Corresponding Author: Dr. Pablo Munoz, Ph.D.

Corresponding Author's Institution: University of Leeds

First Author: Pablo Munoz, Ph.D.

Order of Authors: Pablo Munoz, Ph.D.; Boyd Cohen, Ph.D.

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MAPPING OUT THE SHARING ECONOMY: A CONFIGURATIONAL APPROACH

TO SHARING BUSINESS MODELING

Abstract

Sharing economy businesses have emerged in recent years as a disruptive approach to the traditional way of planning, modeling and doing business. The phenomenon has gained significant traction within a wide range of domains including entrepreneurship, innovation, technology and management more broadly. Despite this surge and interest, there is a lack of empirical research regarding the increasing diversity of sharing economy business models and the implications for business growth, community impact, sustainability and public policy. With this research, we sought to leverage a rigorous comparative method, fs/QCA, to assess the business models of 36 firms in the sharing economy. Leveraging a rich set of qualitative data, our analysis leveraged seven dimensions of sharing economy business models drawn from extant research, revealing a typology comprising five ideal types that collectively account for the constellation of possible, empirically-relevant business models across the sharing economy. The emergent dilemmas and paradoxes as well as implications of these typologies of business models for startups, investors and policymakers are explored.

Keywords: sharing economy; business models; typology; qualitative comparative analysis;

fsQCA

1. Introduction

The sharing economy has emerged in recent years as a disruptive approach to traditional business to business and business to consumer business models. Price Waterhouse Coopers estimates that global revenues from sharing in just five sectors -travel, car sharing, finance, staffing, music and video streaming- will increase from $15 billion in 2015 to $335 billion by 2025.[1] Perhaps then it is no surprise we have witnessed an explosion in sharing economy startups, capturing the interest and imagination of entrepreneurs, investors and the academic community, and igniting the anger of many other stakeholders and sharing illiterates who feel threatened by or perceive sharing businesses as platform "deathstars" for their winner-takes-all global domination strategy.

The value of the sharing economy, and sharing-based business for that matter, resides beyond the potential economic benefit for major players in the sharing space. To date, the field lacks a unified definition of the sharing economy. Instead, we have witnessed ongoing debates in the press, policy circles and increasingly with researchers as to what actually constitutes the sharing economy, or if, in fact, it should even be referred to as such or instead, the collaborative economy (Chase, 2015; Owyang, 2015). Meanwhile, McLaren and Agyeman (2015) emphasize the need to juxtapose the sharing economy with a broader framing of the sharing paradigm which considers sharing in society without expectation of economic gain. For the purposes of this research, we draw on the work by McLaren and Agyeman (2015), Martin et al, (2015) and Chase (2015) to define the sharing economy as: *a socio-economic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of under-utilized resources in society*.

The sharing economy holds the promise for a more sustainable world by giving access to underutilized resources at a fraction of the cost to some who cannot or do not want to buy new

products, and the chance of making an extra income for those who already own such underutilized resources. The sharing economy is seen as instrumental in facing wicked problems such as overconsumption and income inequality. Sharing-based businesses have evolved from simple peer-to-peer lending initiatives to complex platforms and networks of people and companies interacting for the collective use of extant or new resources. This ranges from decentralized, self-organized shared urban farming to worldwide, shared scientific development. Despite the growing complexity of the phenomenon, most media and emergent scholarship seem to paint all sharing activities and businesses in particular with the same brush, assuming that a one-size business model fits all. In reality, business models in the growing diversity of sharing businesses are quite disparate, and require further examination. In facing this theoretical and practical challenge, our research seeks to uncover the underlying conceptual structure of a sharing business model by exploring the following research question: how do existing conceptualizations of sharing economy firm attributes combine to form different sharing business models?. Utilizing extant research on business models for sustainability (e.g. Schaltegger, Ludeke-Freund, et al. 2016) and emerging research on sharing-based business and entrepreneurship (e.g. Cohen & Kietzmann 2014), this research is therefore focused on understanding the inner complexity of the sharing economy and elaborating on the diversity of business model types within the space.

In order to get under the hood of so many emerging business models, we collected and analyzed a range of secondary data from 36 different companies, representing 12 categories and 30 subcategories of sharing activity sourced from the Honeycomb v2.0 framework (Owyang 2015). The Honeycomb model seeks to depict a holistic representation of the different sectors of the economy being disrupted by startups and established firms utilizing sharing economy

approaches. Honeycomb v1.0, launched in 2014 consisted of just six categories and 14 subcategories. In May of 2016, a v3.0 was released, which contains 16 categories and 41 subcategories, demonstrating the rapid proliferation of the sharing economy over a few years. Leveraging the data obtained, two researchers independently rated the 36 companies on eight dimensions of their business models. Applying a configurational comparative research method (fs/QCA), an empirical typology comprising five sharing business models emerged.

By embracing the sharing economy's complex and diverse nature, we believe that this paper contributes to the literature in a number of ways. First, we leverage a literature review of emergent academic and grey research on sharing economy business models in order to identify a more holistic set of criteria researchers and thought leaders claim to reflect sharing economy activity. To date we have lacked such clarity in the field by attributing just a few characteristics to the field such as the optimization of under-utilized resources or the prevalence of peer to peer interaction. Yet even those two examples suggest a binary relationship exists, that sharing economy business models optimize underutilized resources or they do not, that they are peer to peer or they are not and if they are not, they are not part of the sharing economy. In reality, as we discovered, there are many shades of grey, and also many other relevant factors that uniquely combine to create different types of sharing economy business models.

Similarly, by departing from arbitrary industry classifications, our configurational approach enables a more fine-grained understanding of the sharing business space. It elaborates and tests a range of components for sharing business modeling and empirically demonstrates the many different ways in which these components combine to create unique business models. Both components and models can set the basis for a new stream of research within this emerging domain.

Also, we bring to light a number of paradoxes and dilemmas which have grown to become intractable challenges for industries, markets and policy-making, but at the same time represent invaluable opportunities for new research and theorizing not only on a new type of business and market dynamics, but also on a new societal phenomenon closing and expanding the gap between business, communities and the environment.

This paper is structured as follows. First, we present a literature review focusing on the emerging field of the sharing economy from sociological and management perspectives, highlighting paradoxes and gaps. Secondly, we describe our methodology and sampling approach. Third, we introduce and describe the typologies that emerged and discuss the emerging nuances, dilemmas and paradoxes emerging as the field moves from childhood to adolescence. The paper concludes by discussing the implications of our results for research, practice and policy-makers who have been struggling to keep pace with the rapid introduction and growth of the sharing economy in their jurisdictions.

2. Business Models and the Sharing Economy

Management, entrepreneurship scholars have demonstrated an increased interest in the relevance, diversity and implications of business models within and across industries. Osterwalder and Pigneur (2010) have been widely credited for bringing business model framing into mainstream normative application with the introduction of the business model canvas and its associated nine elements. Of course much of the research, and practitioner tools focused on business models have been oriented towards traditional business and startup environments (e.g. Doganova & Eyquem-Renault 2009).

While there is a lack of consensus on the definition of what a business model actually is (Arend 2013), a useful definition for the purposes of this research is that of (Teece 2010):

the design or architecture of the value creation, delivery and capture mechanisms. The essence of a business model is that it crystallizes customer needs and ability to pay, defines the manner by which the business enterprise responds to and delivers value to customers, entices customers to pay for value, and converts those payments to profit through the proper design and operation of the various elements of the value chain. (p. 179)

Over the past several years, a number of altogether new and different sharing-based businesses have emerged. What their underlying business models have in common is that they operate in the "sharing economy" of collaborative consumption (Botsman & Rogers 2011), where people or organizations offer and share resources in creative, new ways. Airbnb lets people rent out part or all of their homes for short stays, and Uber allows for real-time, location-based ridesharing. An increasing number of individuals who may not have considered ridesharing or renting a room in a private residence as their vacation domicile a few years ago now prefer such sharing models to mainstream alternatives. While Airbnb and Uber get all the media attention due to their unprecedented valuations and market penetration, they also have drawn the ire of a range of stakeholders who claim these models unfairly compete in an unregulated environment, fail to meet minimum quality and safety standards, exploit "on-demand" workers and, in the case of some listings with Airbnb, have detrimental impacts on local neighborhoods and quality of life in cities (McLaren & Agyeman 2015).

On the other side of the spectrum we can find Repair Cafes and Food Preps, community-based initiatives using a similar model (i.e. under-utilized resources, peer-to-peer interaction and platforms for collaboration) to create public benefits, which may or may not evolve to create a formal business (Cohen & Munoz 2016). Repair Cafes, food preps, community gardens and many other community-led actions rely on sharing and trading, as do Airbnb and Uber, but the

purpose, governance and expected outcomes are unequivocally different from their famous counterparts (Metcalf 2015). Nevertheless, when it comes to explaining what the sharing economy is, inevitably both sides of the spectrum are frequently presumed to be part of the same economic paradigm through the application of constructs such as peer-to-peer, the use of platforms and the optimization of underutilized resources (Chase, 2015) which inevitably fall well short of unifying the field.

Drawing on Teece´s definition of business models and the literature review of academic and grey literature on emerging writing on the sharing economy, comprising 26 papers, reports and books, we have sought to develop a set of dimensions from which sharing economy business models could be evaluated and differentiated (Appendix A). It becomes apparent at this stage that the field is in its infancy. Only three of the references emerge from 2010-2013 with the bulk of the extant research emerging since 2015. Recently, there has been a growing interest in business models in the sharing economy (Acquier et al. 2016) as scholars and thought leaders seek to understand the widening gap of approaches to support the often disruptive intermediation of exchanges between peers and organizations.

