JOURNAL OF MANAGEMENT STUDIES

Journal of Management Studies 58:4 June 2021
doi:10.1111/joms.12711

The Sharing Economy and Business Model Design: A Configurational Approach

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ABSTRACT The rapid growth of the sharing economy has attracted a recent surge of academic interest. However, few studies to date address performance variation among sharing platforms. Building on the notion of business model design and applying a configurational approach, we develop a conceptual model that investigates what combinations of design elements can enhance the performance of sharing platforms. Data from 189 platforms and fuzzy-set qualitative comparative analysis (fsQCA) reveal six business model designs, each with its own performance implications. Of these, four configurations lead to high performance and two lead to low performance. Our study advances current understanding of the sharing economy and sheds important light on business model research.

Keywords: business model design, fsQCA, performance, sharing economy, transaction efficiency

INTRODUCTION

The sharing economy is defined as a class of economic arrangements in which asset owners and users mutualize access to products or services (Wang et al., 2017). This phrase is more than a buzzword. Successful pioneers of sharing platforms, such as Grab and Airbnb, have transformed today's business landscape (Chang and Sokol, 2020; Garud et al., 2020; Gerwe and Silva, 2020).[1] Yet, despite their economic significance, many sharing platforms perform unsatisfactorily. Chasin et al. (2018) report that one in four sharing platforms cease to operate within 35 months after launch. However, little is known about the considerable performance heterogeneity of sharing platforms. Addressing this issue is critical to the development of the sharing economy.

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Recent work in business model research may offer important insights into this issue. By business model, we mean the way in which a firm transacts business with all parties to create value (Zott and Amit, 2007). This stream of research highlights the critical impact of business model design on performance; yet two issues remain unaddressed. First, the building blocks of a business model design and the theoretical mechanisms used to explain performance implications remain underdeveloped (Zott et al., 2011). Second, business model design – that is, configurations of interdependent business model elements (Zott and Amit, 2007) – calls for a more holistic perspective. Thus, the effect of business model designs on firm performance may not be as straightforward as originally thought; this is tested with a regression approach (Foss and Saebi, 2017). This study addresses these gaps by asking: *What configurations of design elements may lead to performance differences in sharing platforms?*

To this end, we first extend Zott and Amit's (2007, 2008) theorization of the efficiency-based business model design in the context of the sharing economy and highlight how costs associated with sharing products/services can structurally affect overall performance. Specifically, we identify six design elements that are most salient in the sharing economy. They are as follows: (1) *asset-lightness*, describing the extent to which the shared products/services are provided by platforms (Sohn et al., 2013); (2) *frequency* of recurring transactions; (3) *anonymity* between asset owners and users; (4) *transferability*, that is, the extent to which the transacted assets can be moved geographically (Anand and Delios, 1997); (5) *modularity*, defined as the extent to which products/services can be separated and recombined (Markman and Waldron, 2014); and (6) *product category*, that is, referring to a customer's ability to judge the quality of a product or service before purchasing before purchasing (Nelson, 1981). Taken together, these elements can further advance our understanding of how business model design impacts performance for sharing platforms. Second, we adopt a configurational approach using the fuzzy-set qualitative comparative analysis (fsQCA) technique for a sample of 189 sharing platforms to investigate the different impacts of various design configurations upon performance (see Fiss, 2011).

This study makes three contributions to the literature. First, answering calls for more theory in business model studies (Zott et al., 2011), we reveal six main business-model design elements. Second, we extend the sharing economy literature by explaining the significant variations in performance among sharing platforms with different business model designs. Finally, we show that 'low-performing' configurations are not mirror images of 'high-performing' ones. This asymmetry in business model design configurations challenges earlier, simpler, and narrower views of the relationship between antecedents and organizational outcomes.

THEORETICAL BACKGROUND

The Sharing Economy: Embracing Distinctive Business Model Designs

While the rapid growth of the sharing economy has attracted significant attention, scholars have developed multiple terms and definitions to capture its nature – each with a distinctive focus on how sharing platforms organize transactions with external stakeholders (Parente et al., 2018; Zott and Amit, 2007). For example, Bardhi and Eckhardt (2012,

p. 881) use the term *access-based economy* to describe 'transactions that may be market mediated in which no transfer of ownership takes place'. This is frequently used to refer to car- and house-sharing services. Alternatively, Belk (2014, p. 1597) characterizes the sharing economy as *collaborative consumption*, in which 'people [coordinate] the acquisition and distribution of a resource for a fee or other compensation'. Attention is mostly on person-to-person transactions of goods (e.g., online flea markets). In a consulting report, Bughin and Mischke (2016) call the sharing economy a *gig economy*, meaning this economic arrangement uses digital platforms to connect skilled workers with consumers for temporary jobs. Table I summarizes some of the most prevalent terms and definitions in the domain of the sharing economy. These diverse terms and definitions capture distinctive business model designs that sharing platforms present. Following Wang et al. (2017), we define the sharing economy as a platform-based economic arrangement in which parties mutualize access to products or services.

To scrutinize such variations in how sharing platforms operate, we focus on their business model design – that is, how they organize and manage their transactions with parties (Zott and Amit, 2007). Consider an example that contrasts two sharing platforms in the short-term car rental business. At Zipcar, the platform owns a dedicated fleet of vehicles and can make them available to customers, whereas at Turo individuals own the cars and can rent them to other users. Although both business model designs focus on the same market, they exhibit markedly different ways of sharing cars with users. Notably, Zipcar carries tremendous risk because it owns its vehicles, while Turo merely affords access to cars owned by private providers. Configuring such designs represents a fundamental concern for sharing platforms. They seek to identify the 'best' business model design that can efficiently organize sharing activities with parties.

It has long been recognized that business model design plays an important role in firm performance (Markides and Charitou, 2004). Afuah (2004) conceptually develops a strategic framework in which the critical components of a business model are introduced to determine firm performance. Zott and Amit (2007) empirically show that novelty-based business model designs improve firm performance. However, the literature remains largely silent on how these effects occur. At this point, these analyses are too abstract and descriptive when explaining how business model designs influence performance. The building blocks of the business model designs, and the theoretical mechanisms through which they affect performance, thus demand more clarity (Zott et al., 2011).

Business Model Design in the Sharing Economy

Firms design their business models to create value. Some firms do this more efficiently than others (Amit and Zott, 2001). In this perspective, efficiency represents a major source of value due to its role in reducing costs. Value creation can derive from the attenuation of uncertainty, coordination costs, and information asymmetry (Williamson, 1975). This is particularly pertinent for the sharing economy, where a tremendous number of transactions occur among asset owners and users. High scalability of a business model design enables providers to share access to their products/services at little cost, attracting an increasing number of users. Thus, by employing an efficiency-based business model design, these firms may extract more value from transactions and generate more performance.

Table I. Terms and definitions in relation to the sharing economy

Terms	*Definition*	*Literature*
Access-based economy	Transactions that may be market-mediated in which no transfer of ownership takes place.	Bardhi and Eckhardt (2012)
Commercial sharing systems	Marketer-managed arrangements providing customers with product benefits without ownership.	Lamberton and Rose (2012)
Collaborative consumption	A market in which people coordinate the acquisition and distribution of a resource for a fee or other compensation.	Belk (2014)
On-demand economy	A term that describes digital platforms that connect consumers to a service or commodity through the use of a mobile application or website.	Cockayne (2016)
Gig economy	A digital, on-demand platform that enables a flexible work arrangement.	Burtch et al. (2018)
Lateral exchange market	A market that is formed through an intermediating technology platform that facilitates exchange activities among a network of equivalently positioned economic actors.	Perren and Kozinets (2018)
Sharing economy	A socioeconomic system that allows peers to grant temporary access to their underutilized physical and human assets through online platforms.	Grewe and Silva (2020)
Sharing economy	A platform-based economic arrangement in which parties mutualize access to the products or services.	The current study

Take TaskRabbit as an example. A user posts the desired task via TaskRabbit and then, receives mini-profiles of a few workers deemed most appropriate by an algorithm, with the final selection up to the user. The user can schedule the specific time and pay through the platform after the task is completed as expected. Upon completion of the task, the user can rate the worker. If a worker receives too many unfavourable reviewers, the worker is banned from listing on TaskRabbit. This process helps the user to lower the costs of searching for 'matched' workers and monitoring service quality. Hence, by configuring business model designs, these sharing platforms focus on reducing the potential search costs and uncertainty involved among parties.

