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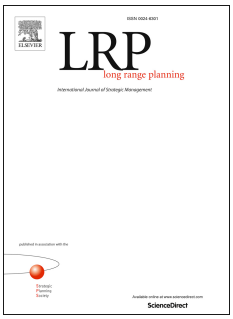

The evolution of platform business models: Exploring competitive battles in the world of platforms

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THE EVOLUTION OF PLATFORM BUSINESS MODELS: EXPLORING COMPETITIVE BATTLES IN THE WORLD OF PLATFORMS

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THE EVOLUTION OF PLATFORM BUSINESS MODELS:

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Abstract: In recent decades, multi-sided platform business models have become an important avenue for value creation and capture, but the phenomenon itself remains under-theorized. We address this gap and present new, empirically-driven insights into how platform business models evolve in a context of fierce competition. Through a longitudinal, qualitative study of twelve multi-sided platforms that operate under challenging industry conditions, we discover that success in platform battles can plausibly be explained by a combination of complexity in the business model design, and the simultaneous use of innovation and imitation to create highly intricate systems of activities. We further discuss how our findings open several new avenues for future platform research.

INTRODUCTION

The emergence of wireless and Internet technologies has brought opportunities for the creation of new organizational forms (Eckhardt et al., 2018; Iansiti and Lakhani, 2017; McIntyre and Srinivasan, 2017; Parker and Van Alstyne, 2018; Teece, 2018). Firms like Alibaba and Uber have adopted new ways of structuring firm and industry boundaries by shifting organizational design away from selling products towards the facilitation of economic exchanges between two or more (related) user groups (e.g., riders and drivers in case of Uber). Such multi-sided platforms mediate user interactions and therefore differ from firms that control a linear series of activities as well as from manufacturing platforms that orchestrate a network of suppliers to build a family of related products (Gawer and Cusumano, 2014; Thomas et al., 2014). Moreover, compared to intermediaries outside the digital economy (e.g., insurance brokers, some department stores), these multi-sided platforms can introduce new transaction mechanisms more rapidly and at much lower cost.

A noteworthy factor in the growth of multi-sided platforms in the digital economy is fierce rivalry between platforms that target the same user base. There is the micro-blogging site Pownce, out-performed by Twitter. The social network Orkut, which was very popular in Brazil but (despite being operated by platform star Google) did not survive competition with

Facebook and Myspace. The transportation network Sidecar, which pioneered the peer-to-peer ride-sharing model, lost in competition with Uber and Lyft. Looking at the platform landscape, Van Alstyne and Parker (2017, p. 28) conclude: "For every successful platform, there are many more that struggle or simply don't make it" – dynamics that may eventually give rise to a winner-take-all outcome (Boudreau and Jeppesen, 2015; Cusumano et al., 2019; Gawer, 2014; Zhu and Iansiti, 2012).

Yet, despite this recognition that competitive dynamics play a critical role in the development and growth of multi-sided platforms, there has been surprisingly little systematic empirical inquiry into this aspect of the platform phenomenon. While a deeper understanding of how to create viable multi-sided platforms in a context of fierce competition is needed, prior platform research has largely neglected competitive interactions in the process of creating and growing new organizational forms that mediate transactions between user groups, and mostly focused on single design parameters that give users a good reason to join and keep using the platform: notably, the creation of new features and add-ons that attract users (e.g., Gawer and Cusumano, 2008), the adoption of activities that enable frictionless platform access (e.g., Parker et al., 2016), and the choice of mechanism to match users effectively (e.g., Wei and Lin, 2017). These studies echo the logic of Katz and Shapiro (1985; 1994) and view network effects as a source of competitive advantage in platforms, since "consumers place a higher value on platforms with a larger number of users" (Cennamo and Santaló, 2013: p. 1331). While this stream of platform research has vastly enhanced our understanding of platform characteristics, a focus on individual design parameters is problematic for both theory and practice for at least two reasons. First, a focus on specific design elements that promote the growth of the user base may explain and predict network effects, but not the underlying mechanisms that lead to the creation of such design elements or interdependence between them. In other words, we know a good deal about the nature of

single pieces in a platform "puzzle", but how the pieces emerge under conditions of intense rivalry and fit together remains undertheorized. Second, since multi-sided platforms operate "in a setting that calls for highly interdependent decisions" (Helfat and Raubitschek, 2018, p. 1391), the creation of a successful platform may require holistic thinking, i.e., attention to the entire architectural recipe rather than just to single ingredients (Andries et al., 2013; Casadesus-Masanell and Ricart, 2010; Zott and Amit, 2010). As an example, a multi-sided platform like Airbnb needs to make decisions about whether to include a rating system for guests or not, how precisely to link travelers with hosts, and who provides insurance for listed properties, often simultaneously. Yet, the implications of such interdependent decisions for platform success are unknown.

This article, then, addresses two research questions. First, how can we describe and analyze interconnected and interdependent decisions in the development of multi-sided platform designs? A second question relates to the design of a platform in its competitive context – how do some multi-sided platforms succeed in the competitive battle for market leadership, while many more perish?

To answer the research questions, a level of analysis is needed that allows us to describe the design of a platform firm's set of boundary-spanning exchanges *in toto*, and permits the analysis of dynamic changes therein, in response to competition. We argue that this level of analysis is the business model – a "system that is made up of components, linkages between the components, and dynamics" (Afuah and Tucci, 2000, p. 4). On the one hand, the business model identifies transaction partners, establishes the value proposition(s) for each partner, and describes how a focal firm connects to them (Baden-Fuller and Mangematin, 2013; McGrath and MacMillan, 2000). On the other hand, it defines how value is delivered, monetized, and shared among transaction partners (Johnson et al., 2008; Teece, 2010). The business model, therefore, refers to the overall *gestalt* of interlinked boundary-

spanning transactions and interdependent activities that enable value creation and capture (Zott and Amit, 2008). We follow prior research and conceptualize a business model as a system of activities that can be described through design elements, namely activity content, structure, and governance (Foss and Saebi, 2018; Snihur and Zott, 2019; Zott and Amit, 2010). We begin our theoretical analysis from this activity system perspective because it allows us to ground our contribution solidly in prior work (Amit and Zott, 2001; Zott and Amit, 2007; 2008; 2010) before going beyond it by considering competitive dynamics in the evolution of multi-sided platform business models.

We develop our argument on the basis of an inductive multiple case study (Eisenhardt, 1989; Yin, 2013) that explores the evolution of twelve multi-sided platform business models in the Chinese Online Group Buying (OGB) industry between 2011 and 2013. The OGB platform business model, pioneered in 2009 by Groupon in the U.S., brings together local merchants and online consumers by offering products or services with deep discounts, should a certain number of fellow consumers buy the same product or service within a limited time period. The Chinese OGB industry is a compelling empirical field in which to address our research question for three reasons. Firstly, when the market emerged in 2010, all entrants chose to copy Groupon's platform business model, i.e., the starting point for designing the business model was similar for all companies. Using Groupon's business model as a reference enabled us to document the whole evolution of each of the business models as they unfolded. Secondly, OGB firms must deal with many of the challenges faced by platform providers working with two or more groups of transaction partners. For example, a design choice in the business model made in relation to one user group may have consequences for another one. Indeed, in our setting, the OGB firms evolved from operating two-sided platform business models in 2010 towards multi-sided business models in 2013 by integrating complementors such as e-malls, app developers, online travel agents, and cloud computing

providers, which increased architectural challenges, as structural interdependencies in the business model became more complex. Thirdly, this market was characterized by intense competition and volatility: it emerged, grew, was shaken-up, and stabilized in just four years. The number of platform firms operating in the Chinese OGB market grew significantly in a short period of time, reaching a maximum in September 2011 when the market was crowded with 5,058 platforms, falling to only 213 by December 2013, with just two platforms dominating the market with a combined share of 75%. This resolution of the life-cycle of the industry, 2010-14, provided a clear solution to the eternal problem of choosing an appropriate period over which to evaluate platform performance.

We claim that our results contribute to platform research in several ways. Firstly, by extending Amit and Zott's (2001) activity system perspective into the platform context we provide a more complete picture of the heuristic logic that connects platform characteristics with the realization of economic value. In particular, a focus on the pattern of transactions that the platform firm mediates between groups of users allows us to argue theoretically, and show empirically, that a focus on the platform business model, as a source of value creation and capture, can help explain why some platform firms outperform others, and can provide a basis for analyzing how platform business models unfold over time. Secondly, while prior research offers several explanations for the success of platforms like Airbnb or Amazon, including critical strategic choices such as where to play (and why) (Cusumano et al., 2019; Eisenmann et al., 2006; Hagiu, 2014) and what competitive strategy to adopt (e.g., differentiation vs. cost leadership) (Cennamo and Santaló, 2013; Seamans and Zhu, 2017), prior research leaves unexplored another likely contributor to the success of platforms: that their founders designed an effective business model. By revealing that the design of business models contributes to platform performance, we thus complement prior research that has considered alternative determinants of platform performance. Thirdly, by embracing the

competitive actions of platform firms and the responses elicited, we provide a fine-grained approach to understanding what specific platforms do when they compete with specific rivals. Although the engagement between firms is arguably central to firm survival and competitive advantage (e.g., Bettis and Weeks, 1987; Chen and Miller, 2015; Lamberg et al., 2009; Mansfield et al., 1981; Teece, 1986), the role of competitive action and response in the evolution of multi-sided platform business models remains largely unexplored in the platform literature. Our results extend the discussion about platform success (e.g., Adner and Kapoor, 2010; Boudreau and Jeppesen, 2015; Cennamo and Santaló, 2015; Eisenmann et al., 2006; McIntyre and Srinivasan, 2017; Rietveld and Eggers, 2018), showing that business model innovation and imitation are central components of platform firm behavior in a rivalrous situation. Specifically, we observe that both business model innovation and imitation enable OGB platform firms to grow and adjust their business model, but our longitudinal study also reveals that focused commitment to one of these two mechanisms jeopardizes long-term survival. In contrast, the market leaders that emerged from intensive competitive battles pursued business model innovation and imitation simultaneously. Finally, focusing on changes in the architecture of a platform's activity system, we show that the number of business model design elements and the level of interdependence between them has a critical influence on platform performance. Successful platform firms create complex business model designs, i.e., highly interdependent activity systems with a large number of design elements, while platforms that created loosely-coupled activity systems, thus concentrating on creating simple business model designs, lost competitiveness. This discovery allows us to draw a new connection between prior organization literature (e.g., Levinthal, 1997; Rivkin, 2000; Siggelkow, 2002; 2011) and platform research, and it enables us to generate plausible, conjecturable explanations for platform success and failure that can facilitate future theory development and empirical research.

MULTI-SIDED PLATFORM BUSINESS MODELS

Multi-sided Platforms

In this section, we define multi-sided platforms, conceptually differentiate multi-sided platforms from other organizational forms that involve two or more transaction partners, and highlight different streams of platform research that are relevant to the proposed activity system perspective.

Prior literature characterizes multi-sided platforms as hubs or intermediaries for value exchanges between two or more markets of users and producers (Gawer, 2014; Hagiu and Wright, 2015; Rochet and Tirole, 2003; Parker and Van Alstyne, 2005). For example, Cennamo and Santaló (2015, p. 12) define multi-sided platforms as "networks that bring together two or more distinct types of users and facilitate transactions among them", and McIntyre and Srinivasan (2017, p. 143) conceptualize multi-sided platforms as "interfaces that can serve to mediate transactions between two or more sides". Implicit in these definitions is the notion that value creation through multi-sided platforms is dependent on enabling interactions between different sides of the market, or as Chakravarty et al. (2014, p. 3) note: "a core benefit that each side seeks from the platform is access to participants on the other side." An example for a multi-sided platform is the e-commerce marketplace eBay that facilitates consumer-to-consumer and business-to-consumer sales. eBay's role is to attract participants to join, consummate matches between buyers and sellers, and facilitate value-creating exchanges by providing transactional architecture, and setting rules and standards.