Yet, the use of terms across studies is highly inconsistent and we can observe several conceptual overlaps among the constructs used in them. As a result of our review of extant business model research and emerging thought leadership in the sharing economy we were able to identify seven distinct dimensions of sharing business models. 1) platforms for collaboration 2) under-utilized resources, 3) peer-to-peer interactions, 4) collaborative governance, 5) mission-driven, 6) alternative funding, and 7) technology reliance.

Platforms for collaboration. Of the 26 references reviewed, 15 specifically identified the importance of a platform as a defining feature of sharing economy initiatives. In the case of

Chase (2015) platforms are considered one of three fundamental features that are required to be present for an initiative to be classified as a platform. Despite a relatively high level of agreement of the necessity for platforms to be present, there still remains some dispute about whether or not the platform must be digital or if physical platforms are also acceptable distinguishing features. Cohen and Muñoz (2016) suggest that platforms can refer to either digital connections or distributed physical resources in sharing initiatives aimed at improving sustainable consumption and production.

Under-utilized resources. As was the case for platforms, 15 of the 26 references reviewed indicate the importance of under-utilized resources as a distinguishing feature of sharing economy business models. Again, Chase (2015), who was also a co-founder of Zipcar, the global carsharing company, considers under-utilized resources as a necessary component of sharing economy business models. Zipcar however offers insight into alternative perceptions of under-utilized resources. Within shared mobility and carsharing in particular, Cohen and Kietzmann (2014) observe different treatment of existing resources. Peer to peer carsharing, for example, encourages peers to optimize the use of their own personal (previously purchased and therefore already existing in circulation) vehicles, whereas business to crowd models like that of Zipcar, typically rely on the purchase and ownership of new vehicles by the intermediary, parked throughout a city with the intent of encouraging the optimization of these new vehicles.

Peer to Peer Interactions. Peer to peer (P2P) interactions represent the third and final element identified by Chase (2015) as a necessary condition for an initiative to be considered part of the sharing economy. Ironically, her own successful venture, Zipcar, could be argued to be lacking in this element since the resources being shared (vehicles) are not owned by peers but rather a corporation. Of course the vehicles are shared by peers through a membership program,

all of which demonstrates ambiguity amongst the elements of sharing economy business models. Despite the potential ambiguity of interpreting what constitutes P2P interactions, 20 out of the 26 sources reviewed reference P2P interactions as a critical element of sharing business models.

Collaborative governance. In an effort to expand the framing of the sharing economy beyond commercially mediated sharing platforms and a broader sharing paradigm, McClaren and Agyeman (2015) make a case for the importance of collaborative and participatory governance models for community-based models within the sharing paradigm. A further nine more sources we reviewed also alluded to collaborative governance as a characteristic of sharing business models.

Mission-driven. Entrepreneurship researchers have been exploring alternative drivers for new venture formation for decades, introducing several sub-fields such as social entrepreneurship, sustainable entrepreneurship, community-based entrepreneurship and urban entrepreneurship among others. Therefore, it is not surprising to see some sharing scholars beginning to explore broader motives for founders of sharing initiatives. Borchert and Geisendorf (2016), for example, developed a taxonomy of sharing economy initiatives, observing a combination of market logics and social/ecological logics driving the business models of 100 sharing startups in Germany. Given recent commitments of global sharing platforms to become legally bound by social and ecological objectives such as Kickstarter, the ubiquitous crowdfunding platform, reincorporating as a Benefit Corporation, while Etsy, the global platform for connecting peers with artisan makers, became a certified B Corp in 2012, the mission of sharing economy companies is clearly not only about profit maximizing, at least not in all cases.

Alternative funding. The alternative funding dimension was only addressed in four of the 26 sources we reviewed. For example, Stephany, (2015) explores both traditional venture capital and alternative models for funding sharing startups. Crowdfunding platforms such as Kickstarter, Indiegogo and Crowdcube have been amongst the earliest, and most successful sharing platforms to emerge in recent years. Given their dependence on peer to peer transactions, there is at least a perceived synergy with sharing economy startups, helping to explain the rise of crowdfunding platforms designed to help fund more sharing economy startups, such as Goteo in Spain, or the fast rising and even faster falling, The D.A.O which raised 150 million in alternative currency to invest in sharing economy startups.

Technology reliance. While the media seems smitten by technology-enabled sharing, only seven of the 26 sources we reviewed specifically focused on the technology dimension as a critical component to sharing economy business models. Belk (2014), Sundararajan (2014, 2016) and Daunoriene et al, (2015) all include a focus on the role technology, particularly web technologies, serves as a primary connecting point for peers on sharing platforms. Yet, they go beyond just the role as a platform (our first dimension) to explore how sharing economy companies are able to make use of big data, location-based, geo-referenced data and other information and communication technologies (ICTs) to facilitate more efficient transactions between peers. Meanwhile, Cohen and Kietzmann (2014) pay particular attention the evolution of technologies to facilitate improved service delivery for bikesharing and carsharing systems.

While research into the sharing economy is increasing rapidly, the majority of the extant work is conceptual or normative in nature, leaving a void in empirical exploration of the boundaries of the sharing economy. We emphasize that this lack of empirical evidence, as well as theoretical development and clarity regarding the diverging business models is restricting the

growth of an interdisciplinary academic discipline. Furthermore, it is hindering the advancement of sharing economy segments as stakeholders such as public policymakers are torn by the tensions between embracing the disruptive nature of sharing economy activities and safeguarding the public via proper regulation. Tackling this conundrum requires a well-grounded systematic empirical examination of the growing diversity of sharing business models, capable of capturing the complexity of the phenomenon.

The seven dimensions discussed above which emerged from our literature review served to guide our typology development. Next, we introduce our methodology and present the typologies of business models which emerged from the unique combination of these dimensions present, or absent, in the 36 startups we studied for this research.

3. Data and methods

3.1 Methodological approach

In examining the underlying conceptual structure of a sharing business model and how the different components of such a structure combine to yield different sharing business models, we divided our research in two step-wise processes. First, we conducted a review of academic and grey literature with the aim of identifying and elaborating the set of dimensions unique to a sharing business. Second, in dealing with the complex constellation of characteristics upon which sharing business models emerge, which are combinatorial in nature, we drew on the notions of multiple-conjuctural causality and polythetic typology building (Aus 2009; Doty 1994). This recognizes that sharing business models necessarily emerge from several distinct combinations of conditions, and that each of them represents an ideal type, causally connected

and constituting a particular form of sharing business. Since linear modeling and case-based pattern recognition are ill-equipped to deal with complex causality, we conducted a novel fuzzy set qualitative comparative analysis (fs/QCA), which is a set-theoretic method and a member of a family of analytical techniques designed to visualize and analyze causal complexity, while retaining the richness of case data (Ragin 2008). By using Boolean algebra and counterfactual testing Fs/QCA enables researchers with a unique set of tools to perform configurational comparative analyses of the many potential causal combinations of conditions leading to a single outcome, and then derive, in our case, an equifinal yet parsimonious set of causal configurations of factors that explain the many structures underlying sharing business models. Fs/QCA, as a method, is particularly well suited for typology building as it enables the construction of ideal types while preserving the integrity of cases as complex configurations of aspects. In this paper, we do not consider typology building as an analytical procedure aimed at ordering and comparing groups of elements and clustering them into categories. Here, typologies are understood as complex theoretical statements that, unlike traditional linear or interaction models of causality, can accommodate multiple relationships between their constructs, thus considerable levels of causal complexity (Fiss 2011).

3.2 Causal and outcome conditions

As evidenced in our literature review, the use of terms across studies is highly inconsistent and we can observe several conceptual overlaps among the constructs used in them. In order to harmonize this dispersion, we examined the underlying meaning of each listed construct and mapped it onto an appropriate archetype, taking seminal readings, such as Botsman and Rogers (2011) and Chase (2015) as key reference points. As a result of a review of extant business

model research and emerging thought leadership in the sharing economy we were able to identify seven distinct dimensions of sharing business models: 1) platforms for collaboration, 2) under-utilized resources, 3) peer-to-peer interactions, 4) collaborative governance, 5) mission-driven, 6) alternative funding, and 7) technology reliance. In Appendix A, we provide an overview of the literature reviewed leading to each of these dimensions, which specifies the focus and explanatory constructs of each source.

Comparative studies require the definition of causal and outcome conditions. In the elaboration of typologies, this can be done by either using a constant of 1 as an outcome variable (Kent 2008) under the assumption that all cases are part of a homogenous theoretically relevant group, or identifying a defining feature mostly shared within a non-theoretical selection of cases. In the former, we would have to assume that the Honeycomb model is theoretically sound and that cases within it have been purposively selected based on a number of criteria. Under this methodological choice, typology development would have to rely on truth table analysis, as no counterfactual analysis or logical minimization are possible in the absence of positive and negative cases. Since the Honeycomb model is not informed by theory and a truth table analysis would only depict the full complexity of reality, constraining the development of a more parsimonious solution, we decided to continue with the latter alternative.

