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Digital attrition: The negative implications of the sharing economy for the digital options of incumbent firms

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Abstract

One of the key competitive advantages of sharing economy platforms stems from their superior IT capabilities, which enable operations that are more efficient and/or effective than the incumbent firms. However, given that many of the incumbents tend to be established market leaders or resource-rich multi-nationals, their general inability to acquire the appropriate digital options (ie, the IT capabilities that enable the launch of, and response to, competitive actions) to meet the challenge of the sharing economy platforms is puzzling. This study explores this phenomenon by posing the research question: How do the "forces at work" associated with the sharing economy paradigm impact the digital options of incumbent firms? Based on the case of Qiangsheng Taxi and how its IT capabilities have been affected by the emergence of ridesharing platforms, the evidence uncovered suggests that the sharing economy can influence the digital options of incumbent firms through a process of digital attrition, which may be induced by a blend of unfavorable contextual influences (ie, an unbalanced regulatory regime, evolving market preferences and the resourcing advantages of sharing economy platforms).

The order of authorship is alphabetical; Tian Meng and Evelyn Ng contributed equally to this work.

A framework is inductively derived from the data collected that depicts digital attrition as a process of three phases: (a) deinstitutionalization, (b) technological incapacitation, and (c) competitive erosion. In doing so, our study suggests that digital attrition may culminate in IT-induced competitive disadvantages for incumbent firms, which in turn, could exacerbate the unfavorable contextual influences to complete a vicious cycle that reinforces the negative influence of the sharing economy even further.

KEYWORDS
case study, digital attrition, digital options, ridesharing, sharing economy, taxi industry

1 | INTRODUCTION

The sharing economy is defined as the information technology (IT) facilitated "peer-to-peer model for commercial or non-commercial sharing of underutilized goods or service capacity through an intermediary without transfer of ownership" (Schlagwein, Schoder, & Spindeldreher, 2020, p. 827). It is a paradigm for consumption that has gained prominence over the last decade, to the point where analysts believe that the size of the global sharing economy sector will reach US$335 billion by 2025 (see Marchi & Parekh, 2015). The main drivers of its rise are the numerous benefits that the sharing economy is expected to generate. These include the increased convenience and the elimination of ownership costs required for the consumption of a product/service for consumers, the reputational benefits for suppliers and intermediaries, as well as waste reduction and the opportunity to increase social connections for society at large (Puschmann & Alt, 2016; Schor, 2016). However, while the sharing economy was heralded as an economic, environmental and social game-changer when it first entered mainstream consciousness (see The Economist, 2013), the enthusiastic prognostications of its potential have been tempered by the reality of its development since (Schlagwein, Cecez-Kecmanovic, & Hanckel, 2019). In particular, there is a growing realisation that the sharing economy can lead to the exploitation of labour (eg, unsafe working conditions and lower than minimum wages), the paradigm may fare poorly in checking undesirable provider and consumer behaviours (eg, sexual harassment by Uber drivers/passengers) and its positive ecological impact may be overstated (Rinne, 2018).

Reflecting the growing awareness of these issues, a number of scholars within academia have now turned their attention to examining the potential negative implications of the sharing economy and offering prescriptions on mitigating its "dark side" (eg, Malhotra & Van Alstyne, 2014; Rinne, 2018). But in spite of their academic and practical significance, these emerging works tend to be either unsubstantiated empirically (eg, Kathan, Matzler, & Veider, 2016; Schor, 2016), or have treated the mechanisms through which the implications arise as a "black box" (eg, Chang & Sokol, 2020; Zervas, Proserpio, & Byers, 2017). In addition, the sharing economy may negatively impact the traditional industries that it is transforming as well (Constantiou, Marton, & Tuunainen, 2017), precipitating the loss of revenue and jobs or even the exit of incumbent firms (Zervas et al., 2017). However, there have been only a handful of studies undertaken from the perspective of these incumbent firms, and the mechanisms that underlie the negative influence of the sharing economy on these firms have not been adequately studied.

In particular, it is widely acknowledged that one of the key advantages of sharing economy platforms is their superior technological capabilities that enable operations that are more efficient and/or effective than the incumbent firms (Cramer & Krueger, 2016; Parente, Geleilate, & Rong, 2018). Nevertheless, given that many of the incumbents tend to be either established market leaders or resource-rich multi-nationals, their general inability to acquire the

same technological capabilities to meet the challenge of the sharing economy platforms is puzzling (see Chang & Sokol, 2020; Kim, Baek, & Lee, 2018). This suggests that there are "forces at work" that are constraining the incumbent firms' digital options (see Vial, 2019), defined as the IT-enabled capabilities that enable a firm to launch competitive actions in response to environmental opportunities and threats (Sambamurthy, Bharadwaj, & Grover, 2003). The nature and basis of these forces, however, have not been the subject of study to date. Addressing this research gap is important if the incumbent firms are to develop effective counter-measures to the challenges and threats that they are facing (Zhang, Kolte, Kettinger, & Yoo, 2018).

Based on the case of Qiangsheng Taxi, the oldest and largest taxi company in Shanghai, China, whose longstanding market leadership was adversely affected by the emergence of ridesharing platforms such as Didi (see Cohen & Kietzmann, 2014), our aim is to develop a theoretical framework that addresses the research question: How do the "forces at work" associated with the sharing economy paradigm impact the digital options of incumbent firms? In doing so, we expect that our study will enrich the existing knowledge of the dark side of the sharing economy by providing an in-depth view of how the sharing economy paradigm affects the technological capabilities and competitiveness of the incumbents. This will contribute toward a more holistic understanding of the overall impact of the phenomenon (Schor, 2016). Beyond its academic implications, our study will also provide indications for practice on how to mitigate these negative implications, so that the incumbent firms can continue to co-exist or even thrive in spite of the inexorable rise of this new consumption paradigm.

2 | LITERATURE REVIEW

2.1 | The sharing economy and its implications

The sharing economy, also commonly referred to as collaborative consumption or access-based consumption (Mittendorf, Berente, & Holten, 2019), is based on the principle of sharing access to products and services in peer-to-peer (P2P) markets (Hartl, Hofmann, & Kirchler, 2016). This principle of sharing in itself is not new (Belk, 2014): the sharing of forestry machinery and the services of public libraries, for example, are manifestations of the principle in the business-to-business (B2B) and business-to-consumer (B2C) domains, respectively (Puschmann & Alt, 2016). The extension of the principle of sharing into the P2P domain, however, is a relatively recent development that is driven by economic crises and an increasing awareness of the importance of protecting the environment (Hartl et al., 2016). The benefits of this development have been extensively discussed in the literature. For instance, Hamari, Sjöklint, and Ukkonen (2016) suggests that the sharing economy has the potential to alleviate a host of societal problems such as pollution, poverty and hyper-consumption by lowering the costs of coordinating the supply of assets and services within communities. In a similar vein, Puschmann and Alt (2016) argue that the sharing economy not only generates benefits for consumers, but for suppliers and intermediaries as well. For the former, the benefits include increased convenience, lower consumption costs and the fulfilment of the consumer's social ambitions due to its economic and ecological benefits. For the latter, the benefits are the revenue possibilities associated with new business models, as well as reputational effects and an enhanced brand image (Hawlitschek, Stofberg, Teubner, Tu, & Weinhardt, 2018).

The sharing economy is made possible by advances in information and communications technology (ICT), changing consumer preferences, the proliferation of collaborative web communities, as well as the emergence of social commerce (Hamari et al., 2016). In particular, sharing economy businesses tend to be digital platforms that are based on an online website and/or a mobile app (Barann, Beverungen, & Müller, 2017). These platforms can be classified into four categories arranged in a 2×2 matrix depending on whether they are for-profit or not-for profit, and whether they have a P2P or B2C business model (see Schor, 2016). Of the four categories, the for-profit/P2P platforms have arguably been the most visible with the greatest economic impact: platforms such as Uber and Airbnb that fall under this category have become multi-billion-dollar businesses that are operating in numerous countries

across the globe (currently 60 and 191 countries/territories, respectively). As a result, this category of platforms has received the most research attention (eg, Cramer & Krueger, 2016; Zervas et al., 2017) and studies conducted in the context of these platforms form one of the most vibrant research areas in the current literature. These studies, in turn, can be classified into three main research themes (refer to Table 1).

The first theme is centered on the industry and macro-environmental implications of the sharing economy. Studies that fall under this theme include that of Martin (2016), who examined the existing discourse surrounding the sharing economy and found that the phenomenon is typically framed as a combination of an economic opportunity, a more sustainable form of consumption and a pathway to a decentralised, equitable and sustainable economy. Conversely, the sharing economy may also be criticised for creating unregulated marketplaces, reinforcing the neoliberal paradigm and being an incoherent field of innovation. Adopting a more specific focus, Zervas et al. (2017) investigated the impact of Airbnb on the incumbent hotel industry and found that the sharing economy platform reduced the revenue of traditional hotels by 8% to 10%, with lower-priced hotels and hotels that do not cater to business travellers the most affected. They argue that this impact is mostly due to lower prices on Airbnb and is most pronounced when there is a spike in demand, suggesting that sharing economy platforms have an advantage in terms of their ability to flexibly scale their supply to meet demand.