A Configurational Approach of Business Model Designs

Amit and Zott (2007, p. 183) suggest that 'configuration theory provides a useful starting point for developing measures of business model designs, because it considers holistic configurations, or gestalts, or design elements'. No single design element can delineate the full picture of business model designs; rather, a combination of different elements is required to distinguish between different types of business model designs. Further, the effect of each design element on firm performance is often conditioned by the presence or absence of other elements, indicating the existence of multiple interactions and equifinality. As suggested by Zott and Amit (2011, p. 1019), business model designs 'emphasize a system-level, holistic approach to explaining how firms "do business"'. We, therefore, adopt a configurational approach to elaborate on our theory of business model designs. In what follows, we discuss the specific design elements and their link to firm performance.

Zott and Amit (2008) propose a comprehensive theoretical framework of business model design in which three factors directly affecting transaction efficiency are identified: costs for providing resources, average number of transactions, and costs of collaborating with external stakeholders. Following this line, we go one step further to develop design elements in the sharing economy context; these represent basic requirements in structuring orchestrating transactions among parties. The first factor is the focal platform's costs for providing their own resources for transactions. In the context of the sharing economy, this factor indicates *asset-lightness*, which describes the extent to which the shared assets are provided by platforms. The second factor concerns the average number of transactions, which is quite straightforward in the context of the sharing economy: the number represents the *frequency* of sharing behaviours among users of the focal sharing platform. The third factor is the cost for focal platforms to collaborate with a supplier/partner in a transaction, which hinges on the level of asset specificity and behavioural uncertainty based on the transaction economics reasoning (Poppo et al., 2016). More specifically, in the sharing economy, asset specificity – reflected in anonymity, transferability and modularity – emphasizes the extent of specificity of the shared goods/services. Behavioural uncertainty is reflected in the shared product category, including search, experience, and credence goods.

We thus follow this framework and develop six design elements which as listed as follows: *asset-lightness, frequency, anonymity, transferability, modularity,* and *product category*. These design elements together reveal an array of options for sharing platforms to configure business model designs. Below, we explain how each design element can affect performance of sharing platforms. The definition of our six design elements and their effects on platform performance are summarized in Table II.

Asset-lightness. This design element describes the extent to which shared products/services belong to focal sharing platforms compared to external stakeholders (Sohn et al., 2013). The heavier the assets, the higher the cost to the platform due to the labour, maintenance, and raw materials needed to support their infrastructure (Bursh et al., 2012). The portfolio of assets varies across the sharing economy. Some platforms are asset-heavy since they have internalized tangible or fixed assets, such as Zipcar which owns its own fleet; whereas others, like Lyft, have access to the same assets but rely on ownership by users. All else being equal, lighter assets lead to lower costs and resource requirements incurred by the platform, and therefore higher performance. However, it is sometimes difficult to maintain the quality of user-provided goods/services which can devastate platform performance.

Frequency. Frequency refers to the number of times the sharing activities occur within a certain time period (David and Han, 2004). This varies substantially among sectors. For example, a used-fashion sharing site (e.g., Poshmark) has relatively frequent transactions,

Table II. Definitions of key constructs and their relationships to performance

Design elements	*Definition*	*Relationship to platform performance*
Asset-lightness	Describes the extent to which shared products/services belong to focal sharing platforms compared to external stakeholders (Sohn et al., 2013) for example, Zipcar is an asset-heavy business model as it needs to own a vast fleet of cars.	Contingent
Frequency	Refers to the number of times the sharing activities occur within certain amount of time (Williamson, 1985; David and Han, 2004) for example, Poshmark has relatively frequent transactions while Beepi doesn't.	Contingent
Anonymity	Captures the extent of the physical and/or virtual co-presence of social actors in a transaction (Perren and Kozinets, 2018) for example, Users in Lending Club are anonymized as they have no opportunities for social communication.	Contingent
Transferability	Refers to the extent to which the assets being transacted can be moved geographically to serve other users (Anand and Delios, 1997) for example, Khan Academy allows users to share content anytime anywhere.	Positive
Modularity	Refers to the extent to which an application service can be divided into sequenced activities (Banalieva and Dhanaraj, 2019; Markman and Waldron, 2014) for example, Mobike disaggregates the bike-sharing service into small and isolated modules that are delivered in a sequence, including positioning, biking, parking and paying.	Contingent
Product category	Refers to the goods type built upon on platforms (Nelson, 1981), including search, experience, and credence goods for example, Poshmark provides search goods (e.g., used clothes); Airbnb provides credence goods (accommodations); Khan Academy provides credence goods (education).	Negative

while a used-car trading site (e.g., Beepi) does not have equivalent frequency because most buyers only purchase a car once every few years. In general, more frequent transactions suggest more opportunities to charge a commission fee, implying a lucrative potential. Yet, high amounts of information asymmetry and uncertainty associated with the transaction can produce high costs, thereby hurting platform performance.

Anonymity. Given that the sharing economy channels multiple parties together, an important design element pertains to the physical presence and exposure of personal information of social actors in a transaction, a.k.a. anonymity (Perren and Kozinets, 2018). Anonymity captures the extent of the physical and/or virtual co-presence of social actors in a transaction (Perren and Kozinets, 2018) and provides an opportunity for social interaction between users and providers. A high level of anonymity represents 'a society of strangers' (Bardhi and Eckhardt, 2012, p. 884), where only limited communication among users is allowed. For example, lenders who invest in loans of other network borrowers will be anonymized in Lending Club, thus having no opportunity to interact socially. In contrast, lower anonymity permits intense social connection. For example, TaskRabbit connects vetted skilled freelance laborers with actors in nearby neighbourhoods seeking services such as cleaning, delivery, or house repair. The strong social interaction created between users and taskers inspires feelings of friendliness and social satisfaction (Perren and Kozinets, 2018).

Effects of anonymity on performance are contingent on several factors. In some cases, the opportunity for social interactions associated with low anonymity can be costly, as these interactions require specific efforts that may not be repeatable in other transactions. For example, a tasker who serves a user develops specific routines and capabilities that are only valued by that user, and new efforts will be required in the future (i.e., 'cost'). High anonymity business models, in contrast, avoid these costs, thereby leading to higher performance. In other situations, some sharing activities require interpersonal interactions in order to better communicate services (e.g., Uber). In these cases, arbitrarily imposing anonymity could spawn information asymmetry which is detrimental to performance. In sum, the relationship between anonymity and platform performance is dependent upon other conditions.

Transferability. Given the geographic concept of space, another design element in the sharing economy is transferability, which refers to the extent to which the assets being transacted can be moved geographically to serve other users (Anand and Delios, 1997). High transferability mostly emerges in online businesses, indicating that products/services can be easily moved to serve alternative customers from anywhere in the world. Khan Academy, principally designed as an online video-sharing education site, serves as a good example. Relying on a simple and intuitive interface design, the business model designs of Khan Academy allow users to share content anytime and anywhere. Low transferability, conversely, partially occurs in a location-based exchange – that is, online-to-offline. In this scenario, the products/services can only be provided to users in a limited location at a certain time. Consequently, the emergence of a transaction is partially bound by location, thereby increasing barriers between connected actors. Transferability, therefore, is strongly expected to enhance performance and serves as an important contingency for the influence of other design elements.