Unlike businesses organized in traditional buyer-supplier relationships, i.e., so called "pipeline businesses" that control a linear series of activities along the value chain (Van Alstyne et al., 2016), multi-sided platforms do not take ownership[1] of products but rather depend on resources (e.g., skills, ideas, physical assets) and activities controlled and provided

[1] This does not preclude a multi-sided platform from, simultaneously, operating as a producer of goods and services. Amazon, for example, operates a marketplace that connects independent sellers with consumers and, at the same time, offers its own products and services (e.g., Alexa, Kindle).

by agents on different sides of a market (Adner and Kapoor, 2010; Boudreau and Jeppesen, 2015; Thomas et al., 2014). In other words, the role of a multi-sided platform is not to develop, manufacture or (re)sell products and services but to connect different sides of a market (Hagiu and Yoffie, 2009). This is also what differentiates multi-sided platforms from manufacturing or product platforms that firms may use to optimize manufacturing of a product or a family of related products in concert with a network of suppliers (Gawer, 2014; Krishnan and Gupta, 2001). Airbus, for example, operates a manufacturing platform to source around 80% of its activities from more than 12,000 suppliers worldwide. Using its platform, Airbus can leverage exchange relationships to access external competencies, share products and services across different aircraft types, and stimulate product development with and among its supplier base. Yet, although Airbus arguably plays a central, orchestrating role within a network of firms, it is still a product-centric business that focuses on the ownership and sale of products. Moreover, Airbus does not view its suppliers as being required to interact with its customers. Hence, in contrast to multi-sided platforms, interaction here between different sides is not a condition for value creation in manufacturing platforms. Table 1 summarizes the differences between pipeline businesses, manufacturing platforms, and multi-sided platforms.

INSERT TABLE 1 HERE

Given the interdependent relationship between two or more sides of multi-sided platforms, prior research suggests that such platforms are characterized by the presence of strong network externalities (Evans, 2003; Hagiu, 2007; Katz and Shapiro, 1985; Parker and Van Alstyne, 2005). In the case of a two-sided platform, the logic is that a larger installed base of producers offering products on the platform leads to greater demand for that platform

and, concomitantly, having more consumers leads to a larger supply of products (Boudreau and Jeppesen, 2015; Church et al., 2008; McIntyre and Srinivasan, 2017; Song et al., 2018; Zhu and Iansiti, 2012). The prospect of such cross-platform or indirect network effects[2] is reflected in the platform literature's emphasis on platform parameters that give transaction partners a good reason to join and keep using the platform. The parameters explored to attract and lock-in large numbers of exchange partners include sweetheart deals and exclusive contracting for producers (e.g., Armstrong and Wright, 2007; Hagiu, 2009; Yoffie and Kwak, 2006), policies to govern and influence behaviors of transaction partners (e.g., Maurer and Tiwana 2012; Tiwana et al. 2010), the creation of new features and add-ons that attract users (e.g., Gawer & Cusumano, 2008), offering convenient and reliable ways to close transactions (Hagiu, 2014), and ways of matching users effectively, with corresponding terms at which transactions occur (e.g., Wei & Lin, 2017). Studies have also considered different monetization models for the different sides of markets, such as sacrificing profits on one side to grow the number of consumers and, in return, making the platform more attractive for producers on the other side (e.g., Clements and Ohashi, 2005; Eisenmann et al., 2006). This focus on selected design parameters offers valuable guidance on how individual choices may relate to the growth of the installed user base and the impact such choices have on the other side of a platform market, but it falls short on fully explaining how a set of growing and interacting design choices impacts platform design over time. While confirming the presence of network effects and analyzing the consequences of individual choices is undoubtedly important to advance the study of multi-sided platforms, existing research has been relatively silent on the theoretically and managerially important question of how the design of a multi-sided platform evolves as a whole, i.e. as a business model.

[2] Same-side or direct network effects are also possible (e.g., Boudreau, 2010; Chu and Manchanda, 2016; Evans and Schmalensee, 2010).

Another stream of platform research has examined interdependent value creation in platforms by a multilateral set of partners, especially in the context of platforms like Apple iOS or Mozilla Firefox that provide a standard with a technological core upon which a community of developers build (Adner, 2017; Adner and Kapoor, 2010; Ceccagnoli et al., 2012; Kapoor and Lee, 2013). Studies in this stream of the literature have focused on structural and evolutionary mechanisms as well as the alignment of partners that enable value co-creation, including the management and coordination of complementors to a platform (e.g., Boudreau and Jeppesen, 2015; Kapoor and Agarwal, 2017; Rietveld and Eggers, 2018). Scholars have also begun to consider the bundling of adjacent platforms (e.g., Facebook's integration of Instagram) or "envelopment" (Eisenmann et al., 2011) as a market entry strategy and associated demand spillovers in complementary markets (Li and Agarwal, 2017). Hence, this stream recognizes the need to go beyond the platform provider and consider connections and interactions with stakeholders that play a critical role in value creation. However, while current theorizing in this part of the platform literature can be used to explain the role of cooperation and competition with value-creation partners for the success of multi-sided platforms, it falls short of fully explaining how viable multi-sided platforms emerge and evolve when competing platforms target the same user and complementor base. Although competition between an entrant platform and an incumbent has been explored (Eisenmann et al., 2011; Seamans and Zhu, 2014; Zhu and Iansiti, 2012), prior platform research remains silent on how multi-sided platform firms interact when they all start from the same position and compete head-to-head in a new market where a dominant player is not yet established.

Platforms as Activity Systems

A concept that allows us to study these questions is the business model. Over the last two decades, the business model has proliferated in both theory and practice as a concept central to firms' survival and growth (Foss and Saebi, 2017; Snihur and Zott, 2019; Sohl et al., 2018; Ritter and Lettl, 2018; Wirtz et al., 2016). A business model elucidates how a firm creates and captures value in concert with transaction partners such as customers and suppliers (Priem et al., 2018; von Delft et al., 2018; Zott et al., 2011). On the one hand, the business model identifies transaction partners, establishes the value proposition(s) for each partner, and describes how a focal firm connects to them (Baden-Fuller and Mangematin, 2013; McGrath and MacMillan, 2000). On the other hand, the business model defines how value is delivered, monetized and shared among transaction partners (Johnson et al., 2008; Teece, 2010). The business model, therefore, refers to the overall *gestalt* of interlinked boundary-spanning transactions and activities that enable value creation and capture (Zott and Amit, 2008). Similarly, Chesbrough (2007, p. 12) defines a business model as "a series of activities, from procuring raw materials to satisfying the final consumer", and Massa and Tucci (2013, p. 9) argue that a business models captures "how an organization orchestrates its system of activities."

An activity in a firm's business model refers to the engagement of resources (human, physical, capital etc.) of the focal firm or of any transaction partner to fulfil customers' needs and create customer benefits while delivering value to the focal firm and its partners (Zott and Amit, 2010). The focus here is on the key activities that create value for transaction partners and the focal firm (every firm also performs generic activities that do not create competitive differentiation). Activities in a focal firm's business model enable the delivery of the value proposition(s) in a repeatable and scalable way (Johnson et al., 2008), and they can be performed by any party to the business model (Zott and Amit, 2007; 2008). The business model can then be defined as the content, structure, and governance of activities between the

focal firm and its transaction partners (Amit and Zott, 2001). Activity content refers to those activities that need to be performed to enable value creation and appropriation; activity structure captures the order or sequencing in which transactions take place, but also the choice of market mechanism; and activity governance refers to who performs certain activities, thus reflecting what partners make a business model work (Zott and Amit, 2010). To illustrate, consider the example of a peer-to-peer lending platform that matches the supply and demand of funds: when creating the business model, choices need to be made in relation to what activities need to be performed to satisfy lenders' and borrowers' needs, how to match demand and supply of funds, and who undertakes activities such as setting interest rates (e.g., lenders vs. intermediary company). Moreover, choices among activity content, structure, and governance can be highly interdependent. A lending platform that chooses an auction mechanism to uncover the price (a structural choice that settled the question of how investors and fundraisers are matched) has also made a governance choice because it shifted the activity of choosing the price to market participants.

This definition of a business model as the architecture or system of interdependent and interconnected activities underlying value creation and capture is "precise, unifying (without being overly inclusive)" (Foss and Saebi, 2018, p. 13). Indeed, defining business models as activity systems is particularly useful to study platform firms since a focus on interdependencies among activities allows us to account for sets of structural relationships between the platform provider and its users, i.e., what Baden-Fuller and Haefliger (2013, p. 419) refer to as a business model "containing cause and effect relationships", and it provides insights into the processes that enable the evolution of a platform firm's business model over time (Zott and Amit, 2010). In particular, studying changes among activity content, structure, and governance allows to explore the design, management, and alteration of interdependent systems under conditions of intense rivalry.

OGB BUSINESS MODELS: CONTENT, STRUCTURE AND GOVERNANCE

Business model designers often borrow from existing firms and, in doing so, use well-honed and legitimate business models as templates (Amit and Zott, 2015; Frankenberger and Stam, 2019). Such templates are a proof-of-concept and can be used by founders of new ventures to reflect on established ways of organizing transactions and activities and to "recycle" successful design elements prior to market entrance (Snihur and Zott, 2015).

In our study of the Chinese OGB industry, all cases used the business model of the e-commerce marketplace Groupon, pioneered in 2009 in the U.S., as a template from which to copy elements, i.e. Groupon's business model was accepted as the default solution for OGB platforms that enable interactions between consumers and local merchants. The OGB business model creates value by connecting local commerce, increasing consumer buying power and local merchants' sales through price and discovery. For example, merchants can benefit from transacting on an OGB platform by reaching new customers and selling slow moving items in their inventory or unutilized services and consumers can discover and save on new products or services. From an activity system perspective, this business model template can be characterized as follows (see Appendix A for the depiction of the activity system):

- *Activity content:* On one side of the OGB business model, the focal platform firm performs activities such as attracting local merchants (e.g., restaurants, bars, spas, and hair salons), negotiating discounts, and crafting offerings into so-called deals. On the other side of the business model, the deals are offered to consumers. Here, the platform performs activities such as promoting deals, attracting consumers, and facilitating online transactions. Once a transaction is completed, the OGB platform

pays the merchant and performs activities to manage customer relationships on both sides of the platform (e.g., subscriptions).

- *Activity structure*: enabling and enriching interactions between online consumers and local merchants is at the heart of the OGB business model. The activity structure defines the sequence of activities and describes the exchange mechanism that enables interactions between consumers and local merchants. For example, a structural choice in Groupon's original business model is to offer, each day, one deal for local services in a city at a certain discount ("deals of the day") and the deal is only valid if a certain number of consumers purchase the deal within 24 hours.
- *Activity governance*: in the OGB business model, the platform provides, for example, transactional infrastructure, sets rules and standards (e.g., restrictions on platform access), and controls activities to attract users and consummate matches among users on both sides. Other activities in the business model are not performed by the platform but by consumers and merchants (e.g., consumers print transaction codes at home and use deals in local stores that supply the product/service offered on the platform).

Designers of such a multi-sided platform business model make decisions on all these parameters, often at the same time. For example, one of the cases we observed, attracted cinemas as platform participants and, after a while, integrated forward by offering digital solutions to cinemas in the form of ticket selling and collection systems. This was a governance choice (settling the question who performs ticket sales and collection) but at the same time constituted a decision about content. Hence, design elements in OGB platform activity systems can be seen as highly interdependent.

METHODOLOGY

To explain why some platforms succeeded in competitive battles, we adopted an inductive, multiple-case study design (Eisenhardt, 1989), where prior theory provided concepts but not relationships for a deductive study. Multiple cases permit a replication logic (Eisenhardt and Graebner, 2007), and facilitate early and nascent theorization of a phenomenon.

The empirical setting for this study is the Chinese OGB industry. When this industry emerged in 2010, entry barriers were low because of advances in digital technologies. A small team could start an OGB platform by simply looking for merchants in a local area and matching them with consumers. As a result, thousands of OGB platforms (5,058 at their peak) emerged between 2010 and 2011 (see Figure 1). This period was characterized by low switching cost for both consumers and merchants. Indeed, at this peak, users frequently used multiple OGB platforms at the same time to find cheaper deals and better services. At this early stage of development, the vast majority of OGB platforms, therefore, focused on survival by rapidly getting to scale.

Using Groupon's business model as a template, all firms started by copying the business model of Groupon, but the Chinese OGB platforms presented great varieties in business model designs over four years (2010-2014). In this process of business model evolution, innovations and imitations in this market were highly transparent to competitors and researchers. Chinese OGB firms frequently communicate with the public about changes to their business models (e.g., to promote new features to users) and systematically monitor competitors' moves. Moreover, competitive moves by OGB firms are reviewed on a regular basis by tech bloggers, business press, and other online publishers, which provided further insights into platform competition in this market. This multi-sidedness in the platform business model design (see also Appendix A), the transparency of competitive moves, and the impressive market growth rate together with the rapid churn of companies as a result of performance variations over a short period of time (see Figure 1) made the Chinese OGB

market a rich and unique context for the study of platform competition and the evolution of platform business models.