The second theme is related to the operations of the sharing economy platforms, which include studies on the platforms' strategies and business objectives as they evolve along their developmental trajectory. To cite one example, Tan et al. (2017) describe how sharing economy platforms can develop a product-service system to resolve the tensions between the competing institutional logics (ie, its prosocial and business objectives) that are imposed upon them by the consumption paradigm, and suggest that a platform should first emphasise its pro-social objectives before ensuring business viability and, finally, striking a balance between its profit and pro-social motivations. In a separate study, Akhmedova et al. (2020) prescribes three strategies that sharing economy platforms should enact to align themselves with market demands, which are to (a) build trust by enhancing interactions, (b) enhance the ease and efficiency of transactions and (c) improving the customers' online experience.

The third theme is centered on the behavioural implications of the consumption paradigm for the consumers and suppliers of the asset or service being shared. As an example of the former, Fraiberger and Sundararajan (2017) suggest that in the case of P2P rental markets, below-median income consumers tend to use the services of the platforms more. Consequently, these customers would enjoy a disproportionate share of the eventual welfare gains through broader inclusion, higher quality rental-based consumption and new ownership facilitated by rental supply revenues. As an illustration of the latter, Lutz and Newlands (2018) demonstrate based on their study of Airbnb that the variety of goods or services available on a sharing economy platform may create consumer segments with distinct needs. Consequently, the providers of those goods or services will have to tailor their approaches to marketing their offerings and meet those needs for matching efficiency.

Overall, our review of the existing literature suggests that while the implications of the sharing economy paradigm have attracted considerable research attention to date, having been variously studied at the individual, organisational and industry levels, an overwhelming majority of the existing studies are conducted from the sharing economy platforms' perspective. The problem with this one-sided view is that it presents only half the story on the overall implications of the consumption paradigm, and casts them in a predominantly positive light (Malhotra & Van Alstyne, 2014). This neglects its negative impact on the incumbent firms (Constantiou et al., 2017; Zervas et al., 2017), some of which may play important economic and societal roles (Cramer & Krueger, 2016) that may be diminished if they do not survive competitive selection. There is only a limited number of studies that have been conducted from the perspective of the incumbent firms that the sharing economy platforms are displacing, and even among these studies, the impact of the sharing economy is typically treated as a "black box." Opening the black box to study the precise nature of these mechanisms would be the first step to establishing a new competitive equilibrium between the incumbent firms and the sharing economy platforms, so that the incumbent firms' economic and societal contributions, as well as the resources invested in them, may be preserved.

TABLE 1 Selected studies on the implications of sharing economy platforms

Source	Key findings/arguments/prescriptions
Theme 1: Industry and macro-environmental implications of the sharing economy	
Martin (2016)	The sharing economy may be framed as a combination of an economic opportunity, a more sustainable form of consumption and a pathway to a decentralised, equitable and sustainable economy. But at the same time, the sharing economy may also be criticised for creating unregulated marketplaces, reinforcing the neoliberal paradigm and being an incoherent field of innovation.
Chang (2017)	There is a substitution relationship between the services of Uber and taxis. By examining the capacity utilisation and operating miles, it is revealed that the negative implications of Uber on taxi revenue are associated with the reduction in the operating miles of taxi drivers.
Zervas et al. (2017)	The sharing economy (Airbnb) has reduced hotel revenues by 8% to 10% in Austin, Texas, where the supply of Airbnb is the highest. In addition, the impact is non-uniform, with lower-priced hotels and those hotels not catering for business travellers being most affected.
Chang and Sokol (2020)	The sharing economy in the context of the hotel industry has made the industry more heterogeneous. Low quality hotels tend to compete on price with the sharing economy platforms, while higher quality hotels have increased their service quality and prices, differentiating themselves by occupying the higher end of the lodgings market instead.
Theme 2: Operations of the sharing economy platforms	
Piscicelli, Cooper, and Fisher (2015)	Platforms have to align themselves with the values and preferences of their consumers to achieve business viability, but highly differentiated business models will still find it difficult to achieve mainstream acceptance due to highly established consumption norms and existing policy and legislation frameworks.
Tan, Cahalane, Tan, and Engelert (2017)	A sharing economy platform must strike a balance between competing institutional logics in order to establish a viable business model. This can be achieved through the development of a product-service system in sequence of steps, including (a) amplifying pro-social objectives, (b) ensuring business viability and (c) blending market and social logics.
Muñoz and Cohen (2017)	There are five ideal business models that are especially viable for sharing economy platforms. They are centered on intermediation, resource optimization, resource ownership, localization and altruism, respectively.
Akhmedova, Marimon, and Mas-Machuca (2020)	Customer loyalty is especially important for sharing economy platforms because they have less control over the quality of the products and services they offer. The strategies the platforms can adopt to ensure customer loyalty include building trust by enhancing interactions, increasing the ease and efficiency of transactions, and improving the customers' online experience.
Theme 3: Behavioural implications of the sharing economy for suppliers and consumers	
Fraiberger and Sundararajan (2017)	The use of P2P rental markets is significantly more pronounced for below-median income customers. These customers will enjoy a disproportionate fraction of eventual welfare gains from this form of the sharing economy through broader inclusion, higher quality rental-based consumption and new ownership facilitated by rental supply revenues.
Kim et al. (2018)	As a result of the sharing economy, traditional service providers have had to transform their operations by increasing the scope and intensity of their services to maintain their revenue and market position. In doing so, consumers enjoy greater convenience and accessibility to services.
Lutz and Newlands (2018)	Within a single sharing economy platform, the variety of offerings can result in distinct consumer segments based on demographics and behavioural criteria.

(Continues)

TABLE 1 (Continued)

Source	Key findings/arguments/prescriptions
	Consequently, asset or service providers have to use the appropriate means of marketing to the various consumer segments or there will be reduced matching efficiency.
Xu (2020)	Consumers' perceptions and behaviours are profoundly shaped by the sharing economy. More specifically, when participating in sharing, the consumers' valuation of their experience shifts from more to less tangible attributes. They care more about social interaction and economic value than traditional consumers.

For instance, Chang and Sokol (2020) looked at how traditional hotels responded to the emergence of Airbnb and found that hotels tend to respond differently based on the quality of their positioning (ie, low vs high quality hotels). The exact nature of Airbnb's influence, however, was beyond the scope of their study. In other words, while they were able to reveal the impact of Airbnb on the hotels, our understanding of "how" (Walsham, 1995, p. 74) the platform affects the hotels remain limited. In another study, Chang (2017) discovered that following the entry of Uber in Taiwan, taxi revenues were reduced by approximately 12% in the first year and 18% in the third year. Here too, the underlying reason proffered for these findings is speculative (ie, a substitution effect) and has been contradicted in other studies (see Kim et al., 2018). Similarly, Geissinger, Laurell, and Sandström (2018) found that the scope of the sharing economy's impact is expanding from the transportation and accommodation sectors to others such as on-demand services, fashion and clothing and food delivery. Once again, while the effects of the consumption paradigm on the incumbent firms within these industries have been demonstrated and ascertained, there remains limited knowledge on the underlying mechanisms through which these effects are actualized.

Second, there is general consensus that one of the main competitive advantages of sharing economy platforms lies in their superior technological capabilities (Cramer & Krueger, 2016; Parente et al., 2018). To cite just one example, Kathan et al. (2016, p. 664) assert that "the success of sharing models mostly lies in the ubiquity of the Internet and other associated technologies, which makes sharing possible at scale". But given that many of the incumbent firms that are being displaced by sharing economy platforms tend to be large, resource-rich organisations that have held market leading positions prior to the inception of the new consumption paradigm, the fact that many have not developed or acquired the same technological capabilities over time to compete with the sharing economy platforms is especially curious (see Chang & Sokol, 2020; Kim et al., 2018). This suggests that there are constraints on the digital options (ie, the technology-enabled means of launching and responding to competitive actions—see Sambamurthy et al., 2003) of these incumbent firms, which may stem from environmental influences, or be deliberately or unconsciously self-imposed (see Vial, 2019). Nevertheless, to best of our knowledge, of the studies that have been conducted from the perspective of the incumbent firms, none have explored the relationship between the sharing economy paradigm and its effect on the digital options of these firms. We contend that this knowledge gap is important to address because of its profound implications for practice—if the incumbent firms are able to co-exist or thrive alongside the emergence of the sharing economy, the benefits are likely to be immense in terms of the sustained economic and societal contributions of these firms (see Zervas et al., 2017), as well as the increased convenience and access to products or services for consumers (Kim et al., 2018). In addressing this knowledge gap, the understanding our study will generate will represent an initial step toward helping the incumbent firms realise those benefits and meet the competitive challenges of the sharing economy platforms. As we are exploring the influence of the sharing economy on the digital options of the incumbent firms, we turn to the literature on digital options as the starting point of our inquiry. Thus, we aim to construct a theoretical lens that will serve as "a complicated sensing device to register a complicated set of events" (Weick, 2007, p. 16).

2.2 | Theoretical foundation: Digital options theory

The concept of digital options has its roots in real options theory, where options refer to "rights to future investment choices without a current obligation for full investment" (Sambamurthy et al., 2003, p. 247). With an option, a firm is making a small investment to acquire and hold an action potential, which can be exercised when the time is right (eg, the emergence of a market opportunity) to gain a sustainable competitive advantage over its competitors (Bowman & Hurry, 1993). In the context of information systems, digital options stem from investments in IT capabilities that add to a firm's repertoire of potential competitive actions (Overby, Bharadwaj, & Sambamurthy, 2006). Practitioners are encouraged to carefully consider their firm's current capabilities and expectations regarding future market opportunities, assess and bundle digital options into potential investment alternatives, and pursue those alternatives selectively (Sandberg, Mathiassen, & Napier, 2014).