Here, we tested our evidence against two questions. First, which of the seven conditions can potentially be considered as an outcome variable and second, which of those is the most predominant within the sample, yet exhibiting certain degree of variance. In order to do so, we returned to Appendix A and noticed that platforms for collaboration, under-utilized resources and peer-to-peer interactions have been used interchangeably and can potentially play both roles. This is further supported by Kohler (2015) and Chase (2015). Following the same logic whereby

a fully necessary condition can be excluded from a configurational analysis after being deemed as redundant, we conducted an exploratory necessity analysis with a constant outcome variable of 1, under the assumption that the condition with the highest consistency score, below 1.0 (i.e. instances of an outcome agree in displaying the causal condition thought to be necessary, before full consistency) is the one that better accounts for the presence of sharing businesses, without being redundant. Platform for collaboration exhibits a necessity score of 0.7169, higher than under-utilized resources (0.4497) and peer-to-peer interaction (0.6716), meaning that 72% of the cases within the Honeycomb use a platform for collaboration as an attribute of the business model. In our pursuit of an outcome condition with positive and negative cases, we defined *Platforms for collaboration* as the outcome for the configurational analysis and subsequent typology development. While the ideal situation would have a clearly defined outcome, most emerging real world social science phenomena are ill-defined and require logical exercises to enable their operationalization.

Platforms for collaboration (PLATFORM) is the outcome condition and measures the extent to which the business relies on a -digital or physical- platform for collaboration (user-to-user or business-to-user) in offering its products and services. Under-utilized resources (RESOURCES) captures the degree to which resources are shared by users and the business relies on excess capacity of resources. *Peer-to-peer interactions* (INTERACTION) captures types and relevance of peer-to-peer interactions and transactions and seeks to evaluate the extent to which the business model enables and/or relies on them. *Collaborative governance* (GOVERNANCE) assesses the extent to which the business is open to integrate the users into value creation activities and benefits. By looking at the mission statement of the business and how it is implemented, *Mission-driven* (MISSION) seeks to capture how central are social and

environmental value and impacts in relation to economic value and to the business as a whole. *Sources of Funding* (FUNDING) evaluates the extent to which the business utilizes or prioritizes alternative funding such as grants, crowdfunding, equity-based crowdfunding or similar through the different stages of the venturing process. Finally, *Technology Reliance* (TECHNOLOGY) captures the extent to which the business leverages or relies on technology to operate. Specifically, it evaluates how the business uses technology to exploit, for example, social networks, peer- to-peer interactions, user-generated content, and mobile connectivity. Table 2 provides a summary of the evaluation criteria.

Table 2. Summary of data and scoring criteria

Condition	Data	Scoring criteria
Sharing economy business: platform for collaboration	Types of platforms used in delivering services Role and functionality of the platform Specific use of the platform by users, customers and the company Types of activities performed by the company and users while interacting Degree of centrality of the platform to the company's core business	0= No evidence of platforms for collaboration 50=presence of platforms, but not essential in the operation / success of business 100=full dependence on platforms for collaboration, essential in the operation / success of business
Under-utilized resources	Kind of users' resources the peers share to enable sharing Reliance on excess capacity of users	0= No evidence of under-utilized resources 50= the company uses / enables the use of under -utilized resources, but not essential / integral to business / equally relevant as new resources. Business does not depend on under -utilized resources 100=the business fully depends on under -utilized resources. Key to success of business
Peer-to-peer interaction	Types of peer-to-peer interactions Types of peer-to-peer transactions Relevance of interaction and transaction to business model and performance	0= no evidence of peer-to-peer interactions or transactions 50=some degree of peer-to-peer interactions, but not central to the model 100=model fully reliant on peer-to-peer interactions and transactions
Collaborative Governance	Legal structure, equity model, governance structure and mechanism, decision-making processes, consultation, and CSR and engagement strategies	0= no collaborative governance, or user involvement in any type of business activity 50= evidence of some collaborative efforts, such as consultation, but model does not rely on it 100=full involvement of users in decision-

		making and benefits
Mission-driven	Formal mission statement Relevance of social and environmental value and impacts in relation to economic value and to the business as a whole Evidence on how the mission is implemented: strategies, practices	0= No evidence of social and environmental value / impacts in the mission 50=presence of social and environmental value / impacts in the mission, but not essential / integral to business / equally relevant as economic value 100=full integration of social and environmental value / impacts in the mission. Evidence of implementation in operation and practices. Key to success of business
Alternative funding	Type of funding and stage in which the funding is requested/used. Extent to which the business utilizes or prioritizes alternative funding such as crowdfunding, equity-based crowdfunding or similar	0= traditional funding, such as VC, loans 25=mixture of funding, yet traditional is more prominent 50=mixtures of alternative and traditional 75=mixture of funding, yet alternative is more prominent 100=fully reliant on alternative funding such crowdfunding
Leverage on technology	Type of technology used by the business Relationship between the technology in use and the core business How the business uses technology to operate	0= business or model no reliant on technology 50= business uses technology, but not central to the model 75= technology is predominant, but model can work without it 100=model fully reliant on technology, can't work without it

3.3 Case selection and data

Case selection in fs/QCA studies is based on two main criteria: it requires an area of homogeneity and within that a maximum heterogeneity of cases. This means that all cases must be comparable in terms of background characteristics but at the same time the sample requires cases with both positive and negative outcomes. Given that cases are seen as configurations of factors, we can assume that these are homogenous enough to equate their dissimilarities while retaining the specificity of each case (Ragin 2000). In line with these criteria, our cases stem from the Honeycomb 2.0 model, which organizes the sharing economy into 12 categories of sharing sectors and 30 subcategories, and provides a range of exemplary cases for each.

Developed by Owyang (2015), this is one of the most widely referenced framing approaches of the sharing space.

The research team purposively selected 36 cases (Appendix B) based on fs/CQA and two additional criteria: inclusivity and availability. Having the area of homogeneity established by the Honeycomb industry classification, we selected cases to inclusively cover all categories and subcategories of the Honeycomb and then retained those with data access and richness. The research team prepared case files for the entire sample including: overall description of the cases and a collection of evidence to support the analysis of the dimensions of interest. In minimizing the effect of the inherent bias of Owyang's (2015) framework, the sample was carefully structured to also ensure time geographical diversity. Two researchers collected data on these different sharing economy pioneers, based on the specific measures outlined above. Table 2 provides a summary of the kind of data collected for the study, alongside the evaluation criteria used by the research team. Once the data collection process was completed, we independently rated each of the 36 enterprises across the seven business model dimensions. In a second stage, we conducted a simplified inter-rater reliability (IRR) test to demonstrate consistency among observational ratings provided by the two coders. Given that our analytical units are dimensions of sharing economy business, not reflective measures, the IRR calculation relies on average scores, not statistical techniques of variance of true scores and measurement errors. Discrepancies were detected when IRR was +0.3, which we scrutinized and discussed until reaching agreement in line with current practice (LeBreton & Senter 2007). Table 3 depicts the scores resulting from the rating procedure, calibrated scores and results from the IRR test (0.91).

Table 3. Summary of data and IRR check

	Raw scores							IRR – 0.91						
	Governance	Mission	Resources	Funding	Interaction	Technology	Platform	Governance	Mission	Resources	Funding	Interaction	Technology	Platform
Udacity	17.5	55	17.5	0	70	95	55	0.15	0.1	0.25	0	0	0.1	0.1
Skill share	40	65	47.5	0	80	95	80	0.2	0.1	0.15	0	0	0.1	0
Maven	25	25	45	0	85	87.5	80	0.1	0.1	0.1	0	0.1	0.25	0.2
Velib	30	75	40	35	10	67.5	20	0	0.1	0.2	0.1	0.2	0.15	0
Muni Rent	30	65	95	10	80	95	75	0.2	0.1	0.1	0	0.2	0.1	0.1
Musketeer	15	80	20	5	100	100	95	0.1	0	0.2	0.1	0	0	0.1
OK Coin	20	10	0	0	95	100	80	0.2	0	0	0	0.1	0	0.2
Kick Starter	30	85	20	0	100	95	87.5	0.2	0.1	0.2	0	0	0.1	0.15
Kiva	50	100	20	70	65	90	85	0	0	0.2	0	0.1	0	0.1
Etsy	15	62.5	30	0	95	95	85	0.1	0.15	0	0	0.1	0.1	0.1
Rent a Runway	22.5	20	90	0	17.5	95	85	0.05	0	0	0	0.15	0.1	0.1
Yerdle	40	90	100	0	100	95	85	0.2	0.2	0	0	0	0.1	0.1
Cohealo	20	35	85	5	25	80	70	0	0.1	0.1	0.1	0.1	0.2	0
Medicast	20	35	25	0	15	90	70	0	0.1	0.1	0	0.1	0	0.2
Vint	15	35	50	0	65	85	55	0.1	0.3	0.2	0	0.3	0.1	0.1
Airbnb	15	15	40	0	65	90	87.5	0.1	0.1	0.2	0	0.1	0	0.05
Everbooked	5	0	10	0	10	100	12.5	0.1	0	0	0	0	0	0.15
Talent Garden	45	20	35	10	60	10	55	0.1	0	0.1	0.2	0.2	0	0.1
Left over Swap	5	92.5	90	0	100	90	75	0.1	0.05	0.2	0	0	0	0.1
Share your meal	25	95	60	60	85	85	85	0.1	0.1	0.2	0	0.1	0.1	0.1
Prep Atlanta	10	40	40	0	15	10	60	0	0.2	0.2	0	0.1	0	0.2
Fon	45	30	72.5	5	85	100	35	0.1	0	0.05	0.1	0.1	0	0.1
Mosaic	40	80	45	30	85	75	60	0.2	0.2	0.1	0	0.1	0.1	0.2
Vandebron	10	85	80	0	85	90	85	0	0.1	0.2	0	0.1	0.2	0.1
Bla Bla Car	10	85	95	0	85	90	80	0	0.1	0.1	0	0.1	0.2	0.2
Sherpa Share	10	35	10	0	20	95	25	0	0.1	0	0	0.2	0.1	0.1
Drive Now	10	55	35	0	10	85	35	0	0.1	0.1	0	0	0.1	0.1
Task Rabbit	15	40	55	0	80	85	75	0.1	0.2	0.1	0	0.2	0.1	0.1
Time Banks	60	85	55	80	100	45	40	0	0.1	0.1	0	0	0.1	0.2
Upwork	10	40	45	0	100	97.5	85	0	0.2	0.1	0	0	0.05	0.1
Nimber	10	65	82.5	0	95	95	80	0	0.1	0.25	0	0.1	0.1	0
Instacart	10	20	25	0	85	95	40	0	0	0.1	0	0.1	0.1	0.2
Boxbee	22.5	15	20	0	20	60	25	0.05	0.1	0	0	0	0.2	0.1
Button	10	0	20	0	10	100	25	0	0	0	0	0.2	0	0.1
Cargomatic	10	12.5	75	0	40	95	80	0	0.25	0.1	0	0.2	0.1	0
Warp it	15	80	85	35	55	75	80	0.1	0.2	0.1	0.1	0.1	0.1	0
IRR								**0.93**	**0.90**	**0.89**	**0.98**	**0.90**	**0.92**	**0.89**