INSERT FIGURE 1 HERE

Case Sampling

In the Chinese OGB industry, we sampled twelve multisided platforms (see Table 2) that competed intensively based on a great number of business model innovations and imitations. To avoid a selection bias, we purposefully studied both successful and unsuccessful platform firms based on their sales performance and market share between 2010 and 2013 (see Figure 2). Our sample covers the biggest Chinese OGB firm at the time of study as well as firms that failed and subsequently left the market. The platforms in our sample accounted for 99.6% of OGB sales in 2013. The cases differed in their respective business model evolution processes but were relatively homogeneous in terms of other parameters that affect performance. First, the discount rate (60%-70%) and commission rate (10%-15%) were similar across the platforms, which requires OGB firms to move away from relatively simple price competition and explore the competitive advantages rising from the overall architecture design of the activity system. Second, the cases were all digital start-ups that came into existence at a similar point in time (Table 2). Although two cases had parent companies, the existing businesses of the parent companies (e.g., online security services) were very different from OGB and no parent company had access to merchant resources. Thus, there was no significant migration of user base at start-up and all cases begun operations with an installed user base of zero. Third, there was no difference in the nature of the founding team in that all founders had prior business experience and expertise in information technology but not in OGB platform business models. The homogeneity of cases

in terms of parameters provides a level of confidence in explaining the success/failure of the platforms by exploring their business model evolution processes.

INSERT FIGURE 2 AND TABLE 2 HERE

Data Collection

To capture longitudinal dynamics, we conducted two rounds of data collection in 2013 and 2014. In the first round we recorded changes in the business models of the twelve cases from their founding (mostly in 2010) to 2012, while the second round focused on changes between 2012 and 2013. We performed 23 semi-structured interviews with founders/co-founders as key informants. To triangulate the information received from the founder(s) of large companies (>1,000 employees), we additionally interviewed 8 top managers. Furthermore, we interviewed 16 industry experts, including the director and associate director of the Chinese OGB Association, journalists, and government officials, to ensure reliability of the data for each case. In total, 47 semi-structured interviews, each lasting one to three hours, were carried out, resulting in 68 hours of recorded data. To triangulate the primary data, we collected extensive volumes of secondary data such as newspaper articles, market reports, and blogs, amounting to between 60 to 600 items per case (see Table 2). The two rounds of data collection generated a total of 5,034 single-spaced pages of data.

In the first stage of primary data collection, each interview opened with questions concerning the chronological narrative of the firm's business model development since it entered the market. Here, we asked respondents to describe (1) their original platform business model, (2) any changes to the activity content, structure, and governance, (3) how these changes were accomplished (e.g., the existing activity structure was modified to successfully integrate a new activity content), and (4) the linkage and coherence between the

individual changes. In the second stage, we asked about the role of competition in the development of the platform's business model, exploring whether any change was attributable to an innovation or an imitation. In the third stage, we solicited data on the contribution of innovations or imitations to performance as well as on how the successive combinations of innovations and imitations together enabled the platform firm to increase sales, the most critical indicator used by firms themselves to measure their own performance. When interviewees reported the effects of innovations and imitations on sales explicitly (e.g., an increase in the platform's user base, repeat purchase rate, or website visits), we triangulated their assessment with sales data provided by the firms. All questions were open-ended, enabling interviewees to fully reflect on the evolution of their platform business model and competitive dynamics.

Data Analysis

The data analysis started by delineating the business model evolution process case-by-case, mapping changes in activity content, structure, and governance that had the effect of changing the entire business model. The analysis identified 329 single changes in total, which formed the chronological narrative of how the business model of each case evolved over the four years. Following a mainly inductive approach, the 329 individual changes were then coded as business model innovation or imitation. The chronologies were sent back to the interviewees, confirming the validity of the initial coding in terms of the sequence, content, and initiatives of the innovations and imitations. The essence of innovation in a platform business model is the conceptualization and creation of new ways of facilitating value-creating exchanges on the platform, which can be achieved by introducing new activities, new ways of linking activities, and/or new ways of governing activities in the platform business model. For example, Case B extended the business model by integrating app

developers (e.g., digital map, weather forecasting, social media) into the platform and introduced new activities such as data sharing and app co-creation, which also had consequences for the activity governance and structure. More examples for new activity content, structure, and governance are provided in Appendix B. Business model innovation aims at improving the relative competitive position of a platform's business model through generating new user segments or through expanding the existing user base. Business model imitation, in contrast, matches changes in a rival's business model in order to defend or enhance the relative competitive position of a focal platform's business model. Thus, business model imitation is used to achieve legitimacy through mimetic isomorphism.

Next, we used established coding techniques – the case dynamics matrix and causal chains of Miles et al. (2013) – to capture coherence between the innovations and imitations in each case over the years. The data analysis focused on the business model changes as units of analysis, exploring how and why innovations and imitations dynamically occurred or co-occurred as patterns. In our analysis, two axes, business model design and entrepreneurial action (innovation and/or imitation) emerged inductively from the coding, which allowed us to categorize the dynamic combinations of innovations and imitations and their effect on business model design into different types. Two of the authors constantly compared, discussed, and refined the categorization during this process. The categorization was repeated in each case and compared across cases, until we identified four business model evolution patterns that continuously shaped and developed platforms (see Appendix C for further details).

As the analysis continued, it became clear that there was variation across cases in terms of how they engaged with the four patterns. To capture this variation in a more fine-grained manner, in the final stage of coding, we investigated how the cases employed different business model patterns (i.e., the strategies to compete in platform battles) and whether these

different strategies of business model design were associated with platform survival or death. We grouped the twelve OGB companies into four categories (market leading, surviving, barely surviving, and failed) according to their sales growth and market share by the end of 2013. Taking Case C as an example, once the leader in the market, Case C lost 50% of its market share within just two years, while Case A, a fierce competitor, increased its market share from 8% in 2010 to 42% in 2013. We, therefore, classified Case A as a successful platform and Case C as a failed platform.

Sales growth and market share were adopted as the indicators of platform performance in this study for three reasons. First, the initial market characteristics, e.g., low entry barriers and low switching costs, pushed OGB platforms into considering survival as the most pressing need at this early stage of the industry cycle. The interviewees revealed that growing the user base and scaling the business model were key to their survival at this stage. Those OGB platforms that were able to grow the user base, and thus increase sales and market share, introduced changes to their activity system but these changes also generated costs, which made it difficult to gain profit at this early stage. As explained by the interviewees: *"We didn't consider profit as the priority"* (Co-founder, Case A), and *"if we would consider making profit every time we make a [competitive] move, we wouldn't be moving"* (Co-founder, Case C). Second, the OGB platforms considered short-term financial losses to be acceptable because they expected that rivals would eventually exit when they could not scale fast enough. The companies made the assumption that the market would tip in favour of the leading company, and they expected to increase unit price and reduce subsidies after achieving a leading position in the long-term. Third, the literature on new ventures in general (e.g., Chandler and Hanks, 1993; Schoonhoven, Eisenhardt, and Lyman, 1990; Short, McKelvie, Ketchen and Chandler, 2009) has suggested sales growth as an acceptable performance measure. Moreover, the strategy literature on firm performance in fast-changing

environments in general (e.g., Wilden et al., 2013), and in the context of high-growth firms in particular (e.g., Demir et al., 2017), often relies on sales growth as a performance measure. Besides sales growth and market share, we further considered the survival and exit of firms from the market. Cases K and L left the OGB industry in 2013 and 2012 respectively. The founder of Case C left in 2013 and it ceased trading by 2014 when the interviews took place, marking its failure in the OGB market.

We then compared the adoptions of business model evolution patterns in each group, analyzing how the market leaders achieved superior performance by applying certain patterns and exploring why the rest of the companies were less successful, either because patterns were absent, or they applied the patterns wrongly. At this stage of the coding process, we not only relied on how often each pattern occurred, but also used the interviewees' narratives to understand firms' preferences towards the patterns. Accordingly, we explored what patterns dominated in the process of competition and what patterns were the key reasons for the success/failure of the cases (see Appendix D for illustrative quotes). During this process, two of the authors moved back and forth to review and consolidate the coding and classifications until a strong agreement was achieved. By design, inter-rater agreement at the final stage was 100 percent.

FINDINGS

This section is organized as follows. First, we introduce the four patterns of business model evolution that emerged as being particularly salient across cases. Second, we describe how and why these patterns varied across cases, i.e., exploring the strategies to design multi-sided platform business models in a context of intense rivalry. We further discuss the outcomes of these efforts (measured by sales growth and market share), explaining how the different

strategies for the design of multi-sided platform business models in this market led to the success or failure of platforms.

Patterns of Multi-sided Platform Business Model Evolution

Our data revealed that OGB companies engage in innovations to develop their business models but also frequently respond to rivals' innovations through imitation. These dynamic interactions between innovation and imitation can be theoretically distinguished, depending on a structural factor in business model design (complexity/simplicity) and the entrepreneurial actions of a platform firm to develop the business model (imitation/ innovation). Complexity in business model design refers to the number of design elements and the interactions among those elements, while entrepreneurial action explains whether a multi-sided platform relies on business model innovation or imitation when changing one or more design elements in the business model. Here, our analysis inductively suggested four patterns of business model evolution: *simple innovation*, *complex innovation*, *simple imitation*, and *complex imitation* (quadrants I to IV in Figure 3; see also Appendix C for illustrative quotes).

Simple innovation. Simple innovation refers to a pattern whereby a focal platform firm introduces, occasionally or infrequently, innovations that are only loosely coupled to other innovations (and imitations) in its business model. Simple innovations involve creating a small number of novel design elements, e.g., Case C opened several offline stores as a promotion channel and to manage customer relationships. This choice was easily added to the existing business model design, as it did not require the firm to create complex interdependencies with existing components.

Multi-sided platforms may also introduce innovations that would have normally required a number of interdependent changes in the existing business model, but they treated

the innovation as a new business that was subsequently spun off from the OGB business. As a consequence of this decision, the spin-offs did not enjoy the necessary support to grow into a sustainable business model component. Taking Case C again as an example, it formed a project team to develop a mobile payment system, hoping to use the system in its own app and lease it to third parties. However, this innovation was abandoned after seven months in favor of scaling its business model through acquiring several small OGB firms. Since the mobile payment system had only a limited relation with Case C's core business, the company failed to devote substantial resources to the innovation. As the co-founder of Case C explained:

"There were a lot of uncertainties with the experiment and it was not like we cannot live without it. So, we did not bet all our efforts and resources on it. That is why only a project team was doing the research and development."

In other cases, the platform firms introduced a core innovation but did not add highly interactive design elements to develop the innovation further. For example, Case L entered the OGB market by introducing the concept of an OGB aggregator platform. Instead of managing relationships with merchants, this innovation enabled L to select deals across several OGB websites and, thus, increased the variety of deals for consumers. Because of this innovation, L no longer needed to maintain or manage relationships with merchants but rather collected existing deals from OGB websites. Consequently, the business model of L became cost-driven. However, the innovation stayed simple as L added only two design elements over a three-year period.

Complex innovation. Complex innovation refers to a pattern in which a platform creates complex interdependencies between a large number of design elements by engaging in on-going innovations within its own business model. However, a business model innovation that enables a firm to gain an advantage over its rivals also encourages imitation, so, to stay ahead of the competition, the innovator may decide to continue developing its new

business model through a series of innovations. Thus, by the time rivals have successfully imitated an innovator's new activity system, the innovator may have made further changes to its business model, thereby shifting its focus from novelty towards reliability.

In other instances, a platform may first engage in a series of changes and, during this process, discover an opportunity to generate new customer segments that it seizes by altering its business model. As an example, through a series of innovations (July 2010 to September 2013), Case B extended its business model and moved from simply offering deals to generating a large amount of data from consumer reviews. Consumers provided these reviews to comment on deals and services offered by local merchants. For instance, B collected data on the popularity of different merchants in a particular area. Because of this enormous data resource, B was approached by Apple in October 2012 to collaborate in the development of the Chinese version of Siri, a program that enables conversational interaction between users and their smartphones. Collaborating with Apple in the development of Siri, *"offered valuable experiences"* (co-founder Case B) that resulted in the subsequent development of innovations. Eventually, Case B created a two-way flow of traffic with Internet firms by providing "big data" to the firms and collaborating to create value-added services, which greatly expanded the platform and industry boundaries. During this process, nine innovations were carried out by B over a three-year period, where the new design elements were highly interactive with one another and tightly linked to shape the evolution of its platform business model.