More specifically, there are four types of digital options that can be created corresponding to the reach and richness of a firm's knowledge and processes when investments in IT capabilities are made (Overby et al., 2006; Sambamurthy et al., 2003). The first is digitised process reach, defined as the extent to which a firm deploys common, integrated and connected IT-enabled processes. High reach is associated with processes that tie activity and information flows across departmental, functional, geographical and inter-organisational units (eg, ERP and CRM systems). A second type is digitised process richness, which is related to the quality of information collected about transactions in the process, the transparency of that information to other processes and systems that are linked to it, and the ability to use that information to re-engineer the process (eg, systems related to decision support and data analytics). A third type of digital option is digitised knowledge reach, defined as the comprehensiveness and accessibility of codified knowledge in a firm's knowledge base, and inter-connected networks and systems for enhancing interactions among individuals for knowledge transfer and sharing (eg, intranets and knowledge repositories). The fourth and final type is digitised knowledge richness, which refers to systems of interactions among organisational members to support sensemaking, perspective sharing and the development of tacit knowledge (eg, video-conferencing systems, collaborative systems). The digital options give rise to enterprise agility (Marcinkowski & Gawin, 2019), which refers to a firm's ability to consistently detect market opportunities and seize them with speed and surprise with the launch of "many and varied competitive actions" (Sambamurthy et al., 2003, p. 237). This will enable a continuous stream of temporary competitive advantages over time (Eisenhardt & Sull, 2001).

From a different perspective, Sandberg et al. (2014) suggest that digital options may exist in three different states: (a) available, (b) actionable and (c) realised. Available digital options refer to IT capability investment opportunities in an option bundle that await recognition. Actionable digital options, on the other hand, are IT capability investments that have been examined and found to be both attractive and viable. Finally, realised digital options refer to IT capability investments that have been made. Moreover, in an attempt to address the residual questions in Sambamurthy et al.'s (2003) initial conceptualization of digital options related to how the current and future IT capabilities of a firm should be managed (Singh, Mindel, & Mathiassen, 2017), Sandberg et al. (2014) suggests that there is a need to analyse the information requirements of a firm's business processes in deciding the IT capability investments to make and digital options to acquire. The three dimensions of information requirements that have to be accounted for include (a) connectivity, which refers to the extent to which information must be shared between the entities of a firm, (b) uncertainty, which is defined as the availability and reliability of information needed to execute business processes and (c) equivocality, which refers to the complexity and ambiguity inherent in the information processing required in support of a firm's operations.

A more recent development in the literature on digital options is the conceptualization of digital debt by Rolland, Mathiassen, and Rai (2018). Digital debt is framed as the antithesis of digital options, defined as the accumulation of technical and informational obligations that hamper the maintenance and evaluability of systems and pose performance risks to a firm's business processes. As this definition implies, digital debt consists of technical and informational debt. The former refers to shortcuts taken by firms in the design, development and implementation of systems that "reduce system reliability and create long-term maintenance obligations" (Banker, Liang, & Ramasubbu, 2020,

p. 3174), while the latter refers to the content inconsistencies and gaps that are embedded in a firm's digital infrastructures and work processes. Rolland et al. (2018) argue that digital debt may have to be resolved before the digital options of a firm can be made actionable, but at the same time, the reluctance to take on digital debt may prevent a firm from realising otherwise beneficial digital options. Moreover, while digital options may offer the means of resolving the digital debt of a firm, an over-eagerness to realise digital options may conversely lead to the undue accrual of digital debt.

Overall, the literature on digital options is especially appropriate for guiding our inquiry since we are exploring why incumbent firms are finding it challenging to invest in IT capabilities, and thereby acquiring the appropriate digital options, to compete with the technological superiority of the sharing economy platforms. Applying the knowledge from this domain as a theoretical lens to analyse the case of Qiangsheng Taxi, a theoretical framework is inductively derived to address the research question set forth at the beginning of the paper.

3 | RESEARCH METHOD

An interpretive case study employing grounded theory techniques is adopted for our study because this research approach is ideal for addressing "how" and "why" research questions (Walsham, 1995), examining mechanisms and processes (Urquhart, Lehmann, & Myers, 2010), and studying phenomena where little is currently known (Corbin & Strauss, 2015), which are all conditions that are relevant to our study. In particular, this approach would be especially likely to generate insights that are relevant to our research objectives because it facilitates the inductive derivation of theoretical concepts related to the phenomenon under examination (ie, the influence of the sharing economy on the digital options of incumbent firms), while simultaneously accounting for the context in which the phenomenon is embedded (Strong & Volkoff, 2010).

To address our research question, we identified two criteria for case selection. First, the selected organisation should be an incumbent firm whose business has been severely affected by the sharing economy. The extent of severity is important because we are aiming to reflect the potential magnitude of the negative implications of the sharing economy for the performance of incumbent firms. Second, the selected organisation should be a commercially successful business and a market leader within the industry prior to the inception of the sharing economy. This is to rule out possible alternative explanations for the failure to develop or acquire the appropriate digital options that we may uncover (eg, a lack of resources). The case of Qiangsheng Taxi is particularly appropriate for our study because not only is the firm the oldest and largest taxi company in Shanghai, but its historically viable taxi business has seen its revenue drastically diminished since the inception of ridesharing in 2012. In addition, it has not been able to improve its competitive position despite the introduction of a number of IT-enabled initiatives (which we will discuss in Section 4). This makes Qiangsheng a revelatory or extreme case (Gerring, 2009) for the purpose of our study. Table 2 summarises how we applied the principles for interpretive field research, as proposed by (Klein & Myers, 1999), to our study of Qiangsheng Taxi.

3.1 | Data collection

Data was collected in two phases. In an initial preparatory phase that lasted from April to May 2018, we gathered data from a variety of secondary sources including news articles, internal corporate documents and industry reports. The information from these "nontechnical" (Strauss & Corbin, 1998, p. 52) sources was used to enhance our knowledge of Qiangsheng (ie, its strategies, operations and business performance) and the traditional taxi industry, which formed the basis for formulating our subsequent interview questions (Darke, Shanks, & Broadbent, 1998; Davison, 2021). The preparatory phase was followed by a field visit phase that spanned June 2018 and involved a team of four researchers. The advantage of involving multiple researchers is that we were able to triangulate our

TABLE 2 Application of principles for interpretive field research

Principle & evaluation criteria	Application of principle in our study
Fundamental principle of the hermeneutic circle - Requires iterating between considering the interdependent meaning of parts (ie, individual and partial accounts) and the whole that they form.	Interviews were conducted with informants representing the organisation's top management, IT function and various business units. These informants were key stakeholders of the groups they represented, and could describe the groups' perspective of the phenomenon under study. Interviews were also conducted with a number of taxi drivers and external industry analysts to access a greater diversity of views. This diversity allowed us to integrate a myriad of perspectives to form a holistic understanding of the phenomenon.
Principle of contextualization - Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.	Each interview was conducted with the help of an interview guide that had a standard core of questions pertaining to the emergence of the sharing economy and its implications for the development of Qiangsheng's business over time. These questions, repeated across all the interviews conducted, allowed us to gain an in-depth understanding of the case organisation and the environmental context in which it operates.
Principle of interaction between researchers and subjects - Requires critical reflection on how the research materials (or data) were socially constructed through the interaction between the researchers and participants.	An iterative interview strategy was employed where the investigating team would reflect on the findings from one interview, and formulated new/refined existing questions for use in the subsequent interviews. Informants were offered the option of anonymity at the start of each interview to encourage free expression. Findings were also checked repeatedly with our informants to verify our interpretation of the data.
Principle of abstraction and generalisation - Requires relating the idiographic details revealed through the application of Principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.	A theoretical framework consisting of concepts that are adapted from the literature or inductively derived from the data was iteratively developed as part of the theory building objective of our study. The assumption is that the framework would be generalizable beyond the research setting and can be verified or extended in future replication studies. Our data were also systematically coded using a data structure to map them to the concepts of our framework. In doing so, the way that our concepts were inductively derived is clarified.
Principle of dialogical reasoning - Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tells") with subsequent cycles of revision.	Our emergent conceptualization was revisited after each instance of data collection and analysis. By critically reflecting on our conceptualization and challenging our own assumptions, we were able to reveal contradictions in our interpretation and the data to refine the emergent theoretical framework iteratively. For instance, many of the forces that influenced the digital options of Qiangsheng stemmed from factors that were not discussed in the existing literature. This process of critical reflection enabled us to clarify these findings and gain confidence in the validity of our theorising.
Principle of multiple interpretations - Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same	We triangulated our findings by ensuring that we had converging data from a variety of different sources. When there was conflicting information, we would conduct follow-up interviews to clarify the divergent

(Continues)

TABLE 2 (Continued)

Principle & evaluation criteria	Application of principle in our study
sequence of events under study; similar to multiple witness accounts even if all tell it as they saw it.	views. When the conflict cannot be resolved in a straightforward manner, data will be gathered from additional sources so as to ascertain the validity of the conflicting accounts. For instance, Qiangsheng's management described a number of welfare initiatives, which were disputed by one taxi driver but confirmed by two other taxi drivers and a number of other informants.
Principle of suspicion - Requires sensitivity to possible "biases" and systematic 'distortions' in the narratives collected from the participants.	The data obtained from primary sources were checked against secondary data to ensure that there were no biases and systematic distortions in the information we were receiving. To illustrate, the scale of Qiangsheng's IT investments reported by the informants was checked against the expenditures reported in the financial reports of the firm.

