a system, data requestors would determine the potential demographics and other criteria that they need, along with the offer (e.g., monetary incentive) made to individuals who are willing to provide that data. The smart contracts on the blockchain platform would then execute the transaction by autonomously collecting or sharing the data with the requesters. At the same time, the smart contract would transfer the money (or other incentive) to the data providers.

A second use of block chains would allow data providers that fit a given demographic profile to be contacted by requesters to share specific types of data. Under such a model, consumers would have the ability to decide what and how much information to share. That is, individuals might be willing to share their gender, age, marital status, etc. In exchange for receiving value whether it be monetary or in other forms, such as advertising relating to certain interests. This custom-designed, smart contract on a blockchain platform would empower both data requesters and data providers. Data requesters could collect data in any form they like (instead of receiving it from a third party), while data providers could determine whether they want to share their data in exchange for monetary benefits or to receive value through alternative means.

Data providers may also allow their information to be shared with a third party or an affiliate of the data requestor depending on the value proposition that data requestors offer. Since the data are cryptographically recorded and stored on a decentralized blockchain platform, data requestors cannot share data providers' information with a third party without their permission. Although companies such as Facebook, Google, and Amazon may not always directly sell their users' data to a third party, they can generate revenues by allowing third parties to tailor their products or campaigns based on sharing their users' data, while providing very little value to the user in return (i.e., Machiavellian value). Thus, blockchain technology facilitates a more efficient platform for the creation of reciprocal big data value.

Blockchain-based shifts in data ownership and control would also benefit companies. Companies would be able to access more data that is

authentic and will be able to provide customized services and products based on the information their customers are willing to share on agreed upon terms, which reduces friction between companies and consumers and enhances customer experience. This may be especially beneficial to small and medium size enterprises such as restaurants or bars that do not have the resources to devote to storing, managing or obtaining big data.

Critics of the arguments espoused in this paper might argue that individuals are providing their data willingly in exchange for services, such as email accounts, maps, internet search engines, and communications through messaging, audio, and video applications. However, users have no choice but to agree to the companies' terms and conditions if they want to use their products and services (Faustian value). Furthermore, users have to trust the company in matters of security and privacy (Orwellian value). The use of blockchain technology would empower users to decide whether they want to share their information in exchange for or monetary or non-monetary benefits in the event of the use of the data for revenue generation (Jeffersonian value).

In the context of the tourism and hospitality industry, restaurants, hotels, airlines, and other businesses have a massive amount of consumer data. However, the current state of data ownership, control and management is not efficient or ideal. While big data can be a powerful tool in offering personalized services, the data are fragmented and their use is limited (Rabah, 2018). In the blockchain platform, consumers own and control their data, including data on social media platforms, browsing histories, and so on. Thus, blockchain technology could enable linking together the complex system of data points that form consumers' online identities. Such data can then be used to provide personalized products and services based on a more complete picture of consumer preferences.

Under such a system, consumers decide whether to share the data in a given context. For example, blockchain based startup companies such as Travel Chain provide a platform that attempts to solve data storage issues (Sheivachman, 2018). The platform proposes to empower travelers and enables them to share their information, including personal information, purchases, location, stays in accommodations, search history, and other activities within the blockchain platform. In exchange for this information, users receive Travel Tokens, which can be used for booking their next flights, hotels, or renting a car.

Blockchains can also be used to enhance blockchain-based loyalty programs as many loyalty rewards are not transferable nor can they be utilized when making purchases from a third party. This can lead to problems like low redemption rates and high switching costs (McCartney, 2017). While an alliance between hospitality companies can be formed within the existing technological infrastructure whereby the loyalty programs are integrated and the loyalty rewards earned from either one of the companies can be used in any company within the alliance, this approach is likely to be limited to large companies (Kizildag et al., 2019; Kowalewski & Simon, 2016). To address this issue, Deloitte has developed a blockchain-based loyalty program that allows any company to join the public blockchain and be a part of the network (Deloitte, 2018). Similarly, Loy all, has developed a loyalty exchange platform in collaboration with IBM that enables customers to buy, sell, or exchange their loyalty points in a marketplace (Kowalewski, McLaughlin, & Hill, 2017), while Trippki offers to consolidate the loyalty programs and eliminate the costly booking channels. While hospitality businesses might have different rewards programs, the loyalty token is transferrable and can be used in any other hotel. For example, with Trippki, consumers can use their tokens or loyalty points at their discretion, paying for their next hotel stay (regardless of which hotel is chosen), at a restaurant, at a coffee shop, and so forth (Trippki, 2018). These blockchain-based loyalty programs all provide emerging evidence of the demand in the hospitality marketplace for reciprocal big data value creation.