Simple imitation. This refers to a pattern in which a platform observes a rival's business model and selects and copies the most imitable design elements into its own business model. Such imitations often require only minor changes in the imitator's business model. There is, therefore, a low level of interaction between the imitated design element and the existing components of the business model. The co-founder of Case G explained that

innovations from first movers often become an industry standard that subsequently attracted imitation. For example, when Case A changed the revenue side of its business model by introducing a refund policy, seven out of the twelve cases in our sample copied this innovation because they *"were afraid of being left out"*, according to Case G. Besides adopting industry standards, platforms following this pattern primarily imitated rivals' business model innovations that were relatively easy to understand and did not require a lot of effort to integrate them into the existing business model. When A, for example, introduced a customer relationship management (CRM) system to its business model in February 2011, Case F, G and J copied this innovation as it was relatively easy to understand how activities in this system, e.g., tracking the transaction history of consumers and recommending deals according to their preferences, create value for the customer and the platform firm as well as its role in improving customer experience. According to Case J, *"the CRM system was crucial to managing customer relationships. When the deals become more diversified, we need to know what type of deals each customer segment is interested in."*

Complex imitation. The final pattern we identified is complex imitation, which begins with imitating a rival's innovation, but successively develops the imitation through innovation. In contrast to simple imitation, this pattern shows a higher demand for integrating a number of design elements into the imitator's business model because the process of adaptation created new linkages among activities, introduced new activity governance, or incrementally changed the content of other activities that complemented the adapted imitation. In this pattern, firms tended to invest heavily in the collection of intelligence about competitors as well as into activities that increased understanding of the interconnections between elements of their own business model. This enabled platforms to copy more complex parts of a rival's business model. For instance, in November 2011, Case I imitated Case D's mobile app which facilitated the promotion of deals depending on the location of a consumer.

Combining this with social media services enabled Case I to greatly extend its original functions. This combination offered significant advantages (e.g., for friends in the same area, the app may recommend deals for "cool bars"; for couples, deals from "romantic restaurants" etc.). As Case I explained, because of this adaptive imitation, social networks and location-based services became the "*key to the business model*".

Strategies to Compete in Platform Battles

In this section, we explore the contribution of the observed patterns for developing platform business models and discuss how and why the platforms compete through applying the patterns (summarized in Table 3). While we observed that platforms can use several patterns in the business model design process, not all patterns mattered for the growth of the platform businesses. The focus is, therefore, on what pattern(s) dominate actions aiming at creating competitive advantage within and across cases (see Appendix D). Our analysis reveals that the case firms used four strategies some of which combined the patterns identified in the previous section, while others focused on a particular pattern to achieve competitive advantage to compete in the market. Figure 3 shows the position of the four strategies within the matrix of the four evolution patterns.

INSERT FIGURE 3 AND TABLE 3 HERE

Innovation-centred strategy to create simple business model designs. Case C was highly innovative between 2010 and early 2012 by focusing on simple innovations (fourteen simple innovations). Cases K and L, in contrast, developed business models around a core innovation in their early platform stage but soon stopped developing the business model further. Although Cases C, K, and L all showed a high level of innovativeness, their business

models were relatively simple in the sense that there was a lack of design elements and/or the interdependencies between the design elements were rather fragile. Subsequently, Case C, K, and L all failed and left the OGB market.

C mostly introduced innovations that were essentially experiments, with little or no relation to its existing business model. Their outcomes were unpredictable, and they were relatively easy to abandon, as their strategic relatedness to other components of the business model were rather weak. Case C abandoned nine out of fourteen innovations, which consumed time and resources in the short-term. Besides these failed innovations, the frequency with which C introduced these changes to its business model had a negative impact on its competitiveness. For example, while C introduced four innovations between December 2011 and February 2012, Case A took advantage of C's distraction with these "*random*" (co-founder of C) experiments and replaced C as the market leader. By this time, C essentially no longer had a vision of its platform evolution and stopped its development for a period of nine months. In that time, C lost market share to B, D, and E (see also Figure 2). Case C completely shifted its focus to imitation in late 2013, which did not, however, aid recovery. Eventually, Case C stopped developing new deals by 2014, which marked its failure in the Chinese OGB market.

Cases K and L were satisfied with the *status quo* and stopped further development of their platform business models. Although their core innovations improved short-term competitiveness, the simplicity of their business models made the firms vulnerable when facing competition from rivals with a deep resource base and strong competencies. Eventually, both firms left the OGB market.

These companies typically did not respond to competitors' business model development during the evolution process, mainly because they were blinded by their temporary competitive advantage as the result of certain innovations. For example, although

L did recognize that its business model innovation was imitated and further developed by others, the founder of the company did not see any need to react to imitators: *"We were completely confident about our business model; we felt no changes were required"*. Only after Case F (a business unit of a well-known Chinese Internet company) entered the market with an imitation of L's business model, did L begin to recognize the market process of competition. While L was shocked that competition "*suddenly became so aggressive*", F assessed the situation quite differently *"[competition] was never something that happened suddenly"*.

Similarly, Case C was the first to introduce social, location, and mobile (SOLOMO) related innovations to its OGB business model. However, when Case C ran into problems with creating interdependencies between the elements, it abandoned these social components in favour of focusing on scaling the business model. C did not notice that competitors, such as Case D, had started imitating their business model. However, asked in the interview about this, the co-founder of Case C noted that a look at competitors "*might have provided potential solutions to the issues*" in developing the SOLOMO innovation. While Case C gave up its business model development, Case D eventually completed its SOLOMO-centred business model and outperformed Case C. The founder of C reflected: *"I don't know why we did not notice Case D. Possibly because we overlooked most competitors at that time; we were the largest, the richest, the most innovative, the leader, you know, all that halo."*

Imitation-centred strategy to create simple business model designs. At the other end of the spectrum, Cases F, G, and J relied mostly on simple imitations in developing their platform business models. Reflected in interviewees' comments, imitation is not as straightforward as it may seem. It requires monitoring a rival's activity system, identifying design elements to copy (often precisely) and integrating them into the imitator's business model. As elaborated by the founder of Case F:

"I do not understand why people have so many negative feelings about imitation. Being ashamed about imitation is like being ashamed about tracking the development of the industry […] Why is introducing a similar activity as a defence wrong? In fact, innovation is linked to a firm's ability to collect information from competitors and learn from existing businesses to a large extent. Competitors can help us to innovate. If you don't extensively observe, disassemble, and 'reverse engineer' a competitor's business model, you will never know how the business model can be improved further. I mean, you will never know what works in the business model and what doesn't."

Indeed, copying the right element may have an immediate positive impact on performance as companies often imitate proven or validated elements from a rival's business model. In other words, copying may save time and deliver quick results. For example, Case G strengthened consumer relationships by copying an activity to provide refunds to consumers.

However, imitators may only be able to evaluate a specific component or part of a competitor's activity system and may overlook the bigger picture: they often copied only what they could easily understand, instead of imitating an interdependent, more complex, set of design elements. For example, while Cases F, G, and J copied the simplest component (the CRM system), Case A continued to innovate around its CRM system (e.g., by adding merchant services and deal development systems) to improve the overall efficiency of its business model. Introducing additional activity content generated virtuous cycles, or feedback loops, that strengthened the interconnection between the CRM system and other components of A's IT infrastructure. Cases F, G and J did not copy subsequent innovations because they were not able to see the value of the interconnections between activity content and structure that A strengthened in several iterations. Even when imitators recognized the value of a complex innovation, they often faced resource constraints and a lack of competencies: some platforms did not, or were not willing to, invest in the integration of complex innovations into their activity system (or develop imitations further). For example, when the founder of Case J was asked why J stopped developing the CRM system further, he explained: *"It was not that we didn't want to. We were afraid of losing customers but we did not have enough money, people, or even time to do that. It was just not an option for us."*

Without continuously developing design elements, the positive effect of the imitations quickly faded in the long-run, which explains why the sales performance of the imitators often fluctuated. For example, the founder of Case F explained:

"When we first copied (the movie ticket-related) services (the simple element in a complex innovation introduced by Case A), sales were great [...] but it did not last long [...] because while Case A created a multi-flow traffic between its tightly linked segments (restaurants, movies, hotels, and food-delivery) within its business model, we did not have the other segments to bring traffic to our movie segment".

Platforms that used this strategy, therefore, barely survived, with sales fluctuating between CN¥10 million (approx. US$1.5 million) and CN¥100 million (approx. US$15 million).

Imitation-centred strategy to create complex business model designs. Cases D and E, as late entrants in the OGB market, overtook Case C through a combination of simple and complex imitations. A typical characteristic of D and E was a strong ability to make sense of how specific design elements in a rival's business model contributed to sales and a strong ability to decompose and modularize their own business model to embrace the new design elements. While simple imitations delivered quick results, complex imitations, i.e., the subsequent adaptation of an imitation, facilitated the integration of the imitation into an activity system, eventually contributing to long-term sales by providing an opportunity to catch up with competitors. For example, Case D copied C's abandoned innovation, the SOLOMO activity system, without fully understanding it at first, but mastered the imitation during the adaptation process, eventually achieving what C originally intended to accomplish. An industry expert commented:

"It is interesting. Nowadays, when people talk about the SOLOMO system, they always give credit to Case D. However, it (Case D) initially did not even understand the location-based services it imitated from Case C […] Yet, (while adapting the innovation) Case D did a much better job and mastered it in this sense."

Although they survived in this highly competitive market, Cases D and E were not able to catch-up with the market leaders. These platform firms displayed a lack of "*forward*

thinking" (co-founder, Case E) and innovativeness. For example, the co-founder of Case D explained that D did not understand the SOLOMO business model in the beginning and they *"just happened to have the social media platform that allowed us to add check-ins (to a nearby shop)"* (the parent company was a social media Internet firm). The co-founders of both D and E showed a deep understanding of their competitors' business models and the design elements that could be leveraged into their own business models but were not able to proactively introduce innovations to fundamentally challenge the logic of value creation and capture.

Furthermore, the adaptation of design elements is difficult and time consuming and the positive impact of adaptive imitation is subject to the required speed of integrating the elements into the business model. In contrast to D and E, Cases H and I took a relatively long time to adapt imitations into their business models. While Case D completed its SOLOMO business model in 2012, Case I eventually designed the social media app based on social interactions and location-based services by the end of 2013. By the time Case I had gone through the long process of configuring and reconfiguring its business model, D had already established a strong position in the market. Consequently, Case I struggled to develop its business model further. As the founder of Case I explained:

> *"We have come such a long way to develop the business model […] as a small company, sometimes we cannot go as fast as the big firms. We must take one step at a time. This is frustrating because we always are at risk of missing the (right) time for introducing the innovations. And sometimes, speed means everything in this market."*

Hybrid strategy to create complex business model designs. By December 2013, with monthly sales of CN¥2.1 billion (approx. US$324 million) and a market share of 48.8%, Case A was the most successful company in the Chinese OGB market. Case B closely followed with a market share of 26.2%. Cases A and B are, therefore, illustrations of firms that successfully developed multi-sided platform business models in this competitive environment.

Cases A and B combined innovations and imitations to create complex and strong interdependencies between business model elements. This combination is associated with a high level of internal disruption and requires full awareness of components, linkages, and dynamics in business models, i.e., how the design elements come together to reinforce the firm's unique competitive position. Case A segmented consumer demands and created four business units (movie, hotel, restaurant, and food delivery), e.g., the movie unit integrated new offerings such as ticket deals, seat selection, ticket collection, movie rating, and fan communities in a specialized app. These activities interacted with each other through four digital systems (CRM, deal development and control, merchant services, and online payment systems) that formed the digital infrastructure of Case A. By the end of 2013, Case A was recognized as a "unicorn" start-up in local services, where *"A is the only name customers have in mind when they think about these things, whether seeking eating, drinking, traveling, or entertainment"* (co-founder, Case A).

From its founding, Case B engaged in innovations and imitations to build its business model around the collection, analysis, and application of "big data". A series of innovations and imitations enabled B, over time, to create complex interdependencies between activity content, structure, and governance. By 2013, B had an industry-wide reputation for creating and capturing value with the management of "big data". During this process, B created interdependencies between design elements, and it also formed a complex system of coherent and mutually reinforcing activities. This turned out to be critical when their business model was constantly undergoing change. According to the interviewees, matching and integrating design elements was important to ensure coherence and consistency within their firm's business model. Once such a complex system is formed and continuously evolved, it may provide a competitive advantage. The co-founder of Case A explained:

"It is unnecessary to monitor how many competitors have copied it (the CRM system), because basically we cannot control imitations. The key is to keep moving. When all OGB

companies developed the CRM system, we had the merchant service system. When they copied the merchant service system, we had other systems ready to use. The competitors cannot copy all our systems, and even if they could, they would be too late because these system developments take time."