Note: Refer to Klein and Myers (1999).

observations and interpretations of the data we were collecting (Klein & Myers, 1999). As part of this phase, we visited the headquarters of Qiangsheng to conduct interviews with representatives from the organisation's top management, IT function and various business units (eg, Asset Management and Human Resource [HR] departments). The informants were identified via chain referral sampling (see Biernacki & Waldorf, 1981) based on a set of preliminary interview questions that we sent in advance to our "gatekeeper" (Pan & Tan, 2011, p. 165) within the organisation. This method of identifying informants was adopted because we, as external researchers, did not possess enough inside information to independently identify the most appropriate informants for our interview questions (Pan & Tan, 2011).

We conducted all the interviews based on semi-structured interview guides (see Appendix A for a sample) that were designed based on the pertinent themes in the literatures on digital options and the sharing economy. This approach is less rigid than an explanatory case study that simply seeks to validate pre-formulated hypotheses, and balances the generative nature of pure induction with the pragmatism of early structure (Langley, 1999). Each interview guide had a standard core of questions pertaining to the impact of the sharing economy and the development of Qiangsheng's business over time. It also included specific questions that were tailored to each informant's role in the business unit that he/she represented (eg, representatives of Qiangsheng's top management was asked about the evolution of its strategies and investments in IT over time). After the data was collected, each member of our research team examined the data obtained carefully and independently to ensure a consistent interpretation (Klein & Myers, 1999). If there were conflicting interpretations, or if clarifications and follow-up questions were deemed necessary, the relevant informants would be contacted via email or instant messaging.

A total of 14 informants were interviewed (some were interviewed repeatedly when required). Twelve informants were internal stakeholders of Qiangsheng, while two industry analysts who were intimately familiar with the contextual conditions surrounding the traditional taxi industry were also interviewed (see Table 3). The two industry analysts were selected on the basis that they have been tracking the development of Qiangsheng for an extended period, and the purpose of interviewing them was to validate the accounts from the internal informants. The interviews took an average of around 60 minutes, were digitally recorded and later transcribed for analysis. The interviews were conducted in Mandarin, but because every member of the research team was bilingual and proficient in both English and Mandarin (including a native speaker of English), we retained and analysed all the textual data in the original language and only translated the data at the time of writing (see Tan, Pan, Lu, & Huang, 2015). A single member of the research team performed the translations to ensure consistency, but other members carefully examined and validated these translations to ensure coherence (Klein & Myers, 1999). The interview transcripts and data from secondary sources amounted to a corpus of textual data of over 125 000 words.

TABLE 3 Summary of interviews conducted

Informant	Key themes covered
Internal Qiangsheng stakeholders	
Deputy General Manager	History and culture of Qiangsheng, evolution of Qiangsheng's business environment, impact of ridesharing on Qiangsheng's operations and digital options, differences between ridesharing and traditional taxis, responses of drivers to ridesharing, societal responsibilities of Qiangsheng.
Information Department Manager	Role of information department, the six strategic thrusts of the department, data planning and use at Qiangsheng, impact of ridesharing on Qiangsheng's operations and digital options, challenges of systems development, organisational inertia to change.
Human Resource (HR) Manager	Role of HR department, traits of workforce, hiring regulations of the local government, impact of ridesharing on Qiangsheng's operations and digital options, tensions between profit motivation and social responsibility, organisational response to the emergence of ridesharing recruitment challenges.
Internal Audit Manager	Role of Internal Audit department, challenges of adopting new technology, strengths and weaknesses of Qiangsheng, organisational culture and leadership style of Qiangsheng, impact of ridesharing on Qiangsheng's operations.
Vice-President (VP) of Operations	Impact of ridesharing on Qiangsheng's operations and digital options, strengths and weaknesses of ridesharing platforms, operational issues and challenges of ridesharing, regulations surrounding ridesharing and Qiangsheng's response to those regulations, regulations surrounding the taxi industry.
General Manager of Tech Subsidiary Company	Role of subsidiary company, history of informatization at Qiangsheng, development of subsidiary, influence of products on Qiangsheng's operations and digital options, characteristics and challenges of the taxi industry, outlook of the taxi industry, impact of ridesharing on Qiangsheng's operations.
Asset Management Department Manager	Role of Asset Management department, impact of ridesharing on Qiangsheng's operations and digital options, outlook of the taxi industry, new businesses planned by Qiangsheng, the legitimacy of ridesharing platforms.
Finance Department Deputy Manager	Role of Finance department, reasons for decline of Qiangsheng's business, Use of technology within the Finance department, impact of ridesharing on Qiangsheng's operations and digital options, cost reduction measures across the organisation, diversification to make up for lost revenue, organisational culture and leadership style.
Communist Party Secretary	Role within the organisation, impact of ridesharing on Qiangsheng's operations and digital options, organisational culture of Qiangsheng, relationship between party/national culture and organisational culture, management philosophy of a state-owned enterprise in comparison to private firms (ie, ridesharing platforms).
Taxi Driver A Taxi Driver B Taxi Driver C	Employment history, impact of ridesharing on work routines, reasons for participating/not participating on ridesharing platforms, professional identity before and after ridesharing, hiring regulations of the local government, differences between a taxi driver and a Didi (ie, ridesharing) driver.
External industry observers	
Industry Analyst A	Conditions within the taxi industry, strengths and weaknesses of Qiangsheng, organisational performance of Qiangsheng, evolution of Qiangsheng's strategy and market positioning over the years.
Industry Analyst B	History and role of parent organisation (Jiushi), culture of Qiangsheng and the Jiushi group, impact of ridesharing on Qiangsheng's operations and digital options, Qiangsheng's response to the emergence of ridesharing platforms.

3.2 | Data analysis

Consistent with the procedures of grounded theory, data analysis was performed iteratively and concurrent with data collection (Strong & Volkoff, 2010). The voluminous and poorly organised qualitative data was first condensed into a more manageable form via the narrative and visual mapping strategies (Langley, 1999). The narrative strategy entailed the construction of a "*story*" that represented our account of what happened. The visual mapping strategy, on the other hand, involved creating chronological event timelines and documenting our emergent theoretical ideas in a series of diagrammatic sketches. After the narrative and the visual maps were constructed, they were verified with the relevant informants and modified with the collection of further data if necessary. This was to ensure the validity of both our interpretation of the informants' accounts and the theory that we were developing (Pan & Tan, 2011).

Following the development of the narrative and visual maps, we then organised and coded the data using the grounded theory techniques of open, axial and selective coding (Strauss & Corbin, 1998). More specifically, open coding was used to assign descriptive labels to our data (eg, interview excerpts) to form first-order concepts (see Gioia, Corley, & Hamilton, 2013). The purpose of these labels is to "capture the core issues, as identified by the speakers, in conceptual language" (Strong & Volkoff, 2010, p. 735). Wherever possible, the labels were taken directly from words used by the informants and included concepts such as "short-term strategic focus," "confused identity" and "slow decision-making." Our final list of concepts included 31 first-order concepts covering the range of concepts that emerged in our interviews. Axial coding was then used to relate the first-order concepts to a number of second-order themes (Gioia et al., 2013). This technique involves coding for conditions (causal, intervening and contextual conditions), actions and interactions, as well as consequences (Strauss & Corbin, 1998), while taking care to ensure that the second-order themes were based on the data, and not from an external framework or our theoretical preconceptions (Strong & Volkoff, 2010). As a result of axial coding, 12 second-order themes emerged (eg, "short-term strategic focus" and "reactive approach to business development" were coded as "Strategic Regression" as they were deemed to be lapsing to a less sophisticated form of strategic development). These themes will be elaborated on in Section 4.

Finally, with selective coding, our data were further examined to integrate and refine our first-order concepts and second-order themes. If we were confronted with data that challenged, or did not fit easily into, our existing first-order concepts and second-order themes, our coding scheme would be modified accordingly (ie, add a new, or modify/delete an existing, second-order theme or first-order category—see Strauss & Corbin, 1998), and coding will be restarted. Selective coding allowed us to move beyond description to a more abstract level of conceptualization (Urquhart et al., 2010), and in doing so we were able to distil our second-order themes into four aggregate dimensions (see Gioia et al., 2013). The four aggregate dimensions include the unfavourable contextual conditions that confront the incumbent firms, as well as the three phases of our theoretical framework that will be discussed in Section 4. By "recursively iterating between (and thus constantly comparing) theory and data" (Eisenhardt & Graebner, 2007, p. 30) in this way, our theory was inductively derived and gradually shaped. This process continued until the state of theoretical saturation was reached (Glaser & Strauss, 1967), which refers to the state where the inductively derived model can comprehensively account for the case data and "incremental learning is minimal because the researchers are observing phenomena seen before" (Eisenhardt, 1989, p. 545). A selection of the first-order concepts, second-order themes and aggregate dimensions that eventuated from our analysis are summarised in a sample data structure (as prescribed by Gioia et al., 2013) in Appendix B.