3.4 Calibration and data analysis

Calibration is essential in configurational comparative studies. It allows for comparability by rescaling the measures into set-memberships scores. By means of a simple estimation technique the calibration procedure transforms variable raw scores into set measures (Ragin 2007), rescaling the original measure into scores ranging from 0.0 (for full exclusion) to 1.0 (for full inclusion) (Ragin 2008). This enables specification of the score that would qualify a case for full membership in the set of sharing economy business, as well as in the set of each condition, and also the score that would completely exclude it from each of the sets. In order to do so, the calibration process requires the definition of three thresholds for full inclusion (≥0.95), full exclusion (≤0.05) and the crossover point (0.5), which act as anchors for establishing deviation scores. This procedure also permits establishing an area of irrelevant variation, which is central in set-theoretical analyses. If one is interested, for example, in creating the set of developed countries based on GDP per capita PPP alone, any country with >US$20,000 would qualify as part of the set of developed countries with a set-membership scores of >0.95. A country such as Qatar with US$130,000 would have the same set-membership score as Cuba, despite the fact the latter is US$110,000 poorer in per capita terms than the former.

In the present study, calibration seeks to create fuzzy-set scores that represent strong membership in causal conditions and the outcome. Therefore, in calibrating the causal and outcome conditions (0-100 scales), we defined 75 as threshold for full inclusion, 25 for full exclusion and 50 as crossover point. Our selection of thresholds relies on the assumption that variance below 25 and over 75 scores is irrelevant since cases scoring below and above such score exhibit already strong membership. Fuzzy membership in each conceptual category is

established when the case's score surpasses the crossover point (Ragin 2008). Calibration scores

are shown in Table 4.

Table 4. Calibration Table

Case	Governance	Mission	Resources	Funding	Interaction	Technology	Sharing Business
Udacity	0.02	0.65	0.02	0	0.92	1	0.65
Skill share	0.23	0.86	0.43	0	0.97	1	0.97
Maven	0.05	0.05	0.35	0	0.99	0.99	0.97
Velib	0.08	0.95	0.23	0.14	0.01	0.89	0.03
Muni Rent	0.08	0.86	1	0.01	0.97	1	0.95
Musketeer	0.01	0.97	0.03	0	1	1	1
OK Coin	0.03	0.01	0	0	1	1	0.97
Kick Starter	0.08	0.99	0.03	0	1	1	0.99
Kiva	0.501	1	0.03	0.92	0.86	0.99	0.99
Etsy	0.01	0.82	0.08	0	1	1	0.99
Rent a Runway	0.04	0.03	0.99	0	0.02	1	0.99
Yerdle	0.23	0.99	1	0	1	1	0.99
Cohealo	0.03	0.14	0.99	0	0.05	0.97	0.92
Medicast	0.03	0.14	0.05	0	0.01	0.99	0.92
Vint	0.01	0.14	0.501	0	0.86	0.99	0.65
Airbnb	0.01	0.01	0.23	0	0.86	0.99	0.99
Everbooked	0	0	0.01	0	0.01	1	0.01
Talent Garden	0.35	0.03	0.14	0.01	0.77	0.01	0.65
Left over Swap	0	0.99	0.99	0	1	0.99	0.95
Share your meal	0.05	1	0.77	0.77	0.99	0.99	0.99
Prep Atlanta	0.01	0.23	0.23	0	0.01	0.01	0.77
Fon	0.35	0.08	0.94	0	0.99	1	0.14
Mosaic	0.23	0.97	0.35	0.08	0.99	0.95	0.77
Vandebron	0.01	0.99	0.97	0	0.99	0.99	0.99
Bla Bla Car	0.01	0.99	1	0	0.99	0.99	0.97
Sherpa Share	0.01	0.14	0.01	0	0.03	1	0.05
Drive Now	0.01	0.65	0.14	0	0.01	0.99	0.14
Task Rabbit	0.01	0.23	0.65	0	0.97	0.99	0.95
Time Banks	0.77	0.99	0.65	0.97	1	0.35	0.23
Upwork	0.01	0.23	0.35	0	1	1	0.99
Nimber	0.01	0.86	0.98	0	1	1	0.97
Instacart	0.01	0.03	0.05	0	0.99	1	0.23
Boxbee	0.04	0.01	0.03	0	0.03	0.77	0.05
Button	0.01	0	0.03	0	0.01	1	0.05
Cargomatic	0.01	0.01	0.95	0	0.23	1	0.97
Warp it	0.01	0.97	0.99	0.14	0.65	0.95	0.97

Calibration procedure enables the construction of a truth table, which lists all different logically possible combinations of causal conditions along with the cases conforming to each combination. In order to reduce the truth table to simplified combinations, the researcher needs to specify the minimum amount of cases to be considered in the analysis (frequency threshold) and the minimum acceptable level to which a combination of causal conditions is reliably associated with each of the outcomes (consistency threshold). A frequency threshold of one and consistency thresholds of at least 0.8 are recommended when the aim is to build theory from a relatively small sample, but these should not be applied mechanistically (Crilly 2011). Taking these guidelines into consideration, we follow Schneider and Wagemann (2012) and selected thresholds that correspond to a gap observed in the distribution of consistency scores.

Table 5. Truth Table: Sharing Economy Business

Governance	Mission	Resources	Funding	Interaction	Technology	Cases	Outcome	Consist.
0	0	0	0	1	0	1	1	1
0	1	1	1	1	1	1	1	1
0	1	0	0	1	1	6	1	1
0	0	1	0	0	1	3	1	0.994
0	1	1	0	1	1	7	1	0.993
1	1	0	1	1	1	1	1	0.881
0	0	0	0	1	1	5	1	0.878
0	0	1	0	1	1	3	1	0.868
0	0	0	0	0	0	1	1	0.855
1	1	1	1	1	0	1	0	0.440
0	1	0	0	0	1	2	0	0.391
0	0	0	0	0	1	5	0	0.325

Table 5 shows the truth table with the resulting 12 configurations and 36 cases that are relevant for the outcome. 28 cases exceeded the lowest acceptable consistency, set at 0.855, and 8 cases are below the consistency cutoff line. There are 52 logically possible configurations

lacking empirical evidence. We cannot infer sufficiency based merely on the fact that the combination is logically possible. These are the remainders which are partially excluded from the minimization process, as they are still relevant and considered in the counterfactual analysis.

4. Results

4.1 Configurations within the sharing economy

Once the many possible combinations of conditions have been identified, in this stage of the analysis we derive a simplified set of configurations of business models with empirical presence within the sharing economy, which establishes and enables us to elaborate on the key configurations that characterize each of them. The procedure is as follows. Using the consistency threshold of 0.855 and a frequency of 1, fs/QCA applies a Boolean algorithm based on a counterfactual analysis of causal conditions and logical minimization to reduce the truth table rows to a solution table (Table 6) comprising five simplified combinations of conditions, which can be understood as different solution paths (Rihoux & Ragin 2009), or in this case business models leading to sharing economy business. In Table 6, black circles indicate presence of the condition whereas white circles are used to indicate absence of the condition. No circle indicates that the condition is irrelevant for explaining the outcome of interest.

The solution table also distinguishes core and peripheral conditions, which is based on how causal components are causally connected to the outcome. In any solution term there are decisive causal ingredients that distinguish configurations, and complementary ingredients that only make sense as contributing factors (Grandori & Furnari 2008).