The co-founder of Case D confirmed this assessment: *"We knew that Case A created the CRM system which we imitated. We even did a better job. However, God knows what other systems they were developing at the same time."*

A focus on the potentially high level of internal disruption that may result from the adoption of changes that affect other parts of the business model does not imply that A and B did not observe their competitors too. In fact, novelty in their business model design was complemented by their willingness and ability to develop intelligence concerning how and why rivals create value with their platforms. This monitoring supported the firms in taking the complexity of their platform business models to the next level. For example, Cases A and B both copied location-based services from C and further integrated the services with their own innovations. The co-founder of Case A explained:

"As for the question whether innovation is important or not, I think that satisfying customer demand is important, because if you develop a new offering that is not accepted in the market, then it is useless [...] I always think it does not matter if it is new, what matters is whether it is useful, that is, if customers have a demand for it. Does this idea come from the competitors or us? As long as it works, why does it matter?"

Using advanced data analytics, Case A even invented a sophisticated monitoring system that enabled it to systematically study the business models of key competitors. This system alerts Case A's senior management team to unusual traffic and patterns on rivals' websites, eventually enabling A to respond quickly to a rival's innovation.

DISCUSSION

This article opened with questions regarding the evolution of multi-sided platform business models in a context of fierce competition. Specifically, we asked how can we describe and analyze interconnected and interdependent decisions in the development of multi-sided

platform designs, and how some multi-sided platforms succeed in the competitive battle for market leadership, while many more perish? The answers, based on the observation and analysis of rich, longitudinal data from twelve multi-sided platform firms in the Chinese OGB market, lie in the patterns of platform business model development and the different strategies for applying (and combining) those patterns. In the following section, we discuss how our findings contribute to the platform literature and how they can facilitate future theorizing and empirical research. We conclude with practical implications.

Theoretical Implications

Our study has several implications for scholarship on multi-sided platforms. First, our study is the first to show that the business model, as a source of value creation and appropriation (Baden-Fuller and Mangematin, 2013; Chesbrough and Rosenbloom, 2002; Teece, 2010), is a useful level of analysis to explore competition in multi-sided platform markets. While prior platform research has advanced several explanations for platform success in nascent markets (Cusumano et al., 2019; Eisenmann et al., 2006; Parker et al., 2016), the business model, as a key imperative was thus far left unexplored. Grounded on the concepts established by prior theorizing (e.g., Amit and Zott, 2001; Zott and Amit, 2007; 2008), we began our discussion by conceptualizing a multi-sided platform business model as a system of interdependent activities that transcends a focal platform firm and spans it boundaries. The activity system describes how the platform firm taps into the ecosystem of producers and users, and it enables the platform firm, in concert with two or more distinct types of platform participants, to create value and also to capture and monetize a share of that value. This is why multi-sided platform business models, while anchored on a particular platform firm, are ecosystem-centric in their design. The specific parameters we considered to analyze the overall organizational *gestalt* of multi-sided platforms are the design elements

of activity content, structure, and governance (Zott and Amit, 2010). While prior platform research has extensively considered the role of individual design parameters in creating successful platform businesses (e.g., Gawer and Cusumano, 2008; Parker et al., 2016), and, to a lesser extent, how a specific choice related to one side of a platform has consequences for another side (e.g., Zhu and Iansiti, 2012), much less attention has been given to the question how choices interact and, consequently, how the system as a whole evolves over time. Studying how the activity systems of twelve multi-sided platforms in the Chinese OGB market evolved over a business cycle enabled us to address this gap and link system design with platform performance. For example, introducing a CRM system allowed Case A to generate deep customer insights, which opened several new business opportunities. The CRM system became critical for value creation because it allowed Case A to build relationships and to improve user experience, thereby retaining users as business model participants. For example, on the merchant side, the insights that Case A generated through this system enabled it to add new services to its platform, which attracted merchants to keep coming back: Case A locked merchants in. On the consumer side, Case A made an effort to create a more personalized and complete consumer experience (e.g., covering more aspects of a consumer's life), which strengthened its reputation and loyalty among consumers. This lock-in made it less likely that consumers would use multiple OGB platforms at the same time for the same purpose. Besides limiting multi-homing, the CRM system had another advantage: user relationships became a difficult-to-imitate element in its business model, eventually enabling Case A to thrive despite a seemingly weak appropriability regime. Moreover, the CRM system was, over time, integrated with other design elements (e.g., deal development, online payment system). Interdependencies between the elements generated positive feedback-loops in the business model, which further increased the total value created for all platform partners and allowed Case A to capture a greater share of the value. These findings

allow us to establish the business model as a new determinant of platform performance, suggesting that the business model, as the architecture of activities, is indeed a useful construct in platform research.

By extending the prior business model literature into a platform context, our study may inspire new research on how platform business models evolve over time. Future platform research could, for instance, integrate the information systems and business model literatures to explore the interplay of choices concerning the technology architecture (i.e., decisions concerning a key resource underlying the activity system) and design choices in a platform business model, and how those interactions shape the evolutionary dynamics of platforms. For example, the choice of Case B to build its business model around "big data" suggests that the choice of technological architecture may have consequences for the design of a platform business model (and *vice versa*). An area of future research, therefore, may involve the dynamic interplay of choices and consequences concerning digital technologies and multi-sided platform business model. What is the effect of a platform's technological architecture on the relationship between business model design and platform success (or failure)?

Second, after theoretically grounding our analysis in the activity system perspective, we moved beyond prior work by generating insights into the mechanisms that enable the evolution of a multi-sided platform's activity system over time in a context of fierce rivalry. Specifically, studying what a multi-sided platform firm does when it competes with specific rival platforms, we identify two principle competitive behaviors, namely business model innovation (Amit and Zott, 2012; Hacklin et al., 2018; Snihur and Wiklund, 2019; von Delft et al., 2018) and business model imitation (Amit and Zott, 2015; Casadesus-Masanell and Zhu, 2013; Frankenberger and Stam, 2019), and show that both innovative actions and imitative reactions are commonplace in crafting a viable multi-sided platform business model in the competitive context of the OGB industry. Business model innovation enabled some of

the OGB platforms to challenge the dominant logic of value creation and capture in the market, and significantly enhanced their platform's relative competitive position. However, successful business model innovations promote rapid imitations that may also be used as an effective means of differentiating and enhancing a platform firm's relative competitive position. For example, Cases D and E used business model imitation to surpass market leader Case C, which, at the time, had the largest installed user base and was widely considered as the most innovative company in the market. However, as our findings further show, while copying a rival's business model innovation is a realistic strategy that can yield successful outcomes, imitation is not always simple: copying a rival's platform business model (in full or in part) requires a great deal of insight into the complex relations between the various elements of a rival's business model. Furthermore, while a group of platform firms in our sample displayed a strong ability to imitate design elements from rivals' business models, and even further adapt and integrate them, these advanced imitators still failed in the market. Neither platforms that focused all their efforts on business model imitation nor platforms that committed to business model innovation survived in the long run. In contrast, the market leaders that emerged from intensive competitive battles used business model imitation and innovation simultaneously, suggesting that successful multi-sided platforms excel at copying from rivals to defend or enhance their relative competitive position *and* at creating new sets of activities to generate new or expand existing user bases. Empirically studying the engagement between platform firms highlight the importance of competitors in the process of creating and growing platform business models and thus complements prior platform research that has focused on other stakeholders such as complementors (e.g., Adner, 2017; Adner and Kapoor, 2010; Ceccagnoli et al., 2012; Eisenmann et al., 2011; Kapoor and Agarwal, 2017; Kapoor and Lee, 2013).

The principal mechanisms for developing platform business models identified in our study open new avenues for further inquiry. To facilitate theory building, future platform research could, for example, explore the underlying drivers that motivate multi-sided platforms to undertake hybrids of innovation and imitation. This behavioral stream of research could also take into account the effects of previous motives and feedback from earlier platform performance. The identified hybrid strategy provides a starting point, but future research is needed to fully understand and unpack the process behind the successful hybrid strategy that we discovered.

Third, focusing on changes in the architecture of a platform's activity system, described by design elements (content, structure, and governance), our research reports that the number of design elements and level of interdependence between them has a critical influence on platform performance. Successful platform firms create highly interdependent activity systems with a large number of design elements, and the sheer complexity of an activity system can itself constitute a barrier to imitation. Here, we claim to extend prior organization literature (e.g., Rivkin, 2000; Siggelkow, 2002, 2011) to platform business models to generate plausible, conjecturable explanations for platform success and failure: complexity became a key dimension in our categorization of business model designs (see Figure 3), where high complexity denoted recognition of the linkages between individual ingredients of change and the platform's entire business model or those of competitors (Sorenson et al., 2016). Successful Cases A and B were located exclusively within this complexity category and became market leaders. Simplicity was associated with failure and mere survival.

The introduction of complexity to the platform literature provides a starting point for several avenues for future empirical research. Future research could, for instance, explore the nature of design elements and their interaction in more detail to further enhance understanding of the role of complexity in the evolution of multi-sided platform business

models. Do all design elements interact equally? If not, what elements are more central or core to a platform business model and which ones are more peripheral, and how does the number and identity of design elements influence platform performance over time? Moreover, future research could further test and refine the proposed link between complexity and platform success. We have argued that complexity can provide a basis for competitive advantage in platform battles, but is it possible that complexity may become a burden at later stages of the evolution cycle? For example, the extant business model literature (Christensen et al., 2016; Johnson et al., 2008) suggests that interdependencies between business model elements are well-established at later stages of development, but also generate more resistance to change. Similarly, prior organization literature suggests that tightly coupled systems, or configurations, might limit a firm's ability to react to environmental changes (Levinthal, 1997; Siggelkow, 2001). Considering these observations, is complexity always advantageous? If not, when in the developmental process, and under what conditions, can complexity be a disadvantage for platform firms?

In relation to platform success, future research that focuses on a mature stage of an industry cycle, might also consider profits when studying the performance of platforms. From a business model perspective, in the early stages of the industry cycle, the OGB platforms searched for a scalable business model (using business model innovation and imitation). The key design principle was to stay competitive and secure a market position, even at the expense of profitability. The companies expected that the market would tip in favour of the leading company. A long-run situation developed whereby, echoing Noe and Parker (2005, p. 142), "…profitability is confined to a very small number of Internet winners". The platforms also expected to increase profit margin after achieving a leading position in the long-term that would allow firms to "…gain significant market power and extract most of the value" (Cusumano et al., 2019, p. 145). However, "market share winners will have to pay back

investors eventually" (Cusumano et al., 2019, p. 136) and it is thus reasonable to suggest that at some stage the leading OGB platforms will have to find a business model that makes profits. Therefore, it seems likely that at a later stage of the industry cycle, platforms need to move from the exploration phase (i.e., the discovery and implementation of a scalable business model that takes advantage of network effects) toward the exploitation phase (i.e., the introduction of changes to the business model that make it more efficient and profitable). In our study, Cases A and B were able to achieve a leading market position, thus creating competitive advantage. Whether this competitive advantage is sustainable or not remains to be seen. Future research should therefore explore how the business model of the leading platforms evolves in the next phase of the industry cycle and beyond.

Research on the later stages of the industry cycle could also explore if changes in the nature of consumer demand (e.g., away from preferring a wide variety of deals, as we observed, towards a preference for more specialized offerings) may force the few remaining platforms to re-think their platform strategies, and to possibly focus on niches. Alternatively, platforms may have the opportunity to combine product and platform features (as Amazon did), eventually growing even bigger and enjoying economies of scale – a situation that may, in the limit, even result in a winner-take-all outcome.

Another stream of future research could consider alternative explanations of heterogeneity in platform performance alongside the role of the business model proposed in our study. For example, building on our exploratory, qualitative study, future explanatory, quantitative research could explore how much the business model matters for platform performance relative to more established concepts (choice of market/industry, competitive strategy etc.) proposed in prior platform research (e.g., Cennamo and Santaló, 2013; Cusumano et al., 2019; Hagiu, 2014; Parker et al., 2016).