4 | FINDINGS

Qiangsheng Taxi was founded in Shanghai as Xiangsheng Automobile in 1919. In 1954, Xiangsheng was renamed the Shanghai Taxi Company, and within a short span of 2 years, it acquired and merged with 16 other car dealers in

the city to become the market leader within the local taxi industry, a position that it has held since for over 60 years. The firm was publicly listed on the Shanghai Stock Exchange in 1992 and acquired its present name in 2001. Qiangsheng Taxi is currently a state-owned holding company under the corporate umbrella of the Shanghai Jiushi Group. It has an asset base valued at approximately US$868 million, 35 000 employees and a fleet of over 13 000 vehicles (including taxis and rental cars). Qiangsheng currently has five main lines of business, represented by its taxi, car rental, automobile servicing, travel and property investment divisions. The first two, in particular, have felt the brunt of the market revolution brought about by the sharing economy. At present, Qiangsheng is pursuing an array of technological innovations such as establishing an intelligent dispatching center, installing location tracking and speed monitoring devices in all of its vehicles, as well as developing a traffic management system that intelligently routes its vehicles based on traffic and road conditions.

In relation to our research question, the findings from our study of Qiangsheng suggest that the sharing economy can influence the digital options of incumbent firms through a process of digital attrition (refer to Figure 1), which we define as the erosion of the capacity for, and effectiveness of, a firm's IT capability investments as a consequence of increasing digitalization and the emergence of new technology-enabled business models. In the context of our study, this process stems from a number of "forces at work" stemming from the sharing economy paradigm, and traverses three phases: (a) deinstitutionalization, (b) technological incapacitation and (c) competitive erosion. Digital attrition culminates in IT-induced competitive disadvantages for the incumbent firms, which in turn, may reinforce the prevailing contextual forces to form a vicious cycle that exacerbates the negative influence of the sharing economy even further. We describe and explain our findings in detail in the stream of reporting that follows.

4.1 | The "Forces at Work" of the sharing economy paradigm

The taxi industry in Shanghai is an established and mature sector with a history of over 100 years. Since taxis are largely seen as a means of public transportation that plays an important societal role, the industry is subject to stringent government oversight and regulatory control. This stands in stark contrast to the permissive attitude adopted

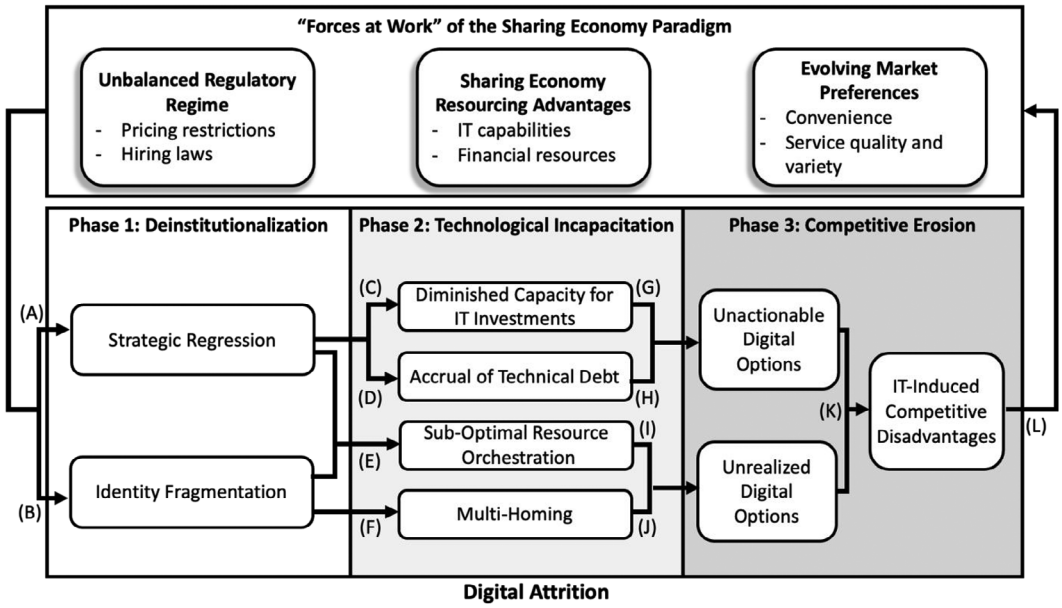

FIGURE 1 The process of digital attrition

by the Chinese government toward new technology-enabled businesses such as the sharing economy platforms that were emerging, which is aimed at fostering economic innovation (see Wilson, 2018). Consequently, the sharing economy platforms benefited from an Unbalanced Regulatory Regime that was simultaneously highly unfavourable to the incumbent taxi firms and favourable to the sharing economy platforms. The disparity in treatment was especially obvious in terms of the *pricing restrictions* and *hiring laws* that were imposed on the two business forms. Qiangsheng's Vice-President (VP) of Operations provided an overview of these disparities within the regulatory regime that was put in place: "Why do I say that the rules of competition are unfair? The first is because of the rules surrounding hiring and licensing—they (the sharing economy platforms) are allowed to hire drivers from other provinces and don't require a taxi license. The second is related to operational revenue because taxi fares are strictly controlled by the state and the current price cap has been unchanged for many years. No matter the quality of your fleet of vehicles, you cannot raise your prices, and we are left on our own to find a breakthrough."

In addition, on the supply-side, there were sharing economy resourcing advantages because the platforms represented a novel and exciting business form that was attracting significant interest from the world's largest institutional investors and venture capitalists. For instance, Didi was backed by China's Tencent and Alibaba, Japan's Softbank and Toyota, as well as Singapore's Temasek Holdings, while its fierce rival Meituan had the support of the United States' General Atlantic and Sequoia Capital. The backing of these global conglomerates meant that the platforms had access to significantly more *financial resources*, which allowed them to offer steep discounts to undercut the fares of the incumbent taxi firms and gain market share, market their services aggressively, as well as provide drivers with better working conditions and opportunities for income generation. The VP of Operations provided an illustration: "Didi drivers are able to earn about CNY$20k monthly, compared to just CNY$7-8k for taxi drivers. Not only that, Didi has flexible working hours, while for taxi drivers, you work very long hours. Because of these (differences), many drivers prefer to drive for Didi rather than for taxi companies."

Another disparity in terms of resourcing stems from the fact that the sharing economy platforms are inherently technology firms, which meant that they had markedly stronger *IT capabilities* as compared to the incumbent taxi firms. As a result, the platforms were able to leverage a larger accumulated base of technology-related assets, knowledge, experience and competencies to ensure the quality of their services, the efficiency of their operations, as well as enabling the platforms to reach the market and scale more effectively. The General Manager of Qiangsheng's Tech Subsidiary noted: "For ridesharing platforms, they are really technology firms with a technological DNA, and therefore they have stronger IT capabilities. They have IT specialists to develop their systems; they have huge venture capitalists willing to invest in their new technologies and systems. Governments are also very open to technological firms: they impose very limited rules for their development, which provide them with the opportunities to grow very quickly."

At the same time, on the demand-side, the increasing digitalization of daily life in China has resulted in evolving market preferences. As the sharing economy paradigm emerged, it was well-positioned to capitalise on these market shifts because it presented a new and compelling value proposition for the majority of China's smartphone users that were aligned with the changes in their expectations and consumption behaviours (Zhu & Wang, 2021). In particular, there were disparities in the levels of service provided by the sharing economy platforms vis-à-vis the incumbent taxi firms in two areas. First, the platforms provided greater *convenience* by allowing their passengers to hail a ride anytime, anywhere with just a few swipes and finger taps via a mobile app. Second, the platforms offered greater *service quality and variety* because not only were there reduced wait times with more vehicles and drivers on the road, but the passengers could select the type of vehicle they wanted, look at the reviews and ratings of the driver, and track the journey in real time as well. As a result, there appears to be a substitution effect (see Chang, 2017) at work in relation to the public's choice of transportation, and the fact that China now also has a sophisticated transportation network in place is preventing traditional taxi firms like Qiangsheng from taking steps to ameliorate the situation (ie, in contrast to the findings of Kim et al., 2018). Qiangsheng's VP of Operations explained: "People tend to take the train if the distance is more than 10 km. For distances around 4-5 km, people tend to use Didi, and for distances below 3 km, people tend to use bicycles or bike shares (eg, Mobike). Therefore, you can see that the demand for taxis is not very high."

To summarise, our findings in the context of ridesharing suggest that an (a) unbalanced regulatory regime that favours new technology-enabled business models, the (b) sharing economy resourcing advantages that the emergent platforms tend to enjoy and the (c) evolving market preferences that are brought upon by the increasing digitalization of contemporary living are three "forces at work" stemming from the emergence of the sharing economy paradigm that are highly unfavourable to the incumbent firms. The regulatory influences, coupled with the supply- and demand-side factors, gave rise to a number of disparities between the incumbent firms and the emergent platforms within the industry (summarised and presented with their supporting evidence from our data in Table 4), which presented conditions that were highly conducive to the business growth of platforms such as Didi and Meituan. This would, in turn, provide the impetus for the initial phase of digital attrition.