4.2. Reciprocal big data value creation via regulations

The present technological infrastructure combined with more transparent privacy and user agreement terms and regulations might alleviate some of the concerns that surround big data collection and usage. Privacy policies and user agreements can be made more transparent either by companies taking the initiative to gain (or regain) their consumers' trust or through lawful regulations that enforce consumer protection.

In 2016, the European Union (EU) adopted the General Data Protection Regulation (GDPR) to protect personal data and privacy of the individuals in the EU. GDPR "regulates the processing by an individual, a company or an organization of personal data relating to individuals in the EU" (General Data Protection Regulation, 2016). Essentially, the GDPR gives rights to individuals living in the EU to protect their personal data and privacy. While companies may continue to collect personal data from consumers, they must comply with the GDPR rules. In this context, consumers have rights to (1) request information about the processing of personal data; (2) obtain access to the personal data held; (3) ask for incorrect, inaccurate or incomplete personal data to be corrected; (4) request that personal data be erased when it is no longer needed or if processing it is unlawful; (5) object to the processing of personal data for marketing purposes or on other personal grounds; (6) request the restriction of the processing of personal data in specific cases; (7) receive personal data in a machine-readable format and send it to another controller; and (8) request that decisions based on automated processing concerning personal data are made by natural persons, not only by computers (General Data Protection Regulation, 2016). The EU privacy and personal data protection laws apply in counties across the EU "regardless of where the data is processed and where the company is established" and that non-EU companies operating in the EU must also comply with these privacy and personal data protection laws (General Data Protection Regulation, 2016).

In the United States, however, the privacy and personal data protection regulations vary across the states because there is no general federal legislation similar to the GDPR. Recently, the state of California, enacted data protection laws similar to the of GDPR laws to protect the privacy and personal data of California residents. The California Consumer Privacy Act is similar to the GDPR and became effective in 2020 (Schulze, 2019). Similar regulations are either already signed into law or proposed across many other US states. However, state by state regulations may be less than ideal to protect privacy and personal data because the right to privacy should not be determined by state lines (Gregersen, 2019). A consumer's right to privacy and personal data is protected in the state of California, while the same consumer might not have the same privacy and personal data protection in other states. A similar approach to the EU would ensure consistent privacy and personal data protection laws across the US, and reduce security and privacy concerns of consumers regardless of where they reside.

Although the GDPR and the California Consumer Privacy Act are a step in the right direction, these rules require an active involvement of consumers to pursue their data ownership and control. This practice may be impractical as consumers engage with many different companies and services. Under these regulations, consumers need to put significant effort into taking control of and protecting their personal data. Also, these regulations do not solve the fundamental issue of data ownership and control because unless consumers act, the personal data will be collected and used by the companies to generate profits either through direct marketing or selling these data to a third party. Although consumers might later request their personal data to be deleted or not to be sold to a third party, the data may well have already been used and/or sold to some other companies. Consumers may not be able completely track their personal data and hence their privacy and personal data will not be fully protected.

Also, these regulations will not be sufficient to ensure privacy and protect consumers against security breaches or cyber attacks. While

additional and possibly more strict regulations to protect consumers are likely forthcoming in the US and other countries, the power of such regulations to ensure individual privacy may be limited depending on the legal and cultural context (Jackson, 2018). While the European Union and the United States value democracy and freedom of speech, many other countries are known to censor criticisms of government institutions. Distributed ledger technology appears to be a viable solution that offers to solve not only the security and privacy problems but also offers empowering the individuals by enabling consumers to own and control their personal data (Davidson et al., 2016; Gupta, 2017). When consumers' privacy is well guarded through a distributed ledger technology, such as blockchain consumers might be more comfortable about receiving personalized products and services at their discretion and control.