Modularity. For sharing platforms to optimize organization of their complex activities, modularity is often needed as one of the design elements (Jacobides et al., 2018). Modularity, adopted in traditional industries such as car manufacturing, software, and computers, describes the extent to which a component can be separated and recombined (Schilling, 2000). It allows interdependent components to be connected by different interfaces with limited coordination required. In the context of the sharing economy, the degree of modularity in a transaction partly depends on the extent to which an application service can be divided into sequenced activities (Banalieva and Dhanaraj, 2019) or parcelled (Markman and Waldron, 2014). A highly modularized example is Mobike, which disaggregates the bike-sharing service into small and isolated modules that are delivered in sequence and include positioning, biking, parking and paying. Such modules act as coordination mechanisms, enabling riders to automatically access any 'Mobikes'. This convenient transaction is achieved by bundling with standardized complementary service parties such as maps (Baidu Maps, Gaode Maps, Google

Maps, etc.); credit card systems; and mobile payment systems (WeChat Pay, Alipay, etc.) through the application programming interfaces (APIs). Moreover, seat height may be adjusted to address the heterogeneous needs of riders. Therefore, by dividing the sharing activity into multiple modules and making them accessible to users, sharing platforms provide a modular process for users to share products or services.

When the shared goods/services are split into flexible components and employ standardized third-party interfaces, the efficiency of sharing between users and providers should be significantly improved. However, modularity may result in the loss of created value when the components constituting the shared goods/services are tightly connected and difficult to disentangle. For example, Quid[2] offers business-to-business strategic problem solving, which is an integrated service program and cannot be divided or standardized, because there is virtually no commonality between any two firm cases. Forcing modularity in such conditions may sacrifice the value created.

Product category. The last element is product category. Nelson (1981) classifies products into search, experience, and credence goods, based on whether or not consumers can judge product quality before purchasing. Specifically, search goods (e.g., cell phones) are those about which consumers can acquire information on product quality prior to buying. Experience goods (e.g., films and restaurants) are products for which evaluation and consumption occur simultaneously. Credence goods (e.g., legal services and doctors) are products for which evaluation is difficult even after consumption. Product category captures behavioural uncertainty – the extent to which the user cannot effectively observe or evaluate the goods/services provided by the asset owner (Poppo et al., 2016).

Many sharing platforms shape their product category and behaviour uncertainty by monitoring transactions (e.g., GPS tracking) and encouraging reviews and ratings by customers and providers. Consider Uber as an example. After submitting the trip request, a passenger can receive an immediate response from an Uber driver, with a waiting time, car make and plate number. Further, the route and price of a trip are calculated by Uber, reducing the possible uncertainty between passengers and drivers. Users greatly value the certainty of knowing when the car will arrive rather than discovering a cab stochastically by standing on the side of the road. In the setting of the sharing economy, we argue for the importance of strategically choosing the target goods/services to be shared. The uncertainty involved in credence goods may breed providers' opportunistic behaviours in the sharing activities, for example, hiding some crucial information, resulting in bad performance. Product category, then, can significantly affect cost in the sharing economy.

In sum, based on the configurational approach, we aim to investigate how these six design elements combined to scale up and/or scale down sharing platform performance. To do so, we utilize the fsQCA technique to perform analysis.

METHODS

Sample and Data

We compiled multiple sources of data and a matched global sharing economy database. Sharing Economy Universe database from Silk provides publicly available information on 976 sharing platforms founded between 1995 and 2014.[3] Applause Sharing

Economy App Quality Index comprises software applications with more than 150 in-store reviews. Given that platforms in these two databases are mainly from Organisation for Economic Co-operation and Development (OECD) countries, we collected additional data on platforms from some important emerging economies. For instance, sharing platforms from China were collected because China has become one of the world's largest homes to such platforms. Its transaction volume topped $500 billion during 2016 and it is predicted to maintain a high annual growth rate of 40 per cent in the coming 5 years (Pennington, 2017). In total, we had 1,009 sharing platforms as an initial data pool.

Four screening criteria were used in this cross-sectional study. First, we excluded platforms with no public investment data from mass media (e.g., corporate annual reports or financial news). Only 368 sharing platforms disclosed their venture capital funding information in the original data pool. Second, in order to match sales revenue with assets (the number of employees), we used only cases with complete financing and accounting information, leaving 236. The data for finance and employees were collected from Owler.com.[4] Third, we ruled out sharing platforms that could not receive at least US$10,000 in the Series A round of venture capital funding during the 10-year period after their inception. Meyer and Crane (2013) suggest that the average small business requires about US$10,000 of start-up capital, which is also a rough indicator of the minimum level of early stage financing. Thus, our testing sample was reduced to 194. Fourth, we dropped another five sharing platforms due to switches in business model design during the observation window period (1995–2019). This left 189 sharing platforms in our final dataset.

To mitigate the concern of potential sampling bias, we followed prior studies such as Campbell et al. (2016) and Cui et al. (2017), examining whether systematic differences existed between the target platforms in the final sample and those excluded. We found no significant differences in any of the causal conditions. More importantly, since the study adopts fsQCA to analyze data, the fuzzy set analysis, unlike regression analysis, does not rely on assumptions of a given probability distribution (Campbell et al., 2016). Thus, fsQCA methodologists suggest that sample representativeness is 'less of an issue' in a fuzzy set framework because calibrated sets help reduce sample dependence (Fiss, 2011, p. 402).

Analytical Approach

To realize the configurational approach, we utilize the fsQCA technique to perform set-theoretic analysis. Grounded in set theory, fsQCA suits a 'middle-way' research design between a purely deductive variable-oriented design and a purely inductive case-based design (Misangyi et al., 2017). This technique is particularly relevant for our study purposes – applying the configurational logic and exploring configurations of design elements to explain variation in performance among sharing platforms.

The analytical technique has the following features: first, it identifies how multiple design elements combine in distinct configurations to affect platform performance (that is, conjunctural causation); second, it can assess whether multiple configurations are linked to the same outcome (that is, equifinality); third, it can examine whether either the presence or the absence of any particular design elements may be connected to performance (that is, asymmetry); and fourth, it can work with a small-to-medium sized sample, which is likely to be the case when studying an emerging phenomenon such as the sharing economy (Cui et al., 2017; Fiss, 2011; Misangyi et al., 2017; Ragin, 2008).

Measures and Calibration

An important procedure to prepare the dataset for fsQCA is calibration. In conventional methods, variables are measured on either raw values or sample-specific scales (i.e., sample-specific mean and standard deviation, with all variations treated as important); whereas fsQCA takes one more step, using external criteria and/or distribution to calibrate variables, and suggests that not all variations are important (Fiss, 2011; Ragin, 2008). That is, calibration is a process of assigning cases with set membership scores (Schneider and Wagemann, 2012). Following some 'best practices' recommended by prior fsQCA studies (e.g., Campbell et al., 2016; Crilly, 2011; Fiss, 2011; Judge et al., 2014), we adopted both three-value and four-value schemes to calibrate measurements of outcomes and causal conditions. When external standards can be implemented using specified values of an interval scale, we use the three-value scheme corresponding to the three key breakpoints of (a) fully in membership (the upper bound of set membership of a case in a fuzzy set, assigned a value of '1'); (b) fully out membership (the lower bound of set membership of a case in a fuzzy set, assigned a value of '0'); and (c) a crossover point (that is, the point of maximum ambiguity and neither in nor out of a particular set, assigned a value of 0.5) (Fiss, 2011; Ragin, 2008). If the information is not systematic or strictly comparable from case to case (Ragin, 2008), we use the four-value scheme, which marks 'more in than out' at 0.67 and 'more out than in' at 0.33, in addition to fully in membership (set as 1) and fully out membership (set as 0). Calibration anchors are reported in Table III.