Configurations	Solutions				
	1	**2**	**3**	**4**	**5**
Collaborative Governance	⊗	⊗	⊗	⊗	●
Mission-driven	-	●	⊗	⊗	●
Under-utilized resources	-	●	●	⊗	⊗
Alternative funding	⊗	-	⊗	⊗	●
Peer-to-peer interaction	●	●	-	-	●
Leverage on technology	●	●	●	⊗	●
Consistency	0.91	0.99	0.92	0.89	0.88
Raw coverage (RC)	**0.69**	**0.35**	**0.23**	**0.06**	**0.03**
Unique coverage (UC)	0.3	0.021	0.103	0.055	0.016
Overall solution consistency			0.91		
Overall solution coverage			0.89		

Model: sharing business = f(technology, interaction, funding, resources, mission, governance)
N=36; consistency cutoff: 0.855; frequency threshold=1

Among the twelve possible conditions (i.e. presence and absence of six conditions), as depicted in Table 6, only the presence of technology, peer-to-peer interaction, under-utilized resources and the absence of collaborative governance are causal mechanisms that exhibit a strong causal relationship with the outcome. Despite the strong causal relationships between the aforementioned conditions and the outcome, none of them are by themselves necessary or sufficient for the emergence of a sharing economy business. As expected, the highest consistency score is of TECHNOLOGY with 0.96.

4.2 An Empirical Typology of Sharing Business Models

One of the major benefits of qualitative comparative analysis in building theory is that it allows for typology building and the construction of ideal types, while preserving the integrity of cases as complex configurations of aspects. Fs/QCA allows for middle range generalizations, as it sees

social phenomena in terms of 'types and kinds' (Aus 2009). While this method was not originally conceived to uncover typologies, it does emphasize similarities among cases in the formulation of types and see the specification of types, subtypes and mixed types as a central mechanism for understanding and explaining differences (Ragin 2000).

A typology is the "conceptually derived interrelated sets of ideal types, each of which represents a unique combination of attributes that are believed to determine the relevant outcome(s)" (Doty 1994:232). Far from viewing typologies as means for ordering and comparing groups of elements and clustering them into categories, typologies need to be understood as complex theoretical statements that, unlike traditional linear or interaction models of causality, can accommodate multiple relationships between their constructs, thus considerable levels of causal complexity (Fiss 2011).

Since the purpose of a typology is to simplify the complexity of the real world, the process of typology development generally involves the pragmatic reduction of an extensive set of features to a limited set relevant to the purpose at hand. Instead of developing a monothetic typology, in which each feature is necessary for membership and the set of features is sufficient, in this paper we elaborate an empirical, polythetic typology of sharing economy business models, which can be formed from different combinations of values on the attributes of interest (i.e. equifinality). This allows the grouping of cases that present similarities, tends to ensure greater parsimony and is considered superior for research intended to identify individuals as part of a type (Fiss 2011). Therefore, the empirical typology derives from the different solution paths detected by the fuzzy-set qualitative comparative analysis.

The emergence of the sharing business model types invites inquiry into the contributions the types offer into early theory building in the sharing economy. In Table 7 we explore the

following three questions for each ideal type: What causes a certain business model configuration to emerge? Why are certain characteristics connected into each business model configuration? What is the outcome of each business model configuration? Below we offer further analysis on the five sharing economy business model typologies which emerged from our configurational analysis.

Table 7. Business Model Typology Insights

	Insights by business model type				
Inquiry	**1**	**2**	**3**	**4**	**5**
Causes of BM emergence	Seeking scalable solutions aligned with angel and venture capital investor expectations	This type is driven by an underlying efficiency logic, seeking to optimize under-utilized resources	The recognition of efficiencies that can be gained from company owned resource optimization models	The desire for optimizing resources at a local level.	Founders with nearly altruistic motives of applying technology to facilitate social and/or ecological impact
Connected characteristics	Dependence on technology and the heavy focus on P2P interaction are what facilitates the scalability of most sharing business models. Meanwhile alternative finance and collaborative governance would restrict pace of scale.	In order to achieve the desired outcomes of optimization of under-utilized resources, significant focus on technology and P2P activity for the sharing of end-user resources are critical	This type combines technology platforms with company acquired resources for widespread sharing by users.	None of the factors identified need to be present to enable Type 4 to function.	In this type, firms harness all but under-utilized resources to facilitate sharing between peers
Outcome of BM configuration	Scalable solutions backed by a strong intermediator platform	Scalable models for resource optimization, although potentially less attractive models for outside investors	From carsharing to dress sharing, this model permits control not only of the platform but the resources to be shared. While the investment required for this model is greater than Type 1, it can still be	Highly localized, low-tech, primarily space-based sharing.	Potential global impact on communities although attractiveness to traditional investors may be low.

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Business model I combines the presence of two core conditions INTERACTION and TECHNOLOGY, with two peripheral conditions GOVERNANCE and RESOURCES. MISSION and RESOURCES are irrelevant conditions. This combination portrays a *crowd-based tech* business model. Thus, crowd-based tech business models are most similar to traditional technology startups as they have a high reliance on technology, with the only unique aspect is that crowd-based tech startups facilitate a high level of peer-to-peer interaction. These business models have significant opportunity to scale which explains the high propensity to have traditional venture capital investment. In fact, depending on the sector and model, some businesses that fall into Business Model 1 could scale even faster than traditional technology-based startups because they rely more on a critical mass of users of the two-sided business model than on increased production and distribution capacity. Founded in 2012, *Instacar*t is a grocery delivery platform that facilities doorstep deliveries of groceries in major cities of USA. This online platform seeks to *build the best way for people anywhere in the world to shop for groceries and* facilitates the interaction between customers and trained personal shoppers. Yet for Instacart no under-utilized resources are shared and social and environmental impacts are not articulated as relevant to the business as a whole. Since its inception, Instacart has raised approximately $275 million (USD) in six rounds of funding, and, in March 2017 was on the verge of raising a $400 million (USD) round at a valuation of $3 billion (USD)[2].

Business model II, combines presence of three core conditions INTERACTION, RESOURCES and TECHNOLOGY, absence of the core condition GOVERNANCE with presence of one peripheral condition MISSION. FUNDING is an irrelevant condition. This

combination of conditions portrays a business model based on *collaborative consumption*. Unlike business model I, under-utilized resources is central to this type of business. This combination of conditions suggests that collaborative consumption business models meet arguably the most critical conditions to be considered part of the sharing economy as defined by Chase (2015). The addition of mission as a peripheral condition is intriguing as this supports extant research which has sought to incorporate social and ecological impact into the framing of sharing economy business models (e.g. Borchert & Geisendorf 2016; Cohen & Muñoz, 2016; Klutt et al., 2015).

Vandebron, for example, is a peer to peer energy platform in the Netherlands that connects those with excess energy with those who want to purchase clean energy directly from the source. Vandebron´s mission is to help transform the energy market in the Netherlands towards renewable energy, while empowering energy users who can select which provider, and which type of renewable energy projects they wish to support. Similarly, *BlaBlaCar* is connecting drivers with empty seats to passengers looking for a ride, with the aim of creating a people powered, city to city transport network. Instead of letting the market dictate the rates (based on supply and demand for certain routes), BlaBlaCar establishes very low rates for trips designed to subsidize the cost of the trips but not to encourage unregulated long-distance private transportation businesses. Unlike the *Instacart* platform, Vandebron and BlaBlaCar rely on the availability of under-utilized resources (i.e. unused seats and KWs) to operate.

Business model III combines the presence of two core conditions, RESOURCES and TECHNOLOGY, absence of the core condition GOVERNANCE with absence of two peripheral conditions MISSION and FUNDING. This combination of conditions portrays a *Business to crowd* business model, characterized by privately acquired goods, shared by people or

organizations without peer interaction. While some, including Owyang would classify these business models as within the sharing economy, a more rigorous definition of minimum conditions may suggest these are really just other forms of traditional enterprise seeking to profit from increased efficiencies. Cargomatic, for example, is an online marketplace that connects shippers and carriers. Users seeking to shipping services indicate what items they would like to list on the platform while carriers can use the platform to choose jobs that they would like to undertake. Unused time and carrier space are enabled by a platform, yet no peer-to-peer interaction is needed. Shippers and carriers simply benefit by having more flexibility and a larger network of people to work with. *Cohealo* operates in a similar way. It utilizes a software tool that allows different hospitals within the same health care system to share expensive surgical equipment. The user involvement is minimum yet the system permits sharing extant resources, increasing the utilization of equipment the hospital system already owns. Cargomatic has raised more than $20 million (USD) over six rounds while Cohealo has raised nearly $14 million (USD) in six rounds, suggesting neither are focused on alternative funding models.

The following two business models, IV and V, exhibit low raw coverage, suggesting the presence of counterintuitive solutions and outliers. These are not treated here as errors, rather as unique combinations of conditions that in spite of their oddness lead to the outcome of interest (Munoz & Dimov 2015), i.e. sharing economy business.

Business model IV, combines the absence of five peripheral conditions: TECHNOLOGY, MISSION, RESOURCES, FUNDING and GOVERNANCE. This unique combination of conditions portrays a *Spaced-based, low-tech sharing* business model. Unlike the previous models, this business model enables sharing by facilitating access to physical spaces, such as kitchens, workspaces, laboratories, etc. Although most of the current sharing economy

businesses rely on technological platforms to operate, cases such as *Talent Garden* (CoWorking) and *Prep Atlanta* (Kitchen) demonstrate that the sharing economy is active outside the tech realm. Talent Garden, was founded in 2015 and has no reported venture capital investment. Talent Garden operates a chain of 17 co-working facilities in five European countries with a focus on supporting independent digital innovators. Their revenue model is reliant on membership fees paid by full-time and part-time users of space throughout their network. Meanwhile, Prep Atlanta is a shared commercial kitchen, providing access to high quality commercial-grade kitchen facilities to aspiring food entrepreneurs. In such business models, the physical space tends to be privately owned by real-state firms or public entities and rented to members with the aim of utilizing new physical resources more efficiently and keeping the operating costs of the members down. In many of the cases of space-based, low-tech sharing businesses, the model can be generative in its capability to support aspiring entrepreneurs.