4.2 | Phase 1: Deinstitutionalization

Instead of seeking to tackle the unfavourable forces at work within the taxi industry in Shanghai head-on, Qiangsheng opted for a radical diversification strategy that resulted in the establishment of new lines of business in travel, logistics, property and advertising. But this strategy is acknowledged by many of our informants to be limited in a number of ways. Corresponding to *Arrow* (*A*) of our process model, one of the industry analysts we interviewed explained: "Qiangsheng was diversifying into other businesses. For example, they are aiming to be a high-end commercial travel service provider, integrating transport, meeting facilities, advertising and travel services together… but this is just being reactive. These new businesses are hardly related to their original taxi business." More specifically, the objective of Qiangsheng was to sustain its revenue because as a publicly listed firm, it had the interests of its shareholders to cater to. And instead of investing to improve its taxi business, Qiangsheng's management was hoping to use the additional revenue from their new ventures to subsidise their ailing taxi business. The industry analyst

TABLE 4 Disparities between incumbent firms and sharing economy platforms

Disparity	Supporting evidence
Unbalanced regulatory regime	
Pricing restrictions	"For Didi, there is no price cap for them. However, for us, our prices are regulated by the government. I think this is unfair as we are treated differently to Didi."- Asset Management Department Manager
Hiring laws	"(The) drivers from other provinces cannot drive taxis, but the rule does not apply to Didi (China's de facto ridesharing platform). Because of this, our business is like stagnant water. We do not have new people joining this profession."—Qiangsheng's HR Manager
Sharing economy resourcing advantages	
IT Capabilities	"For sharing economy platforms like Didi, the main advantage lies in their IT capabilities. With strong IT capabilities, the platform they built is more user friendly and easy to use."—Industry Analyst A
Financial resources	"Sharing economy platforms have huge capital and financial resources as backup… they have money to burn and do not mind running the business at a loss."—VP of Operations
Evolving market preferences	
Convenience	"From the customers' perspective, the use of sharing economy platforms (ie, Didi) is very convenient because they can find a Didi anytime on the app, and the cost is lower that hailing a taxi"—Vice President
Service quality and variety	"Sharing economy platforms have changed the expectations of passengers because you can influence what your ride is like. Unlike taxis, you can choose the type of vehicle you want… you can track your ride with GPS… and you get an estimate of your fare upfront"—Industry Analyst B

added: "Because of low profits and stagnation, there is a need to reform their business or their (taxi) business will not be able to survive in the next five years… The focus is on short-term survival rather than long-term business viability." In other words, this organisational response was a form of strategic regression because Qiangsheng was effectively lapsing into a less sophisticated mode of strategy-making and business development that is reactive, short-term focused, and more importantly, unlikely to be successful. The ineffectiveness of the strategy stems from its self-focused nature, which ignores the "capabilities of existing or potential competitors as well as the market's capacity" (Moore, Oesch, & Zietsma, 2007, p. 440).

Moreover, not only is Qiangsheng's management finding it challenging to respond strategically to the unfavourable contextual challenges that confront the firm, but they are facing difficulties in marshalling their workforce of taxi drivers to respond collectively to the environmental threats as well. This is because the existing regulatory framework in Shanghai does not prohibit taxi drivers from also being Didi drivers, and the resourcing advantages of the sharing economy platforms mean that they are able to offer attractive financial incentives and better working conditions to entice the taxi drivers to join their platforms. As a result, most of Qiangsheng's taxi drivers are now not only driving for Qiangsheng, but they are operating on ridesharing platforms as well. This has caused the issue of identity fragmentation, which we define as the breakdown of the original professional identity as a result of taking on a new occupational role. Corresponding to *Arrow* (*B*) of our process model, a taxi driver spoke of the confusion surrounding his dual identity as both a Didi and Qiangsheng driver: "Driving for Didi definitely pays better… (and because I am driving for both) sometimes I don't really know if I would call myself a taxi driver or a Didi driver. I am like a Didi driver who just happens to be driving a taxi." Identity fragmentation is especially problematic for Qiangsheng because it results in conflicted loyalties among its workforce and their prioritisation of objectives beyond that of the firm's (Fiol, Pratt, & O'Connor, 2009). This would in turn, limit the digital options that are available to Qiangsheng for competing with the ridesharing platforms significantly, since the acquisition and realisation of digital options would require these stakeholders' participation and collective contributions (Sandberg et al., 2014).

To sum up, the evidence from our case study suggests that the unfavourable "forces at work" confronting the incumbent firms can give rise to at least two undesirable outcomes to initiate the process of digital attrition. First, they can precipitate strategic regression characterised by sub-optimal strategy-making and business development as incumbent firms focus on reacting to adversity and short-term business viability at the expense of their long-term organisational vision (Youmans & Tomlinson, 2018). Second, the unfavourable contextual influences can affect the priorities and sense of belonging of key stakeholders resulting in identity fragmentation, and when these stakeholders no longer have a coherent organisational identity, the incumbent firms may subsequently find it difficult to motivate or mobilise them toward their cause (Petriglieri, 2015). Accordingly, we term this initial phase of digital attrition the deinstitutionalization phase because the institutionalised role of the incumbent firms as the de facto suppliers of a product or service is being taken over by the sharing economy platforms, while strategic regression and identity fragmentation render the incumbent firms unable to respond effectively. Moreover, our data suggests that these outcomes would lead to other organisational effects as the process of digital attrition enters the second phase.

4.3 | Phase 2: Technological incapacitation

Strategic regression and its associated reactive and short-term focused diversification strategy affected Qiangsheng in a number of ways. First, there was a diminished capacity for IT investments. In particular, while Qiangsheng was cognizant of the limitations of its existing IT capabilities as compared to the sharing economy platforms, the resources at its disposal for investing in IT capabilities was limited. For instance, corresponding to *Arrow* (*C*) of our process model, the Deputy General Manager of Qiangsheng described how the diversion of capital as a result of strategic regression was affecting the firm's ability to invest in development of IT infrastructure: "Overall, we are facing a loss in our business. We are not competitive in the market anymore. We are facing a big challenge because we

do not have the capital to invest in new infrastructure… This affects our ability to compete with the sharing economy platforms even more." In addition, Qiangsheng was unable to match the attractive financial incentives offered by the sharing economy platforms to attract IT talent, which can make the acquisition of technological expertise immensely challenging (Xiao, Tan, Leong, & Tan, 2020). The Manager of Qiangsheng's Information Department explained: "In terms of IT research and development, we have a lack of IT specialists. This is our bottleneck. The reason why it is difficult to attract IT specialists is that… the pay we can offer to the talents are far less than privately-owned organizations. They are not willing to work for us." As acknowledged by multiple informants, the fundamental reason that Qiangsheng lacked the capacity to make IT investments despite its large firm size was because resources have been diverted to the development of its new businesses.

Second, there was the accrual of technical debt as the diversion of resources also coerced Qiangsheng into taking a number of shortcuts in the design, development and implementation of systems (Banker et al., 2020) that were aimed at mimicking the offerings of the ridesharing platforms. Qiangsheng's Information Department Manager described the firm's efforts in this regard: "We are changing the way we operate… We want to incorporate more technological elements in our business. For example, we have developed an app called Qiangsheng Travel. Customers are able to use the app to call for our taxis, which is similar to the service that Didi offers to their customers." Nevertheless, Qiangsheng's attempt to mimic the offerings of the ridesharing platforms was not particularly successful because without adequate resources, they were forced to rely heavily on, and improvise on top of, their legacy systems, taking on technical debt in the process (see Burden, Van Der Ouderaa, Venkataraman, Nyström, & Shukla, 2018). Corresponding to *Arrow* (*D*) of our process model, the Information Department Manager explained: "In terms of the Qiangsheng Travel app we have, the (product) iteration is very slow… Much of the app is built on top of our legacy taxi radio dispatch system… Hence, if you look at the app, you can feel it is a little outdated."

Third and in tandem with the influence of identity fragmentation, strategic regression resulted in sub-optimal resource orchestration. More specifically, the lack of coherence surrounding the long-term direction of Qiangsheng's strategic direction meant that decision-making surrounding the allocation of resources were laboured and time consuming (echoing the arguments of Kownatzki, Walter, Floyd, & Lechner, 2012). Corresponding to *Arrow* (*E*) of our process model, an industry analyst we interviewed explained: "As a state-owned enterprise, there are more hierarchical levels of decision-making. Now without a clear (strategic) focus, it has only made the speed of decision-making worse… Qiangsheng is unable to allocate its resources efficiently and react quickly enough to the demands of the market." In addition, identity fragmentation meant that Qiangsheng also faced challenges in mobilising its workforce of taxi drivers to support its IT-enabled initiatives fully (eg, its Qiangsheng Travel app). The Deputy General Manager of Qiangsheng described these challenges: "We cannot tell our drivers to stop using Didi. We can only offer incentives like long service awards… and making house visits… to let the drivers know that their services are valued… But the effectiveness of these incentives is limited." The lack of support meant that these initiatives were not widely used and could not achieve their intended business objectives (Berente & Yoo, 2012).