To minimize the subjectivity of the judgment, we assigned two independent and well-trained raters simultaneously to calibrate the causal conditions. The raters calibrated the cases through diversified evidence to achieve triangulation (e.g., relevant literature, field interviews and social news) (Fan et al., 2016). They first discussed and confirmed guidelines for calibration, then searched for a wealth of information about the platforms, and finally calibrated independently. If there were inconsistencies across their coding, they discussed and reconciled these before deciding the membership of a causal condition.

Platform Performance

Revenue is commonly used for assessing performance of sharing platforms (Abrate and Viglia, 2019; Crisostomi et al., 2020, p. 120; Rai et al., 2006). We used the natural logarithm (ln) of sales revenue for 2019 divided by the number of years in existence as the outcome in this study. This ratio captures the amount of revenues sharing platforms generated in the focal year, accounting for the time it took to reach the revenue level. With reference to Fiss (2011) and Greckhamer (2016), we adopted the adjusted distribution method to calibrate high performance. Following Greckhamer (2016) with a stricter standard on data distribution (i.e., the 5^{th}, 50^{th}, and 95^{th} percentiles), we initially chose the crossover point at 4.0 (about the 50^{th} percentile) and decided upon 7.8 as a high full-membership anchor (about the 95^{th} percentile). Accordingly, the full non-membership anchor was set at 0.2 (about the 5^{th} percentile). We are also interested in whether and how various design elements combine in the absence of high performance. Utilizing the negation calculation function via fsQCA 3.0, low performance is accomplished by taking the converse of the outcome in the set of sharing platforms (Fiss, 2011).

Table III. Calibration of the sharing economy outcomes and conditions

Constructs	*Measurement*	*Calibration Anchors*	*Note and References*
High performance	The natural logarithm (ln) of estimated platforms' revenue/age for 2019	7.8, 4.0, 0.2	Distribution-adjusted calibration anchor points following Fiss (2011)
Low performance	Based on the negation of the calculation above	As Above	As Above
Asset-lightness	The natural logarithm (ln) of the number of permanent employees	500,300,100	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)
Frequency	The ratio of Daily Active Users to Monthly Active Users (DAU/MAU)	0.5,0.33,0.15	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)
Anonymity	The extent to which person-to-person interactions between service providers and customers are involved	1, 0.67, 0.33, 0	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)
Transferability	The scope with which the shared assets can be moved geographically to serve alternative users	1, 0.67, 0.33, 0	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)
Modularity	By assessing the extent to which (1) multiple service components are involved in the transaction, (2) the components are undertaken/provided by semi-independent players, and (3) different functions are involved on the platform	1, 0.67, 0.33, 0	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)
Product category	Whether the goods type built upon on platforms is search, or experience, or credence goods.	1, 0.5, 0	Qualitative & external knowledge. See Ragin (2008) and Crilly (2011)

Note: Calibration anchors refer to qualitative breakpoints adopted in the calibration process. These are set by theoretical and external knowledge or data distribution characteristics (Fiss, 2011; Ragin, 2008). For instance, a three-value fuzzy set has three calibration anchors representing full membership, crossover (i.e., maximum ambiguity), and full non-membership, respectively.

Design Elements

Extending Zott and Amit's (2008) work, we identified six design elements: *asset-lightness, frequency, anonymity, transferability, modularity,* and *product category*.

Asset-lightness. Based on prior studies on the asset valuation model (Ang and Straub, 1998), we utilized the number of permanent employees (as the direct costs associated with the production process) to measure asset-lightness. We calibrated asset-lightness by grouping the employee numbers into four categories: fewer than 100 (e.g., Crowdcube) as fully in membership (1); 101-300 (e.g., Poshmark) as more in than out (0.67); 301–500 (e.g., Postmates) as more out than in (0.33); and more than 500 (e.g., Zipcar) as fully out membership (0).

Frequency. Daily Active Users (DAU) and Monthly Active Users (MAU) reflect the number of users that visit a particular application at least once during a given day or month (Emmanouilides and Hammond, 2000). Since DAU and MAU are common metrics to reflect the user activeness, we used the ratio of Daily Active Users to Monthly Active Users (DAU/MAU) to evaluate the frequency of application usage. The larger the ratio of DAU/MAU grows, the more frequently the application are used in 1 month. For example, when DAU/MAU reaches 1.00, it means that the app is used every day. We were, therefore, able to calibrate the frequency by grouping the ratio into four categories: high (DAU/MAU>0.5) as fully in membership; moderate (0.33<DAU/MAU≤0.5) as more in than out in the set membership of frequency, low (0.15<DAU/MAU≤0.33) as more out than in the set membership of frequency, and quite low (DAU/MAU≤0.15) as fully out membership.

Anonymity. Following Bardhi and Eckhardt (2012), we measured anonymity by the extent to which physical and/or virtual interactions between service providers and users occur. Correspondingly, transactions that offer little or no direct interaction (e.g., Lending Club) were coded as fully in membership (1), while transactions requiring inevitable offline in-person meetings (e.g., household chore services) were coded as fully out membership (0). In the remaining sectors, we allocated a low degree of membership (0.33) to transactions involving virtual direct interaction (e.g., online forum or online education) and partial membership (0.67) to transactions involving one-sided attachment between providers and users (e.g., Poshmark).

Transferability. We measured transferability as the degree to which a certain asset can be moved to serve alternative customers (Anand and Delios, 1997), ranging from worldwide to country-specific to local to neighbourhood. We assessed each company's membership using a four-value fuzzy set (Ragin, 2008). Assets that can be easily distributed around the world (e.g., video, photos, or messages) were coded as being fully in in this set (1.00); within a country (e.g., physical production) as more in than out in the set membership of transferability (0.67); at a local place (e.g., household chores) as more out than in the set membership of transferability (0.33); and in the neighbourhood (e.g., calling a taxi) as fully out (0).

Modularity. We assessed modularity according to the extent to which a sharing activity can be independently parcelled out and undertaken by alternative users. Transactions that can be totally parcelled out and undertaken by alternative users (e.g., Zipcar, which empowers drivers to use the services independently) are set as fully in membership (1.00); those that mostly enable this (e.g., BlaBlaCar, which allows users easy access to an empty seat in a car but they sometimes must communicate with drivers about routes) are set as more in than out at (0.67); those that make this partially possible (e.g., the online flea market Poshmark) are classified as more out than in (0.33); and those that have to manage the activities internally, such as Quid and TaskRabbit, are fully out membership (0).

Product category. We used search, experience, and credence goods as product category to assess the extent of behavioural uncertainty in the sharing economy exchanges (Nelson, 1981). 'Search' goods are associated with the least uncertainty; 'credence' goods with the most. We, therefore, set the benchmark of credence goods (e.g., Khan Academy) to 1.0 as fully in membership; experience goods (e.g., TaskRabbit) to 0.5 (the crossover point); and search goods (e.g., Zipcar) to 0 as fully out membership.

Analytical Procedures

Analysis of necessary conditions. We started the analysis by testing whether any factor was a necessary condition to achieve high performance and its negation (e.g., low performance), respectively. A causal condition is called 'necessary' or 'almost always necessary' if the instances of the outcome (high or low performance) constitute a subset of the instances of the causal condition (Ragin, 2008). In line with Greckhamer (2011), we adopt an individual consistency score of 0.90 as the cut-off threshold. As shown in Table IV, none of the individual factors exceeds the threshold of 0.90. Therefore, there was no individual factor qualifying as a necessary condition for both outcomes; that is, none of the design elements can be individually claimed as the necessary condition to reach either high or low performance.