Business model V combines the presence of two core conditions TECHNOLOGY and INTERACTION, the presence of three peripheral conditions FUNDING, MISSION and GOVERNANCE with the absence of one peripheral condition RESOURCES. This combination of conditions portrays a *Utopian sharing outlier* business model. Despite the potential technological bias of the Honeycomb model, this suggests that combinations of collaborative governance, social impact predominance and alternative funding (alongside peer interaction and technology) are actually rare in the sharing economy. We refer to this as utopian sharing outlier because this business model, idealized by the media but empirically counterintuitive, exhibits the presence of the most conditions commonly attributed to the sharing economy.

Interestingly, just one single case, kiva.org, was found in this, perhaps idealized, version of the sharing economy. Kiva, founded in 2005 in San Francisco, is a peer to peer micro-lending

site. Through February 2017, Kiva claimed to have generated almost $1 billion (USD) since its founding for aspiring micro-entrepreneurs in developing countries from more than 1.5 million lenders on Kiva.org.[3] Kiva.org is clearly a platform for connecting micro-lenders and micro-entrepreneurs (as well as third party microfinance institutions), is a non-profit, mission-driven organization and as a successful non-profit, has managed to obtain significant amount of grant funding, instead of seeking venture finance. Technology plays a growing role, not just in facilitating the loans but also in tracking progress of the micro-entrepreneurs, and in measuring the overall success of the program in the communities it serves.

Table 8. Summary of cases and business models

Crowd-based Tech	Collaborative consumption	Business to crowd	Spaced-based, low-tech sharing	Sharing outlier
Instacart	Left over Swap*	Rent the Runway	Prep Atlanta	Kiva
Musketeer	Bla Bla Car	Cargomatic	Talent Garden	
Etsy	Vandebron	Cohealo		
Nimber	Muni Rent*	Fon^		
Upwork	Nimber	Task Rabbit^		
Left over Swap*	Yerdle*	Vint^		
Bla Bla Car*	Share your meal			
Vandebron	Warp it			
OK Coin				
Task Rabbit^				
Maven				
Udacity				
Muni Rent*				
Kickstarter				
Airbnb				
Vint^				
Mosaic				
Yerdle*				
Skillshare				
Fon^				

* Overlapped cases between solutions 1 and 3; ^ Overlapped cases between solutions 2 and 3.

Table 8 provides a summary of the cases confirming each of the business models. Fuzzy-set configurational analyses enable partial membership in the sets. This permits achieving greater parsimony, but inevitable overlaps emerge between solution terms with cases appearing in two or

more conceptual categories. This is not problematic when the aim of the research is typology building, but requires further examination if more in-depth case analysis is to be conducted. In such cases, partial membership can be resolved by looking at the membership scores of each of the cases.

4.3 Robustness checks

Solution paths are evaluated in terms of set-theoretic consistency and coverage. While the former assesses the degree to which the cases sharing a given condition or combination of conditions agree in displaying the outcome in question, which is estimated by dividing the number of cases that are present in a given configuration of conditions and exhibit the outcome by the number of cases that are present in the same configuration but do not exhibit the outcome (Fiss 2011), the latter evaluates the degree to which a causal combination accounts for instances of an outcome (Ragin 2006). If multiple configurations are sufficient for the outcome, raw and unique coverage provide assessments of their empirical relevance (Greckhamer 2011). These set-theoretic measures of fit are descriptive, not inferential, and were developed as methods of exploring cross-case evidence in a configurational way. The solution Table 6 shows that the set relation between configurations of conditions and the outcome is highly consistent, with individual results above 0.88, and an overall consistency of 0.91. The total coverage of the solution or joint empirical importance of all paths is 0.89, indicating that most of the outcome is explained by the five causal paths and thus the solution as a whole is empirically relevant. A consistency of ≥0.8 indicates a strong set-theoretical relationship between the solution term and the outcome as well as between the overall solution and the outcome (Ragin 2006). An overall solution is considered relevant when the coverage score is ≥0.65.

In addition to the evaluation of fit, we conducted a simple correlation analysis (Appendix C) to assess potential collinearity issues between the variables. The relatively low correlation values between key variables (i.e. platform, resources and interaction) do not raise concerns with divergent validity among the conditions used in the analysis and these are not values that normally trigger collinearity concerns. There is only one high correlation between governance and funding. This is expected since collaborative forms of governance as evidenced for example in member-based cooperatives, normally need to use alternative forms of financing. This does not affect the validity of our results.

Finally, we conducted a hierarchical cluster analysis (Ketchen & Shook 1996) to evaluate whether under an alternative configurational assessment our main findings hold, at least when it comes to identifying relatively homogeneous groups of variables based on selected characteristics. The dendrogram diagram is presented in Appendix C, which specifies which clusters have been joined and the distance between clusters. The results give support to our findings and the inferences we make in our discussion below, in particular with regards to *governance and alternative funding* as conditions that operate in close conjunction (1.142). We observe a similar situation with *platform, technology and interactions* that support the strong causal connection between these dimensions observed in the solution table, and with mission and resources as they act together in the collaborative consumption model, predominant in European firms. While this is interesting by itself and provides support to our findings, we cannot rely on such results only, as the method is ill-equipped to explain how the different conditions combine to produce the outcome of interest.

5. Discussion

To date, almost all the emergent research on the sharing economy (Appendix A) has been conceptual in nature, or at best, based on a singular case study. This study, leveraging QCA methodology, represents one of the first efforts to empirically determine the distinguishing features of sharing economy business models.

5.1 Implications for Research

Given the dearth of extant empirical research on business models in the sharing economy, we adopted an exploratory approach to discovering different business model types. Grounded in the emergent academic and grey literature on the conceptual foundations of the sharing economy, we were able to identify seven dimensions of commonly recognized attributes of sharing economy business models. These seven dimensions were then leveraged for the application of a QCA methodology, resulting in the discovery of five unique sharing economy business model types.

If there is one common thread across these business models, it is that sharing economy business models are grey and not black and white. Therefore, prior research which has sought to concisely summarize what is and what is not part of a sharing economy construct has often come short. For example, Chase (2015) suggested that there are three fundamental features of sharing economy enterprises: that they leverage platforms, that they facilitate peer-to-peer interactions and that they enable the optimization of under-utilized resources. While this is highly aligned with business model 2 (Collaborative Consumption), the other four business models discovered through this research exemplified different combinations of business model dimensions, which are also frequently associated with the sharing economy. While most of the business models we

studied, exemplified elements of business model 1 (Crowd-based Tech) we question whether models dominated by technology and peer to peer interaction meet a minimum standard for membership in the sharing economy. Lacking a broader mission, something recognized by several scholars as fundamental in the sharing economy (e.g. McClaren & Agyeman, 2015; Cohen & Muñoz, 2016) and lacking a focus on the optimization of under-utilized resources (e.g. Chase, 2015; Belk, 2014) also weaken the relationship between Crowd-based Tech business models and the sharing economy.

Similarly, business models 3 and 4 are also lacking key elements of sharing economy attributes, such as peer-to-peer interactions (e.g. Daunorienė et al., 2015; Chase, 2015) and mission-driven. Despite the lack of any classical dimensions commonly attributed to the sharing economy from our literature review, however, business model 4 (Spaced-based, Low-Tech Sharing) seems to challenge our collective understanding of what constitutes a sharing economy startup, since business models that permit access to shared physical resources, such as co-working spaces, on a prima facie basis, seem to represent much of the spirit of the sharing economy, and have even been specifically named by some scholars as examples of the sharing economy in urban areas (Cohen & Muñoz, 2016).

Of course, one of the surprises from this research was the apparent lack of sharing economy startups which reflect all of the dimensions commonly attributed to the sharing economy, especially by McClaren and Agyeman (2015, 2016). A nascent literature is emerging to explore new forms of organizing around the sharing economy referred to as platform cooperatives (Scholz, 2016). Platform cooperatives embrace key dimensions discussed in this research such as peer-to-peer interactions, mission-driven and technology platforms, while also adopting the cooperative organizational form. While there are few successful examples to date, the growing

interest in these enterprises suggests, that a future research project replicating our methodology may uncover more examples of sharing economy startups which belong in our utopian business model 5.

We are hopeful that this study, elaborating five distinctive combinations of dimensions of sharing economy startups will help the emerging scholarly field advance beyond existing conceptual models which have been put forth to date. By establishing an empirical typology and demonstrating diversity within sharing economy business models, scholars will be in a better position to conduct research on the implications of sharing economy activity for society, for the economy and for the environment. Furthermore, public policy researchers and practitioners will be armed with an improved ability to identify the implications of different sharing business models instead of painting all sharing economy activity (and therefore subsequent regulation) with the same brush. While this enables reducing the inevitable conceptual ambiguity present in any pre-paradigmatic field, it also triggers tensions, dilemmas and paradoxes resulting from the interpretative flexibility inherent to a social and economic playing field under emergence.