On the other hand, the divided loyalties associated with identity fragmentation meant that the incidence of multi-homing among Qiangsheng's taxi drivers, defined as the simultaneous participation of an entity on more than one platform (Bakos & Katsamakas, 2008), was increasing. Corresponding to *Arrow* (*F*) of our process model, an elderly taxi driver who is close to retirement described how identity fragmentation, particularly among the younger and more technology-savvy taxi drivers, has resulted in widespread multi-homing: "Nobody wants to be taxi drivers anymore. The younger generation, most of them are technology-savvy, and they know how to use Didi well… There is no longer any pride in the profession… It is hard to find someone like me who just drives a taxi and is not on Didi (at the same time)… Most of the people like me are close to retiring." The HR Manager of Qiangsheng added: "Look at our taxi drivers. They carry multiple smart phones with them. They are working for multiple ridesharing platforms… They work for multiple platforms to maximize their earnings." While being able to work for multiple platforms to maximise the revenue from each shift is beneficial for the taxi drivers, it effectively also meant that Qiangsheng's resources (eg, its fleet of taxis) were being leveraged in service of the ridesharing platforms without compensation.

Overall, in relation to our research question, the case of Qiangsheng suggests that the strategic regression and identity fragmentation associated with the deinstitutionalization phase of digital attrition can impact an incumbent firm by diminishing its capacity for IT investments, as well as inducing the firm to accrue technical debt and engage in sub-optimal resource orchestration. Moreover, key stakeholders may engage in multi-homing that involves participating on multiple platforms (Barua & Mukherjee, 2021), which reduces their motivation and ability to contribute to the cause of the incumbent firm further. As all of these organisational effects directly weaken the incumbent firm's ability to develop and leverage its IT capabilities (ie, its IT infrastructure, IT technical skills and the cost-effectiveness of its IT operations, among others—see Wade & Hulland, 2004), we term this second phase of digital attrition the technological incapacitation phase. The implications of this phase on the digital options and competitiveness of the incumbent firms are revealed when the process of digital attrition enters its third and final phase.

4.4 | Phase 3: Competitive erosion

The organisational effects of the technological incapacitation phase constrained the digital options of Qiangsheng in two ways. First, the diminished capacity of IT investments, coupled with the accrual of technical debt that have to be repaid with a premium at some point (Tom, Aurum, & Vidgen, 2013), meant that many of Qiangsheng's potential digital options would have been rendered unactionable. The unactionable digital options of Qiangsheng stem from the fact that even if there was an opportunity for IT capability investment "that has been examined and found to be both desirable and feasible" (Sandberg et al., 2014, p. 447), Qiangsheng would still be unable to pursue them in a timely and effective manner. Corresponding to *Arrow* (*G*) of our process model, Qiangsheng's Internal Audit Manager explained how the firm's diminished capacity for making IT investments meant that they were unable to pursue its digital options even if they were available: "Investing in new IT systems may cost us few hundred thousand dollars, and to put it bluntly, each of our companies have to stick to a budget because their performance are measured based on income and profit. Sometimes we know a system would be beneficial, but we can't demonstrate the benefits immediately, or the benefits may not be easily expressed in monetary terms, like being able to free up two people out of four to do other value adding work… we need to consider our budget constraints and there may be other projects we prioritize."

In addition, corresponding to *Arrow* (*H*) of our process model, the General Manager of Qiangsheng's Tech Subsidiary provided an illustration of how Qiangsheng's digital options were unactionable as a result of the technical debt that it accrued: "We know of the advances in smart transportation and the need to integrate them into our operations with information technology. But pursuing this opportunity requires a certain level of technological sophistication in our products, and our products must be inherently strong. This becomes a long story (that is difficult to achieve given Qiangsheng's current state)." These findings resonate strongly with Rolland et al.'s (2018) assertion that a firm must invest strategically in the appropriate IT capabilities and resolve its technical debt to make digital options actionable.

Second, the sub-optimal orchestration of resources by Qiangsheng and the fact that a significant proportion of its workforce of taxi drivers were multi-homing meant that even if there were actionable digital options that were available, Qiangsheng would nevertheless be unable to realise them. This is because the realisation of digital options would require the commitment of the involved stakeholders (Haffke, Kalgovas, & Benlian, 2017; Marcinkowski & Gawin, 2019). In other words, Qiangsheng had to contend with unrealized digital options in their portfolio, and unleashing the full potential of those digital options would be difficult if the involved stakeholders are unmotivated (Berente & Yoo, 2012) or if their loyalties are divided (Tan et al., 2015). Corresponding to *Arrow* (*I*) of our process model, Qiangsheng's HR Manager explained how the inability to allocate resources effectively (ie, sub-optimal resource orchestration) made it difficult for the firm to realise its digital options: "We do want to invest in and implement new IT systems to enhance our business, however, there are so many constraints, such as the inability to effectively mobilize our resources, that make it difficult for us to do so." In addition, corresponding to *Arrow* (*J*) of our

process model, a taxi driver we interviewed also provided an illustration of how multi-homing could be a reason for the low usage of the Qiangsheng Travel app: "Sometimes I would even forget to turn the app on when I am on shift because I simply do not get many fares from the app… If the company wanted us to use the app it needs to provide more than what Didi is offering in terms of demand and features. I don't see a need to use Qiangsheng's app if Didi is already meeting my needs and there are no advantages."

Qiangsheng's inability to act on potential digital options or capitalise on those they had on hand culminated in the manifestation of IT-induced competitive disadvantages. This is because even if market opportunities presented themselves, or if its competitors are offering a IT-enabled value proposition that it cannot match, Qiangsheng would be unable to develop new, or leverage their existing, IT capabilities to capture those market opportunities or catch up to their competitors (Overby et al., 2006). Corresponding to *Arrow* (*K*) of our process model, the Deputy General Manager of Qiangsheng sheds light on the extent of Qiangsheng's IT-induced competitive disadvantages: "Customers can get a ride easily using the Didi app with just a few taps on their smartphone. Calling our call center or flagging a cab down on the road becomes less convenient for them as nowadays customers like using the smartphone for everything, like for example, ordering food, getting taxis and making payments. We do not have such a capable and user-friendly platform to support our customers, so many of them have switched to these platforms." This finding is corroborated by previous studies on enterprise agility, which suggest that developing IT capabilities and overcoming organisational rigidity are both crucial to mounting an effective response to disruptive digital innovation (eg, Chan, Teoh, Yeow, & Pan, 2019).

To summarise, the evidence from our study in the context of ridesharing suggests that the process of digital attrition triggered by the sharing economy paradigm may culminate in a phase where the digital options of incumbent firms are rendered unactionable or difficult to realise. As the inability to capture market opportunities or respond effectively to the competitive actions of their competitors would translate into competitive disadvantages that will have a direct impact on the incumbent firms' performance and competitiveness (Chan et al., 2019; Overby et al., 2006), we term this third phase of digital attrition the competitive erosion phase. Moreover, our findings suggest that the implications of digital attrition do not end with this phase, as competitive erosion can feed back into the unfavourable contextual influences that the incumbent firms are facing to create a vicious cycle.

4.5 | The formation of a vicious cycle

Beyond their economic contributions, taxi firms tend to have important social responsibilities as well such as serving passengers with special needs or maintaining service continuity during public holidays (see Deloitte Access Economics, 2013). However, fulfilling these social responsibilities may not be in the material interests of their taxi drivers, which can reinforce the sharing economy resourcing advantages even further as ridesharing drivers are free from such obligations. Corresponding to *Arrow* (*L*) of our process model, the Manager of the Asset Management Department of Qiangsheng provided an example: "During Chinese New Year, Didi drivers who come from other provinces are not working because they are back home for the holidays. Because of this, many customers are unable to get a Didi, and there is only us, the state-owned taxi business, that is reliable and able to provide taxi services for customers. During the time, we even have to subsidize our drivers out of our own pockets to encourage them to work."

In addition, with the negative impact of digital attrition on its operations and business performance, Qiangsheng's ability to fulfil its social obligations has been curtailed. Consequently, when societal needs have to be met, the government will be forced to intervene, which will further reinforce the unbalanced regulatory regime that is in place. For example, at present in Shanghai, only taxi firms are required by law to put vehicles out on the roads during the major public holidays. Moreover, if there are fewer taxis on the road because the poor performance of traditional taxi firms forces them to scale back their business, it may result in dissatisfaction among the customers as their ability to access the service will be reduced, especially among the digitally excluded (eg, elderly and disabled

passengers, also tourists). Since taxis are both a taken-for-granted institution and a clearly visible sight on the roads, the negative responses toward an inability to catch a ride may be especially targeted at the traditional taxi firms (as opposed to unmarked ridesharing cars or an online platform with limited physical presence), which may reinforce the evolving market preferences for ridesharing even further. Supporting *Arrow* (*L*) of our process model as well, the Information Department Manager explained: "Some of our passengers scold our drivers the moment they board our taxi. Why is that? They don't care about the quality of service, they are not really interested in complaining, they also do not care about our offline services. They only care about prices (and the availability of taxis) and this creates a lasting mindset. In contrast, the sharing economy platforms are able shed their social responsibilities and burden, while holding on tightly to whatever benefits them." These effects close a loop on a vicious cycle, which, with regard to our research question, illustrates that digital attrition is an iterative, as opposed to a linear, process and the negative implications of the sharing economy for the digital options of incumbent firms are likely to grow over time.