Sufficiency analyses. An algorithm based on Boolean algebra is used to logically reduce the Truth Table[5] rows to simplified combinations (Fiss, 2011). Details are supplemented in Appendix 1. Consistency thresholds – 0.830 for high-performance configurations and 0.808 for low-performance configurations – are adopted. The frequency threshold is set at 2.0, which is a sound standard to ensure at least two representative cases for each configuration identified by fsQCA3.0 (Judge et al., 2014). Our configurational results are generated and reported in Table V.

Two fit indicators, solution consistency and coverage, are reported in Table V. These aid the interpretation of results (Greckhamer, 2011; Ragin, 2008). The consistency score measures how well the solution corresponds to the data (Crilly, 2011; Ragin, 2008), which is calculated for each configuration separately as well as for the whole solution. Although consistency should be as close to 1 as possible to suggest that a subset relationship exists – that is, all cases (assuming equal to 1) would share a condition and the outcome – existing studies generally suggest an acceptable consistency level of 0.80 (Crilly, 2011; Fiss, 2011; Greckhamer, 2011; Ragin, 2008). We obtain overall consistency values of 0.86 and 0.81 for high-performance and low-performance outcomes, respectively, and the individual consistency scores of all six configurations are also greater than 0.80.

The solution coverage scores measure how important a causal combination is to the outcome (Ragin, 2008). We obtained the identical overall coverage scores of 0.41 with solutions for the high- and low-performance sharing platforms. These overall coverage levels indicate the empirical importance of our solutions as a whole (Crilly, 2011; Ragin, 2008). Although there is no threshold to judge the acceptable level of the overall

Table IV. Testing necessary conditions of high and low performance

Causal Configurational Solutions	*High Performance*		*Low Performance*	
	Consistency	*Coverage*	*Consistency*	*Coverage*
Asset-lightness	0.79	0.50	0.89	0.58
Frequency	0.58	0.74	0.47	0.58
Anonymity	0.58	0.68	0.49	0.55
Transferability	0.61	0.63	0.54	0.54
Modularity	0.71	0.64	0.65	0.56
Product category	0.47	0.65	0.51	0.68

[a]Necessary conditions are calculated with the fsQCA 3.0 software.
[b]A causal condition is called 'necessary' or 'almost always necessary' if the instances of the outcome constitute a subset of the instances of the causal condition (Ragin, 2008). The individual coverage score is a gauge of empirical importance or weight (see Ragin, 2008), which shows the proportion of the sum of the outcome membership score (i.e., high/low performance in our study) that is 'covered' by a causal condition (Ragin, 2008).
[c]In contrast to coverage scores, the individual consistency score is the more important indicator. A consistency score of 1 indicates that individual causal condition meets the rule across all cases. The more cases that fail to meet the consistency criterion, and the larger the distance from meeting the criterion, the further the consistency score will fall below 1 (Ragin, 2008). In line with Greckhamer (2011) and Schneider et al. (2010), we adopt a consistency score of 0.90, as the cut-off threshold. In our analysis above, no individual factor is a necessary condition for both outcomes; that is, none of the design elements can be individually claimed as the necessary condition to reach either high or low performance.

coverage (Misangyi et al., 2017; Ragin, 2008), prior studies show a comparable range of overall coverage scores between 0.30 and 0.50 for small and medium-sized samples (e.g., 10-300) (see Cui et al., 2017; Fiss, 2011; Greckhamer, 2016). Table V also reports the raw coverage and unique coverage levels for each individual configurational solution. The raw coverage measures the explanatory power of an individual configurational solution. However, any single observation might be explained by multiple configurations, and therefore a measure of each configuration's unique contribution to the solutions is provided in the form of unique coverage (Greckhamer, 2011; Ragin, 2008).

Table V displays the results of fuzzy-set analysis of configurations of the design elements' causal conditions on platform performance. Following Greckhamer (2011) and Ragin (2008), the intermediate solutions generated by fsQCA 3.0 are reported, because the intermediate solutions are more conservative and have stronger empirical plausibility than complex and parsimonious solutions (Ragin, 2008). Thus, four distinctive configurations are obtained for high performance and two for low performance. In regard to the notation, a black circle (●) indicates the presence of a condition, while a circled cross (⊗) indicates its absence. Blank spaces indicate ambiguous situations, in which the corresponding causal condition may be either present or absent and therefore, plays no significant roles in the configurational solutions.

Robustness Tests

Robustness checks were performed to examine the stability of the configurations. Following previous studies, we adopted four main types of robustness checks: different calibration rules; use of the PRODUCT[6] value; reduced threshold; and decreased

Table V. Fuzzy set configurations of sharing economy

	High Performance				*Low Performance*	
Design Elements	*Configuration 1*	*Configuration 2*	*Configuration 3*	*Configuration 4*	*Configuration 5*	*Configuration 6*
Asset-lightness	●	⊗	●	●	●	●
Frequency	●	●	⊗	●	⊗	⊗
Anonymity	●	●	⊗	⊗	⊗	⊗
Transferability	●		●	⊗		⊗
Modularity		●	●	●	⊗	⊗
Product category	⊗	⊗	●	⊗	●	
Consistency	0.92	0.94	0.83	0.85	0.82	0.84
Raw Coverage	0.15	0.17	0.10	0.23	0.33	0.34
Unique Coverage	0.05	0.06	0.05	0.09	0.07	0.08
Representative Case	Poshmark (PBSE)	Zipcar (RBSE)	Khan Academy (KBSE)	Uber (LBSE)	Quid (KBSE)	TaskRabbit (LBSE)
Overall Solution Consistency	0.86				0.81	
Overall Solution Coverage	0.41				0.41	

[a]Following Ragin (2008), only intermediate solutions are reported.
[b]● indicates the presence of a condition; ⊗ indicates the absence of a condition; blank spaces indicate that the presence or absence does not affect performance.
[c]Representative cases are identified by fsQCA3.0 when cases have membership greater than 0.5.
[d]PBSE=Product-based sharing economy; RBSE=Rental-based sharing economy; KBSE=Knowledge-based sharing economy; and LBSE=Labor-based sharing economy.

frequency of cut-off value.[7] For instance, following Fiss (2011), we conducted sensitivity analyses by varying the crossover point ±25 per cent for our measures during the calibrations. Minor differences were observed regarding the configuration of solutions, but our results remain robust. Specifically, when the crossover point of the calibrations floats upward by 25 per cent, the coverage value for high-performance cases remains at 0.41, while the consistency value drops to 0.83. Meanwhile, the overall coverage value and the consistency for low-performance cases increase to 0.43 and 0.89, respectively. When it floats downward 25 per cent, the coverage and consistency for high-performance cases change to 0.45 and 0.87, respectively; while those for low-performance cases drop to 0.39 and 0.69, respectively, but Configuration 5 disappears. We also adopted a higher cut-off (0.60) of PRODUCT, which further justifies our selected raw consistency cut-off points. As shown in Appendix 1, the PRODUCT values of covered solutions are generally greater than 0.60, with the exception of the third raw cut-off point for low performance with a slightly marginalized value (0.551). In general, we confirm that all six solutions obtained from the main tests are robust.

FINDINGS AND PROPOSITION DEVELOPMENT

Next, we interpret our findings by referring to representative cases generated from fsQCA 3.0. These cases are associated with each configuration of Truth Tables, where cases with membership greater than 0.5 imply substantive case knowledge (Cui et al., 2017). All qualitative case information was collected from publicly available archival sources (e.g., corporate reports, news, and media interviews). Based on the six configurations, we developed the corresponding propositions outlined below.