5.2 Practical dilemmas and paradoxes

As shown, sharing economy business models are diverse and can emerge even under odd conditions. Drawing on such complexity, we can infer that market actors and interactions equally differ in response to the different value propositions articulated by startups. In exploring dilemmas and paradoxes, the circumstances surrounding investors and investment allocation provide a rich ground for discussion. Aside from the range of investor types found in entrepreneurship there are also an increasing array of motivations and screening approaches by different investors. While venture capital tends to receive most of the media and scholarly

attention as it pertains to startup investment, there is a growing group of impact investors globally who seek to invest in projects that not only have the potential for return on investment but also for positive impacts in society (Bugg-Levine & Emerson 2011). It has been argued that these are the first in line when it comes to nurturing and growing alternative forms of start-ups, including mission-driven and sharing ventures.

Interestingly, our findings show otherwise. Most of the current sharing economy flagships have been supported by mainstream investors, moving business models away from the still predominant view of sharing businesses as driven by social-oriented goals. Mainstream investors such as venture capitalists will want to look for business models heavily reliant on technology as they are generally the most scalable (Lockett et al. 2002). We argue that such investors may also shy away from business models that engage in collaborative governance since such models bring complications to equity arrangements and possible exits. Some impact investors are more focused on social impact, some on environmental impact and some look for holistic social and environmental impact (Bugg-Levine & Emerson 2011). This suggests that impact investors would probably be more interested in sharing economy startups where evidence of collaborative governance, mission-driven and/or the optimization of under-utilized resources are present. Perhaps unfortunately for impact investors, we found little evidence of sharing startups that leverage collaborative governance models. In our robustness checks, we noticed a strong positive correlation (.689[**]) between collaborative governance and alternative funding and a strong negative correlation (-.411[*]) between collaborative governance and technology. This points to a paradoxical causal chain that moves sharing businesses away from deep collaboration since technology requires mainstream funding, which in turn affects governance structure given the need of ownership over the benefits of scaling up. Interestingly, what seems to be the main

enabler of sharing business also constrains the possibilities of developing a sharing model in a broader and more inclusive sense. This also triggers concerns about sustainable change more broadly, since impact investment normally moves businesses away from socially and environmentally harmful practices, towards producing instead net positive impacts (Brest & Born 2013).

As one can easily infer, entrepreneurs range widely in their motivations and expectations for their ventures, aligned with the business models they develop and promote. Entrepreneurs seeking to enter the growing opportunity space in the sharing economy range from mission-driven individuals embarked on a world-changing quest to profit-seeking serial entrepreneurs following the attractive numbers shown by e.g. Airbnb and Uber. The relationship between both mission-driven and profit-seeking entrepreneurs and their respective business models is interesting and equally paradoxical. Although the predominance of peer to peer interaction across solution terms and the high correlation between peer to peer interaction and outcome (.500[**]) can be expected, this seems to derive not from the actual business dynamics but rather from the business approach and mission. This becomes evident in models 2 and 5, and the strong correlation between mission-driven and peer to peer interaction (.454[**]). The direction of causality argued here is inferred based on the logics of business planning where mission drives modeling. However, this relationship requires further testing since it is also plausible and perhaps likely that opting for a business model reliant on peer interactions will trigger changes to a sharing business's strategic approach and mission.

Uncovering sharing business models sheds light on several tensions emerging in already "disrupted" industries, due to the highly intractable nature of the challenges the sharing economy poses to industry incumbents. The type of unprecedented growth rates for sharing stalwarts, as

shown above, have clearly raised the attention of many established industry incumbents, where we have witnessed actors in the hospitality and transport sectors lobbying local governments in places like New York City and Berlin to stop the growth of Airbnb and Uber respectively. Yet not all industry incumbents view the sharing economy exclusively as a threat. Large car manufacturers, such as BMW, Daimler, Volvo and Ford have decided to test the carsharing space. Most notably in the case of BMW´s Drive Now, the company expects that the increased exposure to their vehicles to a new segment not normally targeted by the luxury brand may result in future sales to current carshare customers[4].

This, we argue, goes well beyond the risk/opportunity dichotomist assessment when something new breaks through and enters highly stabilized markets. Similarly, it transcends the somewhat obvious question of what is the right strategy for industry incumbents facing rapid entry of disruptive sharing startups. How to react to or compete against such a disruptor entails a reconsideration of the nature, purpose and ultimate outcome of business. The paradoxes and dilemmas emerging from our analyses and reflection lead us to argue that admiration and anger are not the mere result of the economic benefit sharing businesses are capturing. These are rather expressions of satisfaction when certain businesses contribute to society by enabling collaboration, use of under-utilized resources and further inclusion, and disappointment when other businesses, assumed to be a good thing, negatively impact society by permitting gentrification and the subsequent social dislocation. Interestingly, these two outcomes (i.e. inclusivity and exclusion) can co-exist under the same business model, leading to the emergence of inner oppositional tendencies. Therefore, the extent to which Uber and BMW positively or negatively influence society is not yet clear, and the solution is not in the eye of the beholder.

These internal oppositional tendencies seem to be part of all sharing businesses, and will certainly require further exploration.

Another interesting area for discussion pertains to policymaking at both local and national levels. The debate around how inclusive or exclusive are sharing business is ongoing and so far unresolved. While Fraiberger and Sundararajan (2015), for example, emphasize that the sharing economy does indeed lead to greater inclusion since lower-income consumers traditionally excluded from participation now have access to products through peer-to-peer marketplaces, Schor et al. (2016) show that the assumed goals of openness and equality are actually leading to growing inequality, which is reproduced within micro- level interactions.

In light of our results, we argue that regulation and policy for the sharing economy is complex in large part because the variation in business models adopted have varying negative and positive impacts for communities. We believe our research not only reveals the moral tensions - bright and dark sides – inherent to sharing business modeling, but also paves the way for getting out of the swamp. Teasing out which business models should be encouraged and which should be discouraged is a critical and important next step for policymakers. Business models that rely on recirculating under-utilized resources should usually be encouraged. The UK, France and South Korea have already moved to a leadership position by regulating and providing incentives to those sharing activities relying only on under-utilized resources. As more actors get on board in proactive efforts to encourage and promote desirable sharing, we believe more attention will be paid to the underlying components of the business models such as those which we leveraged in our data collection process.

5.3 Moving forward

We strongly believe that the sharing economy space offers a rich opportunity for a range of scholars to explore an array of interdisciplinary angles. Just as we indicate public policy actors need to refine their approach to regulation, we suggest that going forward, it is important that scholars incorporate a more fine-grained approach to theoretical and empirical research strategies in the sharing economy. All sharing economy activity should not be grouped together in one research project unless attention is paid to the different business models and the differential relationships those models have with entrepreneurs, investors and society. As the continued growth and diversity of sharing economy startups enter the market place, it will be easier for scholars to obtain sufficient data regarding specific typologies. Or perhaps, for example in the case of sustainability and circular economy researchers, they may just focus on sharing typologies where the business models rely on under-utilized resources (collaborative consumption, business to crowd and perhaps utopian sharing).

The Utopian Sharing typology in and of itself is something that requires further research. While many hold out hope that sharing with a strong focus on community building amongst peers, that addresses income inequality, that is not primarily a profit grab for capitalist corporations and venture capitalists, our data found little evidence of such startups. Of course, it is likely there was bias in our sample since it was largely driven by the framing of Owyang (2015) and he is based near Silicon Valley. More research needs to be done to determine if "utopian sharing" really exists as a business model beyond a few outliers and how these models, including emergent forms of platform cooperativism are different from the other typologies we uncovered in this research.

The sharing economy is such a complex and dynamic phenomenon that more interdisciplinary approaches to scholarship of the sharing economy are required. In fact, even

referring to this activity as sharing "economy" is problematic as some emerging "business models" actually have no economic transactions in them at all. Repair Cafes for example, of which there are nearly 1,000 around the globe, bring locals together to repair broken household items without any money or any exchange, other than conversation and knowledge about fixing things occurs. Time banks are emerging around the world where instead of getting compensated with cash, people with abilities get points to use for getting other services or support from the community. Indeed, McLaren and Agyeman (2015) make the argument for going beyond the sharing economy to the "sharing paradigm" specifically to allow scholars and policymakers to recognize non-economic objectives of some sharing activities. All of this calls for scholars from different disciplines to draw on a broader range of theoretical foundations ranging from economics, sociology and behavioral sciences, public policy, urban geography, complexity science and more.

6. Conclusion

The purpose of this research was to analyze the underlying components of sharing economy business models across all emerging sectors of this growing space in a way that helps clarify what sharing economy business models are, and how they vary. Rather than be concerned with a pragmatic sectoral approach to understanding where the business opportunities may be in the sharing economy, we sought to leverage extant theory from the business model literature to identify the key underlying components of sharing economy business models. We are hopeful that the five typologies which emerged, and our discussion of their implications will help advance the sharing economy field from a research, practice and policy perspective.