Finally, case study research must always confront the issue of generalizability, but also the possibility that its limitations may represent research opportunities. Our study investigates twelve cases, one industry, and one country in a world where platform business models vary enormously, and our conclusions must of course therefore remain tentative. However, our deep, yet necessarily narrow, focus may have wider implications, and future research may identify the boundary conditions for our findings. Many platforms build around a technological core (e.g., Apple iOS, Google Android) would seem to share many characteristics of our OGB platforms, i.e., digitally-enabled platforms featuring multi-sidedness, interactive ecosystems, and transparency, but differ in terms of what value is exchanged, how they bring together platform participants, and for what purpose. Using economies of scale as a distinctive feature, Hagiu (2014, p. 80), reminds us that not all platforms are the same: "many, but not all, multi-sided platforms exhibit economies of scale." The OGB industry is a setting where – in comparison to other platform markets – the average costs of serving a user do not radically decline with a growing number of users. While many platforms have low or zero marginal costs when adding users, the OGB firms need to incur significant current costs, e.g. hire more support staff when the number of merchants they serve grows. Therefore, do our findings apply to other digitally-enabled platforms? Future research could also test if our findings apply in traditional industries such as energy or healthcare that are currently undergoing digital transformation, as platform firms begin to enter these industries (e.g., Uber partnered with Circulation to provide rides for patients to hospitals).

Managerial Implications

While many disrupting businesses are built on multi-sided platforms, not all multi-sided platform business models work equally well. In fact, most attempts at developing platform

business model fail or at best become enveloped by competitors. We set out to explore what determines the success of a multi-sided platform business model, and our analysis suggests three implications that entrepreneurs and managers tasked with designing a multi-sided platform business model may consider. First, successful platform designers think systemically and holistically about their business model; they generate interdependencies between the various elements of their business model and focus on the overall design, instead of optimizing single features or add-ons. Second, successful platform designers think about competition when designing their business model; they recognize that platform business models do not operate in a vacuum and consider how their model interacts with those of rivals, using ever advancing data analytic tools. Third, platform leaders use both business model innovation and imitation to create complex business models; they generate a tightly coupled system in which various components bond with one another in complementary and consistent ways, and scale the model quickly.

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FIGURES AND TABLES

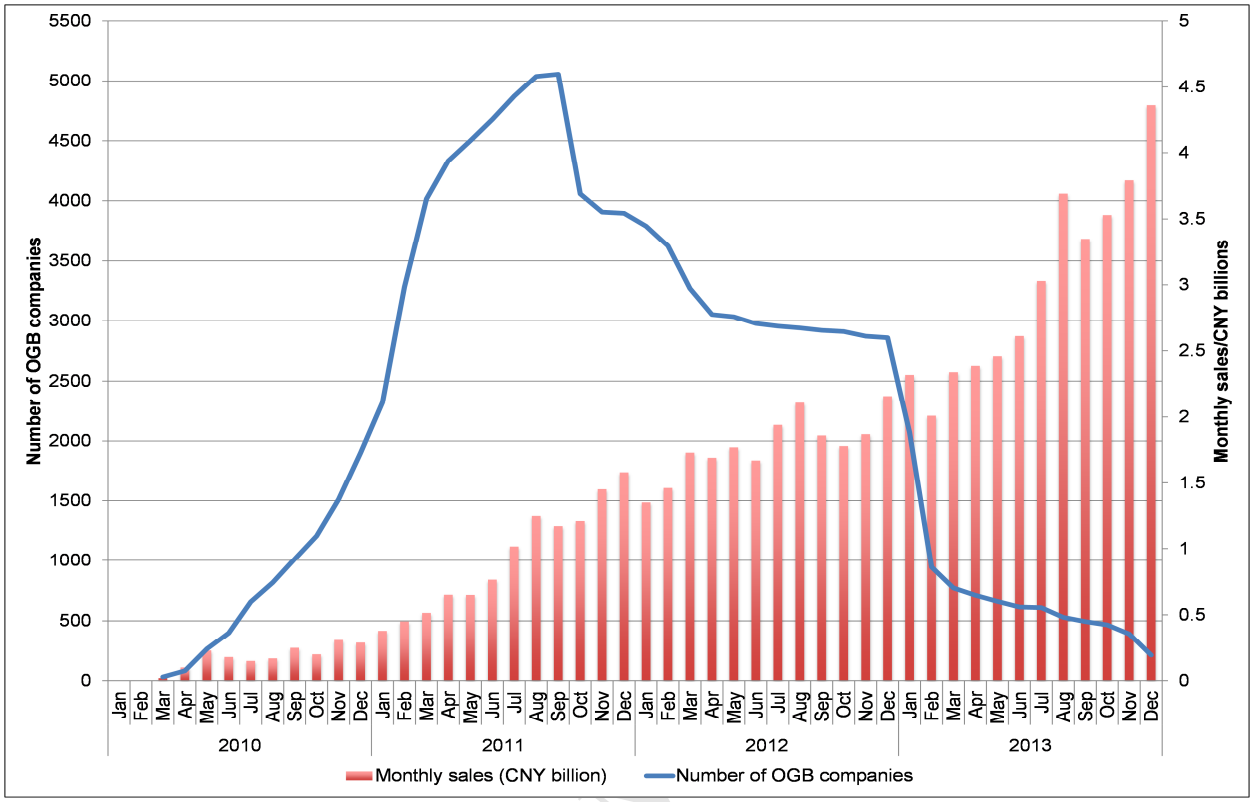


FIGURE 1 Development of the Chinese OGB (Online Group Buying) market between 2010 and 2013 (data obtained from the statistics portal Tuan800).

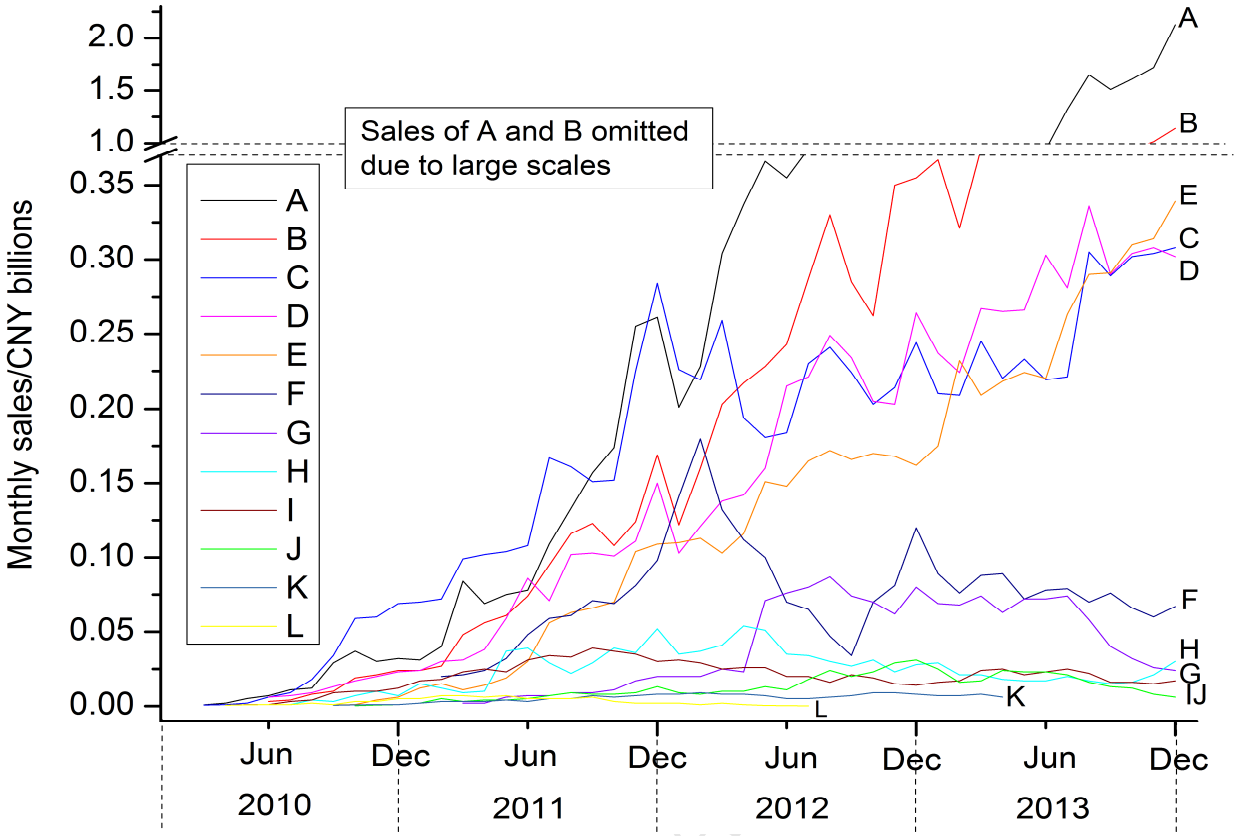


FIGURE 2 Monthly sales of the twelve case companies between 2010 and 2013 (data obtained from the companies).

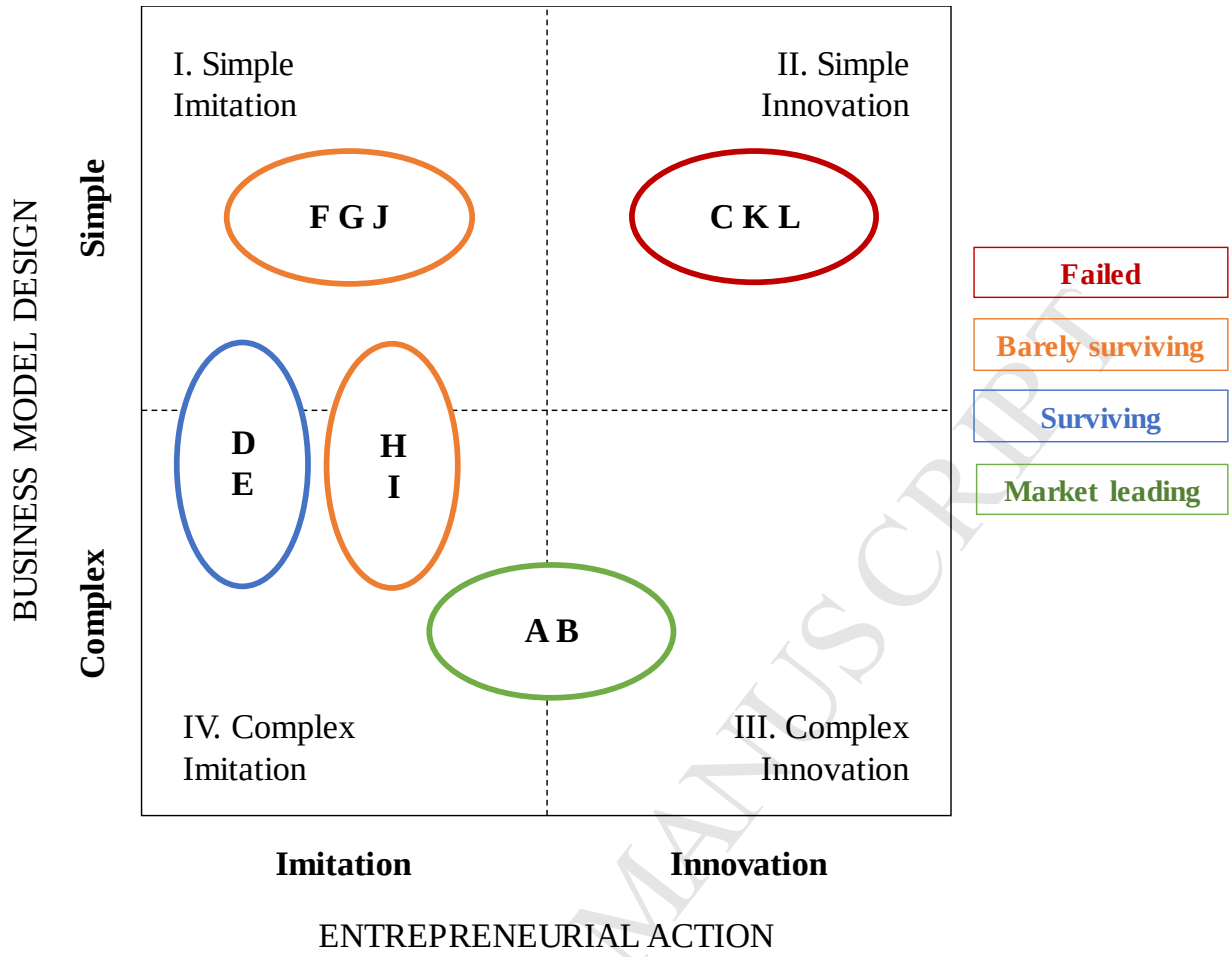


FIGURE 3 Matrix of approaches to platform evolution and strategies to compete in platform battles observed in the Chinese OGB market.