Product-based Sharing Economy

Configuration 1 shows the business model design labelled *product-based sharing economy* (PBSE). This is characterized by light assets, high transferability, and search goods. This term vividly describes a sharing platform organizing selling and trading/bartering merchandise online. This scenario involves light assets, high frequency, high anonymity, high transferability, and search goods. sharing platforms with light assets are relieved of high production costs. The transactional configuration of high anonymity and high transferability suggests that users share goods swiftly with few social interactions, which may speed up business transactions. sharing platforms using such a design still manage to make transactions occur smoothly, despite users' inability to customize the goods as they wish and having to encounter the same transaction condition multiple times within a short period of time. Search goods also suggests that the sharing platform can clearly convey the information (e.g., quality and use conditions) about the goods being shared, reducing the probability of opportunism. All the cost merits deriving from search goods, high anonymity, and high transferability enable sharing platforms to compensate for the hassle of frequent transactions in the process of goods sharing. In addition, frequent transactions allude to more commission fees taken by sharing platforms, which implies the potential to achieve high performance.

A representative case associated with this configuration is Poshmark, which is identified by fsQCA3.0's case identification function. Founded in 2011, Poshmark is a peer-to-peer social commerce marketplace with over 4 million sellers, 25 million items and 5,000 brands. Its branding is 'for fashion where anyone can buy, sell and share their personal style'. In a recent interview with Business Insider, company CEO Manish Chandra said that one advantage of Poshmark is its ability to make fashion products commoditized and searchable over the internet – in other words, *search goods*. Against traditional beliefs that fashion is difficult to assess and generally a credence good by nature, Manish creatively utilizes social networks to make style products more searchable. As he noted, 'people want to see clothes through people' (Hanbury, 2018). The success of Poshmark also benefits from 'a well-timed boom in second-hand clothing sales driven by millennials' desire to buy something unique and different and also be more environmentally conscious', according to Manish (Hanbury, 2018). In addition, to enhance transferability, Poshmark provides sellers with a pre-paid, pre-addressed label ready to paste on the box. All arrangements of Poshmark, except modularity, jointly lead to high performance. In just 1 year (from 2018 to 2019), Poshmark doubled its sales revenues from USD $1 billion to $2 billion. Based on the arguments above, we suggest:

> *Proposition 1*: A PBSE business model design: High performance is associated with light assets, high frequency, high anonymity, high transferability, and search goods.

Rental-based Sharing Economy

Configuration 2 is termed rental-based sharing economy (RBSE) and is characterized by heavy assets. It allows users on-demand access to goods owned by the sharing platforms (see Bardhi and Eckhardt, 2012). Configuration 2 suggests that heavy assets result in high performance when combined with highly frequent transactions, high anonymity and modularity, and search goods. Heavy assets, though costly, may positively influence performance by taking shared goods/services under a platform's control. Sharing search goods in a modular way requires minimal coordination costs because there is little information asymmetry between the platform and users. Under this condition, social interactions are no longer necessary to the sharing activities. Thus, high anonymity has become a highly desirable design element to reduce costs. Further, high frequency of sharing activities adds to the potential market value with relatively few concerns for cumulative costs.

Zipcar is the company we use to represent this case. As the world's leading business-to-customer car-sharing network, Zipcar provides users with on-demand access to cars by the hour or the day around the world. In September 2016, it announced that it had 1 million users across 500 cities in nine countries, with a fleet of nearly 12,000 vehicles. The company's success can be explained by the dedication of their strategic leader, Luke Schneider, to streamlining the rental processes by replacing people with technology. Covering fuel, insurance, parking and maintenance, Zipcar offers convenient and frequent use of a vehicle, with potential monthly savings of $600. Zipcar is designed with a high modular procedure: becoming a user, booking, getting, and returning the car. Zipcar sends each user a Zipcard that locks and unlocks vehicles. When booking a car (a kind of search good), users can easily browse all vehicle performance information online. The reserved car is parked in a local lot, often within walking distance of the user, and is ready for use with the keys in the ignition. The fee is automatically charged through Zipcar's proprietary technology system that requires little user interaction beyond waving a Zipcard in front of the reader located on the windshield. The radio frequency-identification technology is a key feature of the Zipcar product, which allows the company to realize an anonymous self-service. Owning the fleet of cars helps Zipcar to easily achieve the high anonymity, modularity and frequency conditions needed to offset the high cost of heavy assets, thereby allowing the company to gain more commission fees with stronger potential to achieve high performance. Based on the reasons above, we suggest:

Proposition 2: A RBSE business model design: High performance is associated with heavy assets, high frequency, high anonymity, high modularity, and search goods.

Knowledge-based Sharing Economy

Configurations 3 and 5 reveal some similarities, such as low anonymity, high transferability, credence goods, and low frequency. Such an overlap of elements bonds both business model designs to a knowledge-based sharing economy (KBSE), which often provides opportunities to involve users in projects and contribute to their knowledge and achievement. A comparison of configurations linked to high performance (Configuration 3) and low performance (Configuration 5) underscores that modularity is a key element affecting sharing economy performance. Specifically, Configuration 3 suggests that a KBSE displays high performance only when it is accompanied by high modularity. In this business model design, even if transacting credence goods (associated with high behavioural uncertainty), users remain interested if the sharing economy is modular, because high modularity allows them to track goods step-by-step to reduce providers' opportunistic behaviours. With the light-asset approach, together with other design elements, the collaborative economy can sustain the overall costs at a lower level.

Khan Academy serves as a representative case. Launched in 2006, Khan Academy is now one of the world's most popular peer-to-peer education websites and describes its mission as providing 'a free world-class education for anyone, anywhere'. As of September 2019, its channel on YouTube had more than 5.11 million subscribers and its videos had been viewed nearly 1.7 billion times. Education is a kind of credence good in the sense that neither students nor teachers can easily evaluate the teaching effect in advance. To deal with the high uncertainty embedded in credence goods, Salman Khan, the founder of Khan Academy, addressed the principal flaw in education systems: the emphasis placed on learning within rigid time constraints. 'If you make "when" and "how long" the variables', Salman told the audience, 'you end up with less gaps in learning' (The Lavin Agency, 2012). In other words, the transfer of knowledge is more effective and trading education content is more efficient. Therefore, he argues, if students can learn at their own pace, in fun, modular and interactive ways (e.g., through games and the peer-review system), they will ultimately gain a better understanding of the concepts being taught. Given this belief, the contents of Khan Academy include thousands of video clips made in digestible 5–20 minutes chunks, especially designed for viewing on the computer. This content is thus highly modular, easily transferred, and useful for students who use it less frequently than a daily curriculum.

Configuration 5, conversely, shows a KBSE designed with low modularity. Lack of modularity enables more communication between parties, thereby strengthening the owners' control over information. This in turn increases the uncertainty surrounding credence goods. An exemplar case is Quid, a business-to-business platform that searches, analyses and visualizes the world's collective intelligence to help answer future direction-related questions. The majority of Quid's clients are corporations that focus on strategic problems, implying that its major service is a type of credence good. Quid's CEO Bob Goodson claims that 'we are doing something different that hasn't been done before'. Quid can source the internet for information on a client's strategic queries, then compile and organize that data into a visual map so that clients can see what trends and themes are emerging most often in the media. Hence Quid allows non-technical users in enterprises to independently access the world's high-value information (e.g., news articles, blog posts, company profiles, and patents) for unique and shareable insights. These corporate clients generally subscribe to Quid's service on a yearly or monthly basis, indicating a low frequency. Quid proprietary algorithms employ artificial intelligence and Natural Language Processing to quickly find insights across millions of data points, thereby making the service highly transferable. However, users with complex problems come from more than 80 industries including such companies as eBay, Hyundai, Intel, and Pepsi. It is, therefore, difficult to divide tasks into specific components applicable to all users. In other words, Quid is faced with a variety of questions that cannot easily be answered in a modular and anonymous way. Overall, Quid has designed a costly business model characterized by a lack of modularity, thereby limiting its performance. Based on the comparison between Configurations 3 and 5, we suggest:

> *Proposition 3*: A KBSE business model design: High performance is associated with low frequency, low anonymity, high transferability, and credence goods, while the absence of modularity is related to low performance.