7. References

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Appendix A. Literature Review

Paper/Book	Focus	Key constructs	Platform for collaboration	Under-utilized resources	Peer-to-peer interaction	Collaborative Governance	Mission-driven	Alternative funding	Leverage on technology
Bangel 2016	Explores the potential of collaborative practices in the hospitality sector in Europe for the established hospitality industry by embracing the new sharing economy paradigm and work with new market players on the creation of new sustainable marketing opportunities	New market opportunities Collaboration New markets	x						
Belk 2010	It examines the differences between sharing in and sharing out, and suggests that sharing in dissolves interpersonal boundaries posed by materialism and possession attachment through expanding the aggregate extended self.	Sharing in and sharing out Interpersonal boundaries Ownership		x	x				
Belk 2014	Compares sharing and collaborative consumption and finds that both are growing in popularity today.	Collaborative consumption Sales models Non-ownership models of utilizing consumer goods Sharing practices Internet reliance		x					x
Borchert & Geisendorf 2016	Proposes a taxonomy of business models that are used by sharing economy organizations	Business model framework Cluster analysis Business Model Canvas Market orientation (social and ecological oriented organizations)					x		
Botsman & Rogers 2011	Explores the notion and boundaries of collaborative consumption	Usefulness over ownership Community over selfishness Sustainability over novelty	x	x	x		x		

Reference	Description	Keywords						
Chase 2015	Introduces Peers Incorporated model. It seeks to deepen and enrich sharing economy, crowdsourcing, collaborative production, and collaborative consumption practices.	Excess capacity Platforms Peers engagement Collaborative production and consumption	x	x	x			
Cohen & Kietzmann 2014	Discusses existing shared mobility business models in an effort to unveil the optimal relationship between service providers (agents) and the local governments (principals) to achieve the common objective of sustainable mobility.	Shared mobility Business models Agency theory	x	x				x
Cohen & Munoz 2016	Provides a comprehensive view of SCP systems in cities by integrating and examining sharing economy activities in the context of two continuums, i.e. SCP and private/public orientation	Sharing economy activities Sustainable consumption and production Sharing cities	x		x	x	x	
Daunorienė et al. 2015	Provides an approach how to address and estimate sharing economy business models sustainability and determines key sustainability perspectives by using Circles of Sustainability	Trade business models Circles of Sustainability Technology Sharing economy growth Temporary access-rights Peer-to-peer platforms	x	x	x			X
Dervojeda et al. 2013	Explores accessibility based business model for peer-to- peer markets and how value propositions create a match between a peer owning a certain resource and a peer in need of that resource, at the right time and against reasonable transaction costs	Peer-to-peer markets Peer-to-peer platform Funding infrastructure Transaction costs	x		x		x	
Hellwig et al. 2015	Identifies segments of sharing consumers to unearth potentially viable clusters of a consumer behavior that is a market of growing economic relevance	Sharing consumers Sharing Behavior Sharing Disposition		x	x			
Klutt et al. 2015	Systemizes our understanding of sharing economy organizations and develops a conceptual framework of sharing economy models. It also explores how the sharing economy contributes to transforming economy and society towards more sustainable models.	Sharing Economy Models Value proposition, constellation and capture Sustainable models		x		x		

			Col1	Col2	Col3	Col4	Col5	Col6	Col7
Kohler 2015	Analyzes successful platforms to identify patterns of effective crowdsourcing-based business models.	Crowdsourcing Open Innovation Business Model Innovation Co-Creation Platforms Technology	x		x	x		x	x
Martin 2016	Analyzes the online sharing economy discourse and identifies five ways in which the sharing economy is framed. It criticizes the notions of hyper-consumption, economic opportunity and corporate co-option	Sharing economy platforms Collaborative consumption Peer-to-peer marketplaces Sustainability transitions Framing	x		x	x			
Martin et al. 2015	Develops a conceptual model of the dynamics of grassroots organisations within socio-technical niches. It shows that grassroots organisation may be subject to coercive and indirect pressures to become more commercially-oriented and highlight the ambiguities of this dynamic	Sharing economy Grassroots innovation Sustainability transitions Social innovation Collaborative consumption			x	x	x		
Matzler et al. 2015	Explores how companies can benefit from the trend toward collaborative consumption (leasing and sharing products) through creative new approaches to defining and distributing their offerings.	Business model Collaborative consumption		x	x				x
McLaren & Agyeman 2015	Proposes a new, broader and more inclusive framing for the sharing economy called sharing paradigm.	Collaborative consumption and production Shared public spaces Equity and justice Civic engagement and political activism		x	x	x	x		
McLaren & Agyeman 2016	It criticizes the limitations of the 'sharing economy' as an object for study and policy and proposes new agendas for research and policy and illustrates how sharing is changing in contemporary society	Socio-cultural to mediated modes of sharing Communal to commercial modes of sharing	x			x	x		

Author	Description	Keywords	C1	C2	C3	C4	C5	C6
Metcalf 2015	Examines small-scale, living examples of a better society and introduces a strategy for scaling up to wide spreading social transformation through democratic models. It shows how alternative institutions can be the central trigger for a broad new progressive movement.	social transformation Democratic models Alternative institutions	x		x	x	x	
Munzel et al. 2016	Analyzes, compares and adds to the business model frameworks of existing studies in the fields of carsharing, the sharing economy and mobility-services and develops a comprehensive business model typology useful for the carsharing market	Carsharing Business model typology Business model canvas P2P models		x	x			x
Nica & Potcovaru 2015	Provides a deeper understanding of possible advantages of the sharing economy, incentives for being involved in the sharing economy, the platforms and practices of the sharing economy, and the capacity of the novel sharing practices to assist in initiating a social transition	Sharing economy Peer-to-peer relationship Collaborative consumption		x	x		x	
Richardson 2015	Observes the differences in performance of the sharing economy, by looking at how the sharing economy simultaneously constructs diverse economic activities whilst also inviting the deconstruction of ongoing practices of dominance	Performance Community Diverse economies Commons	x		x	x	x	
Schor et al. 2015	It explores the boundaries of sharing within the emergence of the sharing economy (when is sharing is use for profit)	Access and ownership Underutilized assets Collaborative and communal sharing Competitive and profit-driven sharing	x	x	x	x		
Stephany 2015	Examines venturing or investment in a collaborative consumption business, emphasizing the role of peer-to-peer exchange	Peer-to-peer exchange Investment Start-up		x	x			x

| Sundararajan 2013 | Examines new "sharing economy" models that generate efficiency gains and the creative use of technology to open up flexible new models | Business model
Technology
Carsharing
Peer economy marketplace
Asset-light supply | x | x | x | | | x |
| Sundararajan 2016 | Introduces and explains the transition to crowd-based capitalism, and how this new paradigm changes economic growth and the future of work | Peer-to-peer commercial exchange
Crowd-based capitalism
On-demand platforms
Alternative organizational forms
Labor | x | | x | x | | x |

Appendix B. Cases

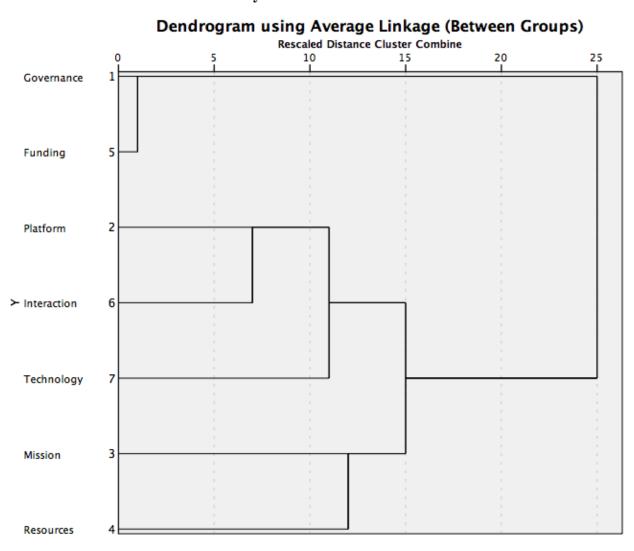| Category	Sub-category	Cases
Learning	Instructor-Led	Udacity
Learning	Peer to Peer	Skillshare
Learning	Peer to Peer	Maven
Municipal	Equipment	Velib
Municipal	Equipment	MuniRent
Municipal	Safety	Musketeer
Money	Crypto Currencies	OKCoin
Money	Crowdfunding	Kickstarter
Money	Moneylending	Kiva
Goods	Bespoke Goods	Etsy
Goods	Loaner Products	Rent the Runway
Goods	Pre-Owned Goods	Yerdle
Health & Wellness	Healthcare	Cohealo
Health & Wellness	Healthcare	Medicast
Health & Wellness	Wellness	Vint
Space	Personal	Airbnb
Space	Rental Optimization	Everbooked
Space	Work Space	Talent Garden
Food	Shared Food	LeftoverSwap
Food	Shared Food Prep	Shareyourmeal
Food	Shared Food Prep	Prep Atlanta
Utilities	Telecommunications	Fon
Utilities	Energy	Mosaic
Utilities	Energy	Vandebron
Transportation	Transportation Services	BlaBlaCar
Transportation	Driver Optimization	SherpaShare
Transportation	Loaner Vehicles	DriveNoew
Services	Personal	TaskRabbit
Services	Personal	TimeBanks, USA
Services	Business	Upwork
Logistics	Shipping	Nimber
Logistics	Local Delivery	Instacart
Logistics	Storage	Boxbee
Corporate	Private Label	Button
Corporate	Supply Chain	Cargomatic
Corporate	Employee Services	Warp it

Appendix C. Robustness Checks

Table C1. Descriptive statistics and correlations

	Mean	SD	governance	mission	resources	funding	interaction	technology
governance	.093	.166						
mission	.500	.434	.256					
resources	.450	.406	.041	.279				
funding	.084	.249	.689**	.393*	.027			
interaction	.672	.434	.263	.454**	.220	.177		
technology	.911	.249	-.411*	.115	.133	-.190	.147	
Sharing biz	.717	.375	-.144	.309	.385*	-.020	.500**	.160

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Table C2. Hierarchical Cluster Analysis

Dendrogram using Average Linkage (Between Groups)

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