5. Contributions and implications

Allowing customers to share and exchange big data in services is an unexplored area of research and provides many opportunities and challenges for all parties involved. The view of reciprocal big data value as a function of control/benefits has additional theoretical implications for the concept of value co-creation as a process that extends beyond the consumptive experience. The proposed matrix of reciprocal big data value creation that captures different levels of data control and benefits received from the firm has some clear connections with the notion of networked value creation. Thus, we introduce the term "reciprocal big data value creation" as more appropriate/accurate term to use in the context of big data to capture data value creation that extends beyond the transactional and interactive process. By doing so, we not only extend the existing literature on value co-creation but also add a new type to existing literature on the various types of consumer value (e.g., knowledge value and influencer value).

This study also illustrates how big data and technology in its various forms (digital/information) can serve as a trust and relationship building mechanism between networks of firms and customers by engaging customers as equal beneficiaries. Customer generated data and its direct value for customers may help to enhance customers' perceptions of trust and encourage further collaboration between the focal firm and customers and other partnerships within the ecosystem. However, how trust mediates the effect of reciprocal big data value on overall customer value to firm requires more exploration.

5.1. Practical implications

Data, if and when it assumes the status of a commodity (something that can be traded), will have the potential to enhance its value to benefit all parties that are involved in the co-creation of that data. Thus, transparency of data capture and value co-creation will not only address the ethical, technological and legal concerns associated with big data management, but if data is managed effectively, it will help firms to enhance customer engagement and experience.

Online data platforms such as blockchain are capable of providing security, transparency and connectivity with customers and service providers across the globe. Advancements in blockchain or other similar distributed ledger technology platforms along with regulations are likely to gradually shift data ownership and control to consumers/users. First mover advantages are available to the firms that can most efficiently/effectively implement a Jeffersonian type of value creation. Firms should look for technology partners that use technological innovations that allow them to pursue data collection in a way that provides value to both the firm and the customer. New businesses have already emerged in response to consumer demand for sharing the value of data and have the potential to disrupt existing business models.

Ballantyne et al. (2011, p. 204) further stipulate that a reciprocal value proposition "makes explicit the benefits expected to be gained and given up." Data use policies that consumers often agree to without reading (Faustian value) should do a better job of communicating both how the consumer will benefit by sharing data and what the company will do with the data in easy-to-understand language. While many of our examples have been focused on the tourism industry, there are many other service industries where personal data and privacy are issues, including healthcare, public services, pharmaceuticals and airlines.

Reciprocal big data value creation represents another potential input into the value creation equation. For firms that measure and manage consumer lifetime value, where the firm's relationship with the customer falls in the reciprocal data value typology will have ramifications on how the balance of data value is distributed between customer and firm and ultimately how much data value contributes from the firm's perspective.

5.2. Future directions for empirical research

The conceptualization and definition of reciprocal big data value creation is net new to the literature and represents the grounds for nurturing future empirical research. One proposition implicit in the discussion is that by ceding more control to customers over their data, both firms and customers will realize greater data value. This proposition is asserted, but not tested. Empirical research must demonstrate how best to measure "control" and "value" for both firms and customers, and then test whether this proposition holds. Also implicit in this speculation is the proposition that customers want more control over their data. To what extent this holds, in what verticals, and in exchange for how much "value"?

A third proposition is that firms are currently receiving a disproportionate share of the data value because customers do not have enough control. But how much do firms have to invest in the reciprocal value creation process for the data to have any value? And what is the equilibrium point at which firms do not receive enough value in return for their efforts to collect, compile, store and execute on the available data? There are opportunities to develop smart systems for helping consumers manage the privacy settings. We are currently living through a natural experiment where some countries and states are enacting privacy legislation and others are not. There are research opportunities to evaluate the effects of these policy changes and analyze which aspects of the policies work or are ineffective.

Contribution statement

As this paper is the product of a thought leadership conference, all authors contributed equally to the conceptualization and writing of the manuscript.

Declaration of competing interest

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