Labour-based Sharing Economy

Configurations 4 and 6 represent business model designs that require offline services (low anonymity and low transferability) shared by users (light assets). Most cases using these designs employ the labour-based sharing economy (LBSE), an on-demand platform that enables individuals to freelance their skills and expertise (Burtch et al., 2018). In addition to low anonymity, low transferability and light assets, Configuration 4 also exhibits high modularity and high frequency. These transaction characteristics are combined to strongly signal the relatively low-cost structure of this business model design. A representative example of Configuration 4 is Fiverr. Founded in 2010, Fiverr is fundamentally transforming the way businesses and freelancers collaborate. It provides a platform for freelancers who offer mostly digital services – that is, graphic design, translation, video production, and voiceovers – to customers worldwide. Fiverr freelancers advertise tasks they are willing to perform for a fixed price on the platform, and buyers pick and purchase their interested services. The service is streamlined, creating an on-demand, e-commerce-like experience that makes working with freelancers as easy as buying something on Amazon. Such a business model design has contributed much to its great success. In 2019, active users were up 17 per cent to 2.4 million. After the world went into lockdown due to Covid-19, Fiverr saw a 12 per cent surge in active users from April to June compared to a typical rise of about 5 per cent over that time period. Fiverr went IPO in 2019 and reported $107.1 million in revenue for the 2019 fiscal year.

Configuration 6, as another typical LBSE, shows low performance. Compared with Configuration 4, this particular business model design exhibits different elements – low modularity and low frequency – which suggest strong potential for poor performance. TaskRabbit is a representative case in our data. Established in 2008, TaskRabbit – a platform connecting freelance labour with local actors seeking help in errands – is indeed an online social community. After entering the task description, the task poster will see photographs and profiles of a few taskers and start a chat with the one selected. On its app, the firm also describes the social aspect of its platform: 'TaskRabbit connects you to safe and reliable help in your neighbourhood', thus binding TaskRabbit services to local networks. TaskRabbit faces high variety in the process of completing various home improvement services, such as cleaning, mounting, moving, and assembling. As such it is not modularly designed, which and increases risks. For example, taskers may feel hurt when they are paid less than the minimum wage to do undesirable tasks. They may consider leaving the platform under such conditions. Despite taking a high commission fee (30 per cent) for each task, TaskRabbit's poor performance is due to its low number of sharing transactions per user (low frequency). All these elements combined to produce a less than satisfactory outcome for TaskRabbit. In September 2017, it was sold to IKEA to increase cash flow. Based on comparison between Configurations 4 and 6 of the LBSE, we suggest:

Proposition 4: A LBSE business model design: High performance is associated with light assets, high frequency, low anonymity, low transferability, and high modularity, while the absence of frequency and modularity is related to low performance.

DISCUSSION

This study provides a holistic view of how business model design elements can jointly affect the performance of sharing platforms. Six configurations of distinct business model designs are theorized. We demonstrate how four of the six configurations can lead to high performance, while the other two may result in lower performance.

Theoretical Implications

This study offers three important theoretical contributions. First, we contribute to the business model research by uncovering six key design elements, addressing Zott et al.'s (2011) calls for further research into the building blocks in business models. The six elements are based on Zott and Amit's (2007) framework and are listed as follows: asset-lightness, frequency, anonymity, transferability, modularity, and product category. These design elements each describe a specific, operationalizable component of business models that is particularly relevant to the transaction efficiency of sharing activities. In particular, our focus on product category also answers a call for research to identify types of resources that have been shared (Eckhardt et al., 2019). Moreover, by identifying six specific design elements, we pioneer investigation of business model design as 'configurational'.

Second, we meaningfully add to the sharing economy literature by considering performance variation based on business model designs. Existing research on the sharing economy has focused on its conceptualization and characteristics (Eckhardt et al., 2019; Gerwe and Silva, 2020); drivers (Stofberg et al., 2019); governance mechanisms (Benson et al, 2020); and social or environmental implications (Jiang and Tian, 2018; Zervas et al., 2017). Some strategy research has also considered the entry strategy of the sharing economy (Garud et al., 2020; Paik et al., 2019; Phung et al., 2020) and entry responses of the affected incumbent firms (Chang and Sokol, 2020). However, business model designs and their performance implications for sharing platforms remain poorly understood.

We build upon the recent development of business model studies – that is, business model design, which focuses on how firms 'do business' (Zott et al., 2011). We identify multiple business model designs in the sharing economy context. Of these, four share similar opportunities in thriving, while the other two designs may result in failure due to inherent cost problems. These findings imply that business model designs help to explain differences in sharing platform performance. We, therefore, enrich the emerging literature on the sharing economy in considering various business model designs and their respective performance outcomes, which also answers Zott et al.'s (2011) calls for further research on business model performance.

Third, our work speaks directly to the importance of looking at business design through a configurational lens (Zott and Amit, 2007) using a fsQCA approach, which provides an alternative explanation to study causal complexity compared to regression. Regression generally assumes that the effects of the cues are symmetric – that is, poor performance is caused by the opposite of what causes high performance. We challenge this implicit assumption and extend prior work by showing that the configurations that relate to high performance are not the mirror image of those that relate to lower performance. This study reveals 'high-performing' and 'low-performing' configurations for knowledge- and labour-based sharing economy. The 'low-performing' configuration of each business model design is not simply the opposite of the 'high-performing' configuration.

Our work also shows that a single design element, such as asset-lightness, is not sufficient in shaping the performance of a sharing platform. The influences of most design elements are contingent upon the presence or absence of other conditions. Specifically, across the six configurations, two design elements – frequency and credence goods – operate as substitutes for each other and should not coexist for sharing platforms that achieve high performance. It is well recognized that credence goods increase the likelihood of a provider's opportunistic behaviour (Mellewigt et al., 2018). Such challenges are accentuated when transactions are frequent. Our findings suggest that sharing platforms should not take on both challenges at the same time. The substitutive relationship between high frequency and credence goods is not always sufficient for high performance (as Configuration 5 shows). Moreover, of anonymity, transferability, and modularity, we find some evidence suggesting modularity to be the most important element of the three.

Its existence alone may compensate for the advantage of anonymity and transferability taken together. Based on our results, a successful sharing economy should at least include the modular design element or both the anonymity and transferability elements.

Practical Implications

Our work establishes a much-needed bridge between scholarly work based on strategy and the practical needs of entrepreneurs, venture capitalists and incumbents to capitalize within the sharing economy. Specifically, as the sharing economy has led to dramatic changes in how transactions are arranged, entrepreneurs and even incumbents can benefit from using new platform-mediated approaches to aggregate their offerings. This study theorizes four business model designs that are likely to be successful and two others that are more likely to be unsuccessful, thus laying a foundation for actionable dialogue with managers on the relative success of sharing platforms. Given the difficulty in changing established business model designs, it is particularly important for entrepreneurs to formulate such designs effectively and cheaply at an early stage. Our findings can be useful for venture capitalists who are interested in investing in emerging sharing platforms. Investors need to be mindful of their guidance and investments in the sharing economy start-ups by evaluating their business model designs.