TABLE 1

Comparison of Different Types of Businesses

	Pipeline business	Manufacturing platform	Multi-sided platform
What is the role of the focal firm?	Producer (operating in linear buyer-supplier relationships)	Producer (operating within a network of suppliers)	Intermediary (enabling direct interactions between users)
Who owns the product?	Focal firm (change of ownership after sale)	Focal firm (change of ownership after sale)	Users
How is value created?	Through product features that deliver customer benefits	Through product features (co-developed with a network of suppliers) that deliver customer benefits	Through enabling and facilitating transactions
How is value monetized?	Charging money (e.g., asset sale, usage fee) for product features (single revenue stream)	Charging money (e.g., asset sale, usage fee) for product features (single revenue stream)	Often free for one user group; access or commission fee paid by other users/complementors (multiple revenue streams)
What is the basis of competition?	Product development Price	Product development Price	Business model development
Examples	McDonalds, Rolex, Stihl	Airbus, Boeing, VW	Alibaba, Airbnb, Uber

TABLE 2
Overview of the Cases and Collected Data

Case	Venture Foundation Date	Ownership type	Firm size[1] (At December 2013)	Total sales (From 2010 to 2013)/ in CN¥ billions)	Market share (Based on sales at December 2013)	Collected data[2]	
A	03/2010	Independent firm	>5,500	21.99	48.8%	4 interviews (6.5 hours)	695 pages
B	06/2010	Independent firm	>3,000	12.39	26.2%	4 interviews (6.5 hours)	539 pages
C	04/2010	Independent firm	>2,500	7.64	7.0%	3 interviews (6 hours)	685 pages
D	06/2010	Business unit of Chinese Internet company α (acquired by Chinese Internet company β in 2014)	>1,500	6.64	6.9%	3 interviews (5.5 hours)	565 pages
E	09/2010	Independent firm	>1,000	5.41	7.7%	3 interviews (5.5 hours)	564 pages
F	02/2011	Business unit of a Chinese Internet company γ	60	2.65	1.5%	2 interviews (4 hours)	393 pages
G	03/ 2011	Joint venture between Groupon and a Chinese Internet company δ (shares acquired by δ in 2012)	>1,000	1.45	0.5%	2 interviews (4 hours)	457 pages
H	06/2010	Independent firm	500	1.03	0.6%	3 interviews (5.5 hours)	253 pages
I	04/2010	Independent firm	40	0.89	0.3%	2 interviews (5 hours)	278 pages
J	10/2010	Independent firm	200	0.49	0.13%	2 interviews (4 hours)	272 pages
K	11/2010	Independent firm	0[3] (20 in 2011)	0.18	0	2 interviews (3 hours)	188 pages
L	04/2010	Independent firm	0[3] (15 in 2011)	0.08	0	1 interview (2.5 hours)	145 pages

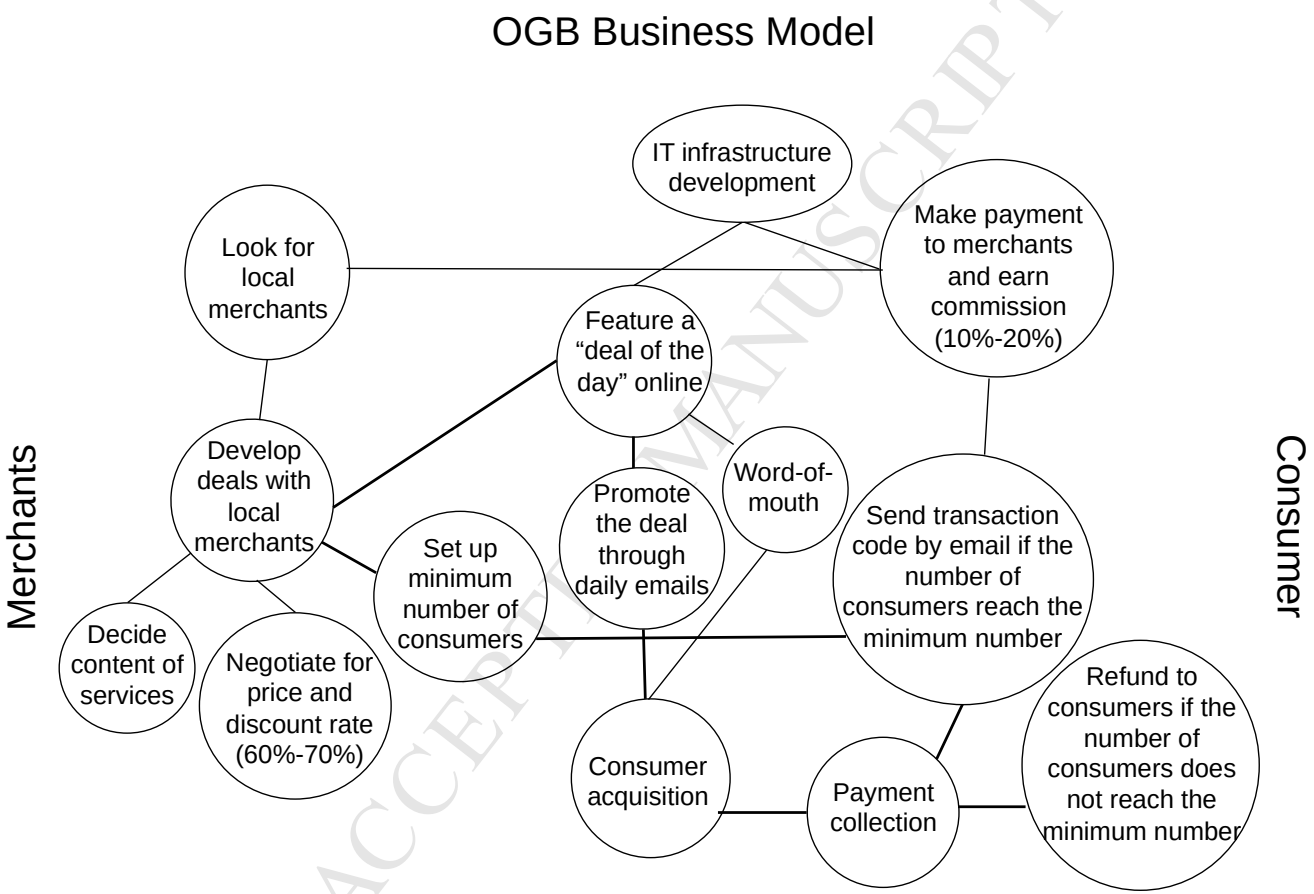
[1] Firm size refers to the number of full-time employees in December 2013.
[2] The number of interviews over the two rounds of interviews. Number of pages includes both transcripts of primary and secondary data.
[3] Cases K and L left the OGB market in 2013 and 2012 respectively.

Cases	Performance	Strategy	Basis of the strategy	Implications of the strategy
C K L	Failed	Innovation-centered strategy to create simple business model designs	• High level of innovativeness. • However, the focal firm typically did not respond to competitors' business model designs, because it was "blinded" by the temporary competitive advantages given by simple innovations.	• Simple innovations are easily abandoned due to their low strategic relatedness with other business model elements. A large number of simple innovations consume time and resources in the short-term and result in a loss of focus in the long-term. • Satisfaction with a simple innovation resulted in losing track of industry trends and accordingly failing to keep up with changes.
F G J	Barely Surviving	Imitation-centered strategy to create simple business model designs	• Ability to monitor rival's activity system and identify specific elements to copy. • However, constrained by a lack of resources and/or competencies, platforms using this strategy were not able to copy more complex sets of design elements.	• Simple imitations saved time and delivered quick results in the short-term. Without continuous development of design elements, however, this positive effect, quickly faded in the long-term. Therefore, the sales performance of the imitators often fluctuated.
D E (H I)[1]	Surviving	Imitation-centered strategy to create complex business model designs	• Strong ability to make sense of design elements in a rival's business model and to decompose its own business model to embrace the new design elements. • However, platforms using this strategy were opportunistic, had a lack of "forward thinking", and less disruptive.	• Complex imitations provided an opportunity to catch up and even surpass competitors in the long-term. • The positive effect of complex imitations was subject to the speed of integration and reconfiguration (Case H and I)[1].
A B	Market leading	Hybrid strategy to create complex business model designs	• A high level of internal disruption was complemented by the ability of developing intelligence about how rivals create value with their business models. • Full awareness of how the design elements come together to reinforce the platform's unique position in the market.	• The series of innovations and imitations formed a complex system of coherent and mutually reinforcing activities. • Once the complex activity system is formed, and continuously evolved, it provided a competitive advantage.

[1]Cases H and I followed imitation-cantered strategy to create complex business model designs but they were barely surviving due to the slow speed of integration and reconfiguration.

APPENDICES

Appendix A Groupon's OGB Business Model.



Appendix B. Business Model Design Elements in Multi-Sided Platforms – Activity Content, Structure, and Governance

Business model design elements		Examples	Platform participants affected by changes
Simple business model design	Activity content	Operated the membership system, in which users paid membership fee to get deeper discounts. (Case A)	Users
		Ran a new website named "E-mall", whereby merchants paid a fixed fee to open their own e-shops. (Case C)	Merchants
		Established a team that aimed to build a mobile payment app to include third party Internet companies in the business model. This new content was viewed as a *"side project"* (Co-founder, Case C) that was not linked to the existing business model. (Case C)	Complementors
	Activity structure	Integrated the social media channels of users, which enabled users to share deals on multiple social media platforms by clicking one button. (Case J)	Users
		Established a feedback loop, providing integrated consumer reviews to merchants. This helped merchants improve services and design of deals. (Case D)	Merchants
	Activity governance	Cooperated with China Unicom to connect OGB accounts with mobile accounts. (Case B)	Users
		An online travel agent provided hotel deals to Case G. (Case G)	Merchants
		Baidu Ads Alliance ads posted on the homepage to earn traffic fees from Baidu (the largest search engine in China). (Case L)	Complementors

Business model design elements		Examples	Platform participants affected by changes
Complex business model design	Activity content and structure	Operated a CRM system, in which users could get refunds for the deals they did not use in store within a time limit. The refund was retained as a revenue stream in the original business model. Although the refunds depleted revenue, this action attracted large numbers of users and saved on advertising expenses. (Case A)	Users
		Integrated social interactions with location-based services through the "check-in" mobile site, social games, and a social interaction platform "Life". Mapped deals according to location of merchants in the mobile app. (Case C)	Users
		Operated a Merchant Service system, whereby merchants could claim payments once certain number of users used deals in the stores. In contrast to the fixed payment term (e.g., 3 months) in the original business model, the flexible payment to merchants expanded the merchant base. (Case A)	Merchants
		Integrated OGB deals with other products including coupons, check-in, key words searching, digital membership card, and seat reservation, in a "total solution" that could be tailored to fit diversified demands of merchants. (Case B)	Users and merchants
		On the one hand, Case I encouraged user interaction and generated big data through the deal sharing page, auction page, user blogs, and communities forming. On the other hand, Case I encouraged merchants to explore user demands (e.g., type of deals that are most attractive to users) on the basis of this big data. Merchants could launch deals on Case I's website in response to user demands. (Case I)	Users and merchants
		Promoted movie deals in an official movie account in WeChat (the largest social media platform in China). Upgraded the channel to sell movie tickets by combining social media marketing with mobile payment. (Case G)	Users and complementors

Business model design elements		Examples	Platform participants affected by changes
Complex business model design	Activity structure and governance	Case K designed products (e.g., clothes) and promoted them to users. Collaborating with a factory, when a certain number of users pre-ordered a product, Case K placed an order with the factory to manufacture it. (Case K)	Users
		Created a merchant database that was opened to all OGB sites. Small and medium sized OGB firms who did not have their own databases could look for merchants in the database and co-develop deals that were promoted through Case I. (Case I)	Merchants and complementors
		Case E was authorized to run the liquor business units of three e-commerce platforms. E provided a total solution to liquor suppliers, i.e., their products could be sold across the platforms. (Case E)	Merchants and complementors
	Activity content, structure, and governance	Ran four inter-related apps that were specialized in catering, movie, hotel, and take-away food delivery markets (activity content and structure). Collaborated with merchants and complementors (activity governance) in each segment to develop new activity content. (Case A)	Users, merchants, and complementors
		Collaborated with shopping malls (activity governance), so that users could try on physical goods (e.g. clothes and shoes) in the malls and then order the goods through Case B to get discounts. This new activity content reversed the sequence of activities, enabling users to try products on before making purchases (activity structure). (Case B)	Users and merchants
		Provide big data to Internet companies (activity governance) through a big data platform (activity content) and created two-way flows of traffic across firms (activity structure). (Case B)	Users and Complementors