Limitations and Future Research Directions

Our work has several limitations that further research may address. First, our study on business model designs of the sharing economy ignores a crucial topic – governance mechanisms. It is noted that the sharing economy is a hybrid governance model (Jacobides et al., 2018). However, existing studies fail to explore the elements needed to clearly conceptualize hybrid sharing platforms along the market-hierarchy continuum. Further knowledge is required about which models are market-like or near the hierarchy, and what happens to a sharing platform whose governance is not appropriate. Thus, we invite future research to directly speak to the theory of transaction cost economics' (TCE) discriminating alignment claim – alignment between transaction characteristics and governance (Williamson, 1985) – to see if the fit between transaction characteristics and governance influences the performance of sharing platforms.

Second, although business model designs in the sharing economy are critical, entrepreneur pioneering in this nascent market often begins with vague ideas, particularly on how to link activities to create value. This raises the question of how entrepreneurs develop an effective business model design in a sharing economy. Moreover, for example, as sharing platforms often evolve with the tensions that arise from their private interests and public regulations (e.g., Uber), it would be interesting to observe how entrepreneurs can keep the fundamentals of their original design while adapting it to better meet government regulations.

Third, the indirect measures (i.e., anonymity and modularity) in our work lead to possible subjectivity, though we invited two independent researchers to set calibration thresholds based on existing theory and substantial knowledge. Our measures of platform performance raise another concern. While this measure is consistent with our theory and is widely accepted in the seminal work of entrepreneurial firm context (Patel et al., 2015), it may not directly capture actual performance (e.g., profits). It would, therefore, be valuable for future research to collect data from other sources and develop more direct measures, such as profits, that are tailored to the sharing economy and alternative theories.

CONCLUSION

Given the important role in creating value played by the sharing economy, both scholars and practitioners need a systematic understanding of how sharing platforms configure their business model designs. Based on the framework of business model designs, this study develops six new design elements – asset-lightness, frequency, anonymity, transferability, modularity, and product category – that are particularly relevant to the efficiency of sharing activities. Using a configurational approach and fsQCA, our findings uncover four business model prototypes of sharing economy – product-based, access-based, knowledge-based, and labour-based – each having its own 'high-performing' configurations. In addition, two of the four prototypes (i.e., knowledge- and labour-based) own 'low-performing' configurations. Our study contributes to understanding on the sharing economy phenomenon and sheds light on the business model literature in terms of theoretical development and empirical examinations. We suggest the sharing economy as an exciting area for future research and hope there are more endeavours to join in such a field.

ACKNOWLEDGEMENTS

The authors appreciate the excellent guidance by Editor Gideon Markman and three anonymous reviewers. This research was supported by the University of South Carolina Center for International Business Education and Research (CIBER) grants, and the National Natural Science Foundation's Major Program of China (Grant 'Research on Major Theoretical and Practice Issues in Innovation-Driven Entrepreneurship' 72091310) Project Five (Grant 'Research on the Theory and Strategy of Innovation-Driven International Corporate Entrepreneurship' 72091314).

NOTES

[1] Evidence shows that the size of the sharing economy was approximately $15 billion in 2014 and will reach $335 billion in global revenue by 2025 (PwC, 2014).

[2] With the use of Quid in this study, we would like to acknowledge the focus is on its inception and formative years, when it was largely built on a knowledge sharing business-to-business model. However, we would like to note, like many start-ups, Quid has pivoted and became a professional data service company, being merged with NetBase in 2020.

[3] The database from Silk was updated to year 2014 only.

[4] As a community-based competitive insights firm, Owler.com provides trigger events, real-time company news and dynamic firmographic data.

[5] Truth Table, as a key tool for analysing causal complexity using QCA, allows structured and focused comparisons, and lists 'the logically possible combinations of causal conditions and the empirical outcome associated with each configuration' (Ragin, 2008, p. 22).

[6] Schneider and Wagemann (2012) propose using the 'PRODUCT' parameter of consistency, which is obtained by multiplying the raw consistency value by the PRI score. The PRODUCT value is a complementary consistency measurement.

[7] Due to space limitations, we limit reporting of robustness tests. The robustness results of using reduced threshold and decreased frequency of cut-off values are available upon request.

Appendix 1. TRUTH TABLE OF CONFIGURATIONAL SOLUTIONS LEADING TO HIGH OR LOW PERFORMANCE (LOGICAL REMAINDERS NOT LISTED)

Causal Conditions						*Number*	*Outcome*	*Consistency*		
Asset-lightness	*Frequency*	*Anonymity*	*Transferability*	*Modularity*	*Product Category*	*(≥2)*	*High performance*	*Raw*	*PRI*	*PRODUCT*
0	1	1	0	1	0	3	1	0.946	0.901	0.916
1	1	1	1	1	0	4	1	0.944	0.853	0.869
0	1	1	1	1	0	3	1	0.940	0.881	0.892
1	1	1	1	0	0	2	1	0.897	0.745	0.767
1	1	0	0	1	0	9	1	0.854	0.670	0.688
1	0	0	1	1	1	6	1	0.830	0.571	0.626
1	1	0	0	0	1	3	0	0.782	0.475	0.481
1	0	0	1	0	1	6	0	0.766	0.442	0.449
1	0	0	0	0	1	3	0	0.722	0.315	0.321
1	0	0	0	0	0	6	0	0.714	0.324	0.324
1	0	1	1	1	0	37	0	0.651	0.371	0.491
Asset-lightness	Frequency	Anonymity	Transferability	Modularity	Product Category	(≥2)	Low performance	Raw	PRI	PRODUCT
1	0	0	0	0	1	3	1	0.864	0.666	0.679
1	0	0	0	0	0	6	1	0.862	0.676	0.676
1	0	0	1	0	1	6	1	0.808	0.542	0.551
1	1	0	0	0	1	3	0	0.797	0.512	0.519
1	0	0	1	1	1	6	0	0.739	0.340	0.374
1	1	0	0	1	0	9	0	0.691	0.304	0.312
1	1	1	1	0	0	2	0	0.687	0.227	0.233
1	1	1	1	1	0	4	0	0.667	0.128	0.131

Appendix 1. Continued

Causal Conditions						*Number*	*Outcome*	*Consistency*		
Asset-lightness	*Frequency*	*Anonymity*	*Transferability*	*Modularity*	*Product Category*	*(≥2)*	*High performance*	*Raw*	*PRI*	*PRODUCT*
1	0	1	1	1	0	37	0	0.658	0.384	0.508
0	1	1	1	1	0	3	0	0.545	0.107	0.108
0	1	1	0	1	0	3	0	0.498	0.082	0.084

[a]Raw consistency refers to the degree to which membership in that corner of the vector space is a consistent subset of membership in the outcome (Ragin, 2017); PRI consistency refers to an alternative measure of consistency for fuzzy sets based on a quasi-proportional reduction in error calculation (Ragin, 2017). The PRODUCT value of consistency is a complementary consistency measurement, which results from multiplying Raw consistency by PRI (Schneider and Wagemann, 2012).[b]The column of 'Number of cases' that are greater than 2 is kept because a high standard of frequency cut-off (=2) is set.[c]The truth table analysis serves two key goals in this study. First, it identifies explicit connections between combinations of causal conditions and outcomes. By listing the different logically possible combinations of conditions, it is possible to assess not only the sufficiency of a specific configurational solution, but also the sufficiency of the other logically possible combinations of conditions that can be constructed from these causal conditions (Ragin, 2008, p. 24). Second, it can transparently reveal the rationale of cut-off decisions in the sufficiency analyses.

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