Business model design elements		Examples	Platform participants affected by changes
Complex business model design	Activity content, structure, and governance (continued)	Involved local liquor stores and convenience stores in the business model (activity governance), developing an app (activity content) whereby users could order liquor from the stores according to the locations and the stores responsible for delivery. (Case E)	Users and complementors
		Organized a strategic alliance between 200 small and medium sized OGB firms by facilitating communicative meetings and conferences, sharing industry information, providing IT training, and co-creating OGB deals (activity content and governance). Small and medium sized OGB firms had difficulties in attracting merchants providing premium services and products. Case F developed a good relationship with these merchants by leveraging the brand reputation of its parent company. OGB firms then took the job over and crafted deals with the merchants (activity structure and governance). The deals were promoted across the platforms of Case F and the small and medium sized OGB firms (activity structure). (Case F)	Merchants and complementors
		Assisted merchants to open e-shops in WeChat shops (activity governance) and provide a marketing solution (OGB deals, coupons, search engine optimization, map-based promotions, etc.) to promote the e-shops, whereby merchants could choose and evaluate these marketing services in an IT system (activity content and structure). (Case H)	Merchants and complementors

Appendix C. Illustrative Quotes of the Business Model Evolution Patterns

Pattern	Business model design	Entrepreneurial action	Implications for firm performance
	Simple	*Imitation*	
Simple Imitation	"*This (embedding the promotion of deals in the parent company's products) was a single action, possibly the only innovation that did benefit from the resources of the parent company.*" (Founder, Case F) *"Developing the goods deals (a simple imitation) aimed to complement the selling of local deals [...] selling the (good) deals was separated from the OGB business model. The OGB business model focuses on local services. Selling goods deals means that we will have to compete with Tmall and we will never win the war with Tmall. Therefore, it was only a single action to increase the margin in a short-term."* (Co-founder, Case G) "*We didn't take a long time to study the innovation. It was relatively simple to introduce the same activity.*" (Founder, Case J).	*"We have always tried to stay close to the top firms."* (Co-founder, Case G) "*It was not very complicated for us (to imitate) because basically the competitors guided us step by step.*" (Founder, Case F).	"*The sales increased nearly 35% two months after the promotion (embedding the promotion of deals in the parent company's products) was introduced."* (Founder, Case F) *"Selling goods deals means that we will have to compete with Tmall and we will never win the war with Tmall. Therefore, it was only a single action to increase the margin in a short-term." (Co-founder, Case G)* While Case A built up the IT infrastructure through a complex innovation, Case J's understanding of the IT infrastructure is limited to "*the CRM system was crucial to manage the customer relationships*." (Founder, Case J). While Case A created a "no boundary" business model to expand into the movie, hotel, and food-delivery market through complex innovations, Case F's understanding of the innovation is limited to *"sales from the movie deals accounted for a large percentage in the total sales"*. Consequently, the imitation of movie related service *"did not provide a long-term competitive advantage"* (Founder, Case F).

Pattern	Business model design	Entrepreneurial action	Implication for firm performance
	Simple	*Innovation*	
Simple Innovation	"*I had no other choice but to look for quick money to keep the site running. I am very familiar with Baidu Alliance ads. This (the innovation of integrating the Baidu Alliance ads into the homepage to generate traffic fees from Baidu) became my first choice. However, I know this was not a long-lasting move [...] because the Baidu alliance can hardly be linked to the core OGB business (model).*" (Founder, Case L) "*There were a lot of uncertainties with the experiment and it was not like we cannot live without it. So, we did not bet all the effort and resources on it. That is why only a project team was doing the research and development*." (Co-founder, Case C)	"*We were the first (OGB company) who tried to develop the mobile payment system*" (Co-founder, Case C). "*I invented the pre-order business model*." (Founder, Case K)	"*The innovation (Baidu Alliance ads) did not work out*." (Founder, Case L) "*Now when I think about it, they (the simple innovations between late 2011 and early 2012) hardly brought any promising results. Despite all the efforts, we still lost the market share in 2012*." (Manager of the Northern District, Case C) "*We panicked (due to the failure of the firm's IPO), looking for every possibility to make money and to make the financial records look pretty […] we did not know what we were doing; we were kind of lost. The core competitiveness no longer existed*." (Co-founder, Case C)

Pattern	Business model design	Entrepreneurial action	Implications for firm performance
	Complex	*Innovation*	
Complex Innovation	"*The food delivery service is naturally linked to our food and drink deals. It is based on our strength and it reinforces our strength in the segment (foods and drinks).*" (Co-founder, Case A) "*We are not only an OGB company. We can do everything related to local services (movie, hotel, and food delivery).*" (Co-founder, Case A) "*Several steps (innovations) were needed to enable customers to make fast purchase decisions in mobile apps*" (Co-founder, Case B) "*It was a long process to develop the (O2O[1]) platform […] we knew it would be a difficult process that involves a lot of reconstructions, reconfigurations and reintegration*" (Co-founder, Case B)	"*The movie-related businesses were all innovations in the OGB market.*" (Co-founder, Case A) "*We were crystal clear that our business should not be limited to the OGB. We would expand to the O2O* market for sure.*" (Co-founder, Case A) "*No one else was able to develop the O2O[1] platform.*" (Co-founder, Case B)	"*When all OGB companies developed the CRM system, we had the merchant service system. When they copied the merchant service system, we had other systems ready to use. The competitors cannot copy all the systems. They would have missed the best timing even if they can copy them all, because these things (system developments) take time.*" (Co-founder, Case A) "*After the complex innovation was introduced), the relationship with both merchants and consumers was strengthened […] The number of merchants who cooperated with us increased at least 30% in 2011[…] (In 2012), the total solution became the key to attract merchants and consumers. I would say that the total solution is key for winning the market.*" (Finance Director, Case B)

[1]O2O = Online to Offline

Pattern	Business model design	Entrepreneurial action	Implications for firm performance
	Complex	*Imitation*	
Complex Imitation	"*We have come such a long way to design the business model (adapt the SOLOMO elements in the business model). Although the ways of using the (consumer and merchant) databases have changed over time, it is always the elements of social, location and mobile that sits at the core of Case I*." (Founder, Case I) "*We first began by linking the deals to the word-of-mouth and the social media platform-based promotions […] then the check-in was added. When a consumer checks in at one shop, his/her friends receive a notification about which store he/she checked-in and what deals are available at the shop […] This requires a very good integration of the social with the location elements*." (Co-founder, Case D).	"*We knew that Case A built up the CRM system and we learned the system from them, we even did a better job comparing to them […] we made successive improvements that get the most out of the system*." (COO, Case D) "*Case C inspired us to combine the deals with social media. We just happen to have the social media platform that allowed us to add check-ins (to a nearby shop)*." (Co-founder, Case D).	"*You might have noticed this, the boom of deals (revenue per deal) actually started from us. Although Case A and C developed a few deals, the revenue per deal was not very good. When we introduced the first deal that was promoted through the collaboration between us and the social media platform of our parent company, it was a movie ticket deal. CN¥19 for two tickets. We sold (this deal) 300,000 times. It was crazy. Many office workers were buying the deal. Even we did not expect such an amazing outcome.*" (COO, Case D) "*All the moves make sense now […] We cannot achieve location-based promotions without the preliminary work, even though we did not really link our work together before*." (Co-founder, Case E)

Appendix D. Applications of Business Model Evolution Patterns

Case	Illustrative quotes of patterns dominating in the process of competition
A	**Complex innovation:** - "*This (the complex innovation around the restaurant, movie, hotel, and food-delivery)* ***has been the core of our business model development****. See how much time we used to develop the core elements, from 2010 till now (2013).*" (Co-founder, Case A) - "*We knew from the beginning that the company would need the innovations around the IT systems […]* ***we (postponed) many programs and projects at that time.*** *We were afraid of losing the market too. However,* ***we never thought about giving up on the innovations***." (Co-founder, Case A) **Complex imitation:** - "*I always think it does not matter if it is new, what matters is whether it is useful, that is, if customers have a demand for it.* ***Does this idea come from competitors or us? As long as it works, why does it matter****?"* (Co-founder, Case A)
B	**Complex innovation:** - "*Everybody collects consumer reviews, but we are the only one who use the reviews so well. The competitors cannot know what is in our mind - even though they have the data […]* ***our entire business model is based on the collection, analysis, and application of data. This is our strength.***" (Co-founder, Case B) **Complex imitation:** - "*We entered the OGB market later than the others (A and C). There has been a learning process where we explored what they have been doing and what we can do better than they.* ***This has been crucial*** *[…] C introduced location-based services but we can do better, for example, the "search around"-app provided an additional contact point.*" (Co-founder, Case B)
C	**Simple innovation:** - "*I believe that we were the* ***most innovative company*** *in the OGB industry at that time (from 2010 to 2012). We introduced so many innovations that all the OGB companies copied us, even Groupon imitated us.*" (Co-founder, Case C) - "*Now when I think about it, they (the simple innovations between late 2011 and early 2012) hardly brought any promising results. Despite all the efforts, we still lost market share in 2012.* ***We were almost doomed to failure (in 2012)****.*" (Manager of the Northern District, Case C)
D	**Simple and complex imitation:** - "***We were basically a follower in previous years****, although we have done a great job in integrating the business model designs (of the competitors) into our own business model […]* ***we have been especially strong in incorporating social elements in the business model, and location-based elements too.*** *We are still much smaller than Case A but we perform strongly in tier one cities (Beijing, Shanghai, Guangzhou, and Shenzhen). These cities accept our business model and brand image quiet quickly.* ***That's how we compete and will keep competing with Case A.***" (Co-founder, Case D)

E	**Simple and complex imitation:** - "*This (total solution for liquor sellers) (a complex imitation) is similar to the customer relationship management of the others (OGB firms). The principles (of designing the business models) are the same (between E and competitors).* ***Managing the supplier (one side of the platform) relationships determines our survival or death.*** *I am sure you understand this. We will have nothing to sell if there are no suppliers*." (COO, Case E)
F	**Simple imitation:** - "*I do not understand why people have so many negative feelings about imitation. Being ashamed about imitation is like being ashamed about tracking the development of the industry.* ***We did a few imitations. Some of the imitations worked well. Why is introducing a similar activity as a defense wrong?***" (Founder, Case F)
G	**Simple imitation:** - ***"We have always tried to stay close to the top firms (competitors)."*** (Co-founder, Case G) - "*We copied it (an innovation of Case A) because we were afraid of being left out in the industry*." (Co-founder, Case G)
H	**Simple and complex imitation:** - "*Case A kind of set up the rule in the industry.* ***We just accepted it very quickly.*** *There were not too many things to think about really*." (Founder, Case H) - "*Why not (copying the innovation)? Everybody has been providing multi-deals. It had been a couple of months since the innovation was introduced. The business model of multi-deals per day had proven its success in the market.*" (Marketing Director, Case H) - "*Developing the total solution to target the WeChat shops (a complex imitation) has been the most crucial task of this year (2013).* ***This is the only chance for us to continue doing business in this industry or even possibly take a leading position.***" (Founder, Case H)
I	**Simple and complex imitation:** - "*I am a big fan of the C2B (business model) (a complex imitation). To me, the nature of doing business is to understand customer demands. Customers may not know what products/services they really desire ten or twenty years ago. (However,) everybody has demands and can tell people what the demands are today.* ***This has been my motivation of developing the business model and how we differentiate from the traditional OGB sites (the competitors).***" (Founder, Case I)
J	**Simple imitation:** - "*Separating the goods deals from local service deals (a simple imitation) contributed a lot to the sales in the beginning of 2011.* ***That was how we survived the fierce competition in early 2011.***" (Founder, Case J) - "***We mostly focused on defending (using imitations).***" (Founder, Case J)

K	**Simple innovation:** - "*I don't feel comfortable to transform the business model every day.* ***We are a small, niche OGB site that focuses on a specific business model (a simple innovation).*** *We had three employees, including me, at the beginning. I need to spend time on refining the details of the business (at the operational level), not on changing the business model every day*." (Founder, Case K)
L	**Simple innovation:** - "*I am a software engineer. All the things (innovations) I do (develop) are based on software engineering.* ***The OGB aggregator (business model) is simple and clear to me.*** *I noticed the other business models like Tuan800 (a follower that further developed the OGB aggregator business model) that has a social community (but) we were completely confident about our business model; we felt no changes were required.* ***The aggregator (business model) was the baseline.***" (Founder, Case L)

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