5 | DISCUSSION

5.1 | Theoretical implications

At the outset of this paper, we noted that there is currently a lack of research on the inability of incumbent firms to develop their IT capabilities to match the technological superiority of the sharing economy platforms despite the fact that many of them are large, resource-rich organisations (see Chang & Sokol, 2020; Kim et al., 2018). With the inductively derived framework we have presented, our study presents a number of theoretical contributions.

First, based on the case of Qiangsheng's taxi business and how it has been impacted by the rise of ridesharing in China, our study has enabled us to construct a novel nomological network that sheds light on how the sharing economy paradigm constrains the IT capability investments of the incumbent firms that are being displaced. More specifically, we have proposed that this effect is due to a process that we have termed digital attrition, which is precipitated by contextual influences that are unfavourable to the incumbent firms (see Chang, 2017; Malhotra & Van Alstyne, 2014), and consists of three phases that culminate in IT-induced competitive advantages as the firms' digital options are rendered unavailable or difficult to realise (see Sandberg et al., 2014). The key factors, influences and effects of each phase have also been discussed in our study. In doing so, our work is supplementing the studies on the negative implications of the sharing economy that have been conducted from the perspective of the incumbent firms, which have focused on demonstrating the impact of various platforms on the performance of these firms without offering a substantive explanation for the effect (eg, Kim et al., 2018; Zervas et al., 2017). With our framework, we have extended the existing perspectives by not only corroborating the findings of these studies (ie, in revealing how the sharing economy can negatively influence the performance of incumbent firms), but providing an in-depth explanation centered on how the consumption paradigm is incapacitating the digital options of the incumbent firms and, hence, constraining their competitive actions and responses (see Overby et al., 2006; Sambamurthy et al., 2003). In doing so, future studies can potentially build on our theoretical framework and explore the influence of the sharing economy on the IT capabilities, competitive strategies and business processes of the incumbent firms further, so that a more complete understanding of their competitive disadvantages and operational challenges can emerge.

Second, even as the awareness of the potential "dark side" of the sharing economy is growing (eg, Malhotra & Van Alstyne, 2014; Rinne, 2018), the existing discourse on the topic tends to be fragmented and substantiated only by anecdotal evidence (eg, Kathan et al., 2016; Schor, 2016). Consequently, our present understanding of the negative implications of the sharing economy resembles a jumble of purported causes and outcomes that are loosely related. A consolidated, empirically supported explanation "of how (an outcome) occurs whenever it does occur" (Mohr, 1982, p. 37) is as yet absent in the literature. The contribution of our study is that it is not only empirically grounded in the reality of a real-world business, but it presents an integrative perspective of the phenomenon as

well. This is because it reveals the intricate connections between several contextual factors and organisational effects that underpin the negative implications and amalgamates these elements into a coherent theoretical framework. In doing so, future studies can use the framework developed in this paper as a baseline theory and the starting point of their inquiry, which will contribute toward a more holistic and balanced understanding of the economic and social impact of the phenomenon.

Third, beyond its implications for the sharing economy literature, our study also has implications for our understanding of digital options. In particular, while the different states (Sandberg et al., 2014) and types (Overby et al., 2006; Sambamurthy et al., 2003) of digital options have been discussed to some extent in the literature, our understanding of how the various states and types come to be is limited. Moreover, the existing discourse on the flip side of digital options is centered on digital debt (see Rolland et al., 2018), but we would argue that this does not represent the full picture. Beyond digital debt, our study suggests that considerations of how digital options may be rendered unavailable, unactionable or unrealizable (Sandberg et al., 2014) should be explored further as well. In other words, while digital options have been framed as opportunities for investments in IT capabilities, the identification and capture of these opportunities may not be straightforward (ie, a digital option is not a simple invest or do not invest decision). Our study could therefore pave the way for further research on the contextual influences and organisational factors that could inhibit the pursuit of those opportunities to advance the state of knowledge on the acquisition, development and actualization of digital options.

Finally, and on a more general level, our study also has implications for our understanding of digitalization (sometimes also referred to as digitization—eg, Yoo, Boland, Lyytinen, & Majchrzak, 2012), defined as the increasing use of digital technologies in the restructuring of contemporary living, organisations and industries (Brennen & Kreiss, 2016). More specifically, the existing discourse surrounding the processes of digitalization such as digital innovation (eg, Nambisan, Lyytinen, Majchrzak, & Song, 2017), digital disruption (eg, Ozalp, Cennamo, & Gawer, 2018) and digital transformation (eg, Vial, 2019) tends to project the impression that digitalization is predominantly positive and can be intentionally harnessed for the benefit of individuals, organisations and society. The process of digital attrition uncovered in our study, however, suggests the existence of "dark" digitalization processes with unintended and negative consequences, which would certainly be deserving of research attention as well. As such, our study may represent an initial step to catalyse further research in this direction, which is important given that "the ubiquitous and functionally pervasive nature of IT use is expected to expose users to ever greater levels of conditions that are potent for experiencing negative outcomes" (Tarafdar, Gupta, & Turel, 2013, p. 270).

5.2 | Practical implications

Beyond its theoretical implications, we believe that the framework we have presented also has significant implications for practice, particularly for two groups of stakeholders. The first stakeholder group would, of course, be the owners and managers of the incumbent firms that are being affected by the emergence of the sharing economy. For this stakeholder group, our study can be a source of empirically supported prescriptions on how to overcome some of the key challenges to acquiring the appropriate digital options or unlocking the full potential of those that they already possess in their portfolio (Sandberg et al., 2014). In particular, by articulating the specific factors and mechanisms that underpin the negative implications of the sharing economy on their IT capabilities, and uncovering the links of a vicious cycle of effects, owners and managers of incumbent firms may be able to use our theoretical framework to identify ways of breaking the cycle. For instance, our framework suggests that while diversifying into other potentially more profitable lines of businesses may be a short-term solution to mitigate the negative financial impact of the sharing economy (see Chang, 2017; Zervas et al., 2017), it may in fact be a form of strategic regression that will diminish the firm's capacity for IT investments, cause the firm to accrue technical debt, and result in the suboptimal orchestration of resources. These effects, in turn, could render the firm's digital options unactionable, which will impact its ability to compete with the sharing economy platforms even further. As such, one of the insights from

our study is that diversification decisions should be carefully considered even if they present a quick fix, and perhaps an incumbent firm's performance can be strengthened in the long run if resources were invested in reinforcing the IT capabilities of the firm instead.

The second stakeholder group that can be potentially informed by our study consists of the government authorities and policymakers who have oversight over the sectors that are being impacted by the sharing economy (see Geissinger et al., 2018). While it is almost inevitable that many incumbent firms will struggle with the disruption presented by this new business form (Zervas et al., 2017), for this stakeholder group, our study may help to draw attention to the fact that many of these firms do have a significant economic (eg, providing employment) and societal (eg, providing a necessary product or service) role. Consequently, if economic and social gaps are appearing as the incumbent firms are being displaced (eg, the increased difficulty of the digitally excluded in accessing vital products and services that used to be provided by the traditional businesses), and the emerging sharing economy platforms are unwilling or unable to address those gaps (see Malhotra & Van Alstyne, 2014), our study suggests at least two ways in which this stakeholder group can intervene. First, they may review the existing regulatory framework to ensure that the incumbent firms are not unfairly disadvantaged to the point where they are unable to perform their economic and societal function. Second, they can identify the incumbent firms that are more likely to remain viable because they have found a way to co-exist alongside the sharing economy platforms (ie, the negative effects on the firms' digital options are not manifesting or manifesting with less severity). Resources can then subsequently be allocated or diverted to support these firms with priority so that their probability of survival is increased further. Conversely, our study can also help government authorities and policymakers to identify the incumbent firms that are less likely to succeed. The appropriate help can then be provided to these firms (eg, offering advice and subsidies to facilitate the acquisition, development and actualization of digital options), so as to preserve the resources that have been invested in the establishment of these firms and, potentially, mitigate the likelihood of business failure.

6 | CONCLUSION

Our study is not without its limitations. First, our study is based on a single case, and although this is a "typical and legitimate endeavor" in qualitative research (Lee & Baskerville, 2003, p. 231), and over half of all case research papers in the field of information systems are based on single cases (Sarker, Xiao, & Beaulieu, 2012), a common criticism of these studies is the problem of external validity or generalizability (Walsham, 2006). An issue that limits the generalizability of our study, in particular, may lie in its singular context (ie, a particular traditional taxi business confronted by a specific set of contextual conditions). However, this study invokes the principles of analytic generalisation (see Silva & Hirschheim, 2007) or what some researchers refer to as "generalizing from description to theory" (Lee & Baskerville, 2003, p. 235). In any case, future research can be directed at validating the propositions of our theoretical framework, so that the potential boundary conditions of our framework can be explored.

A second limitation is that although we were able to identify a number of factors and mechanisms relevant to the influence of ridesharing platforms on Qiangsheng's digital options, we are constrained by the limits of the data collected and must acknowledge that other variations to the effects we found may be possible. Indeed, the impact of the sharing economy tends be both context and path dependent (see Malhotra & Van Alstyne, 2014), and since both of these aspects (ie, the environmental conditions and historical context of an industry) are highly variable, they may give rise to a myriad of other outcomes, both positive and negative. While it is certainly impossible to capture all the possible ways in which the sharing economy can influence an incumbent firm's digital options within a single study, we submit that our framework can nevertheless serve as baseline for subsequent studies to build upon because many of its constituent constructs do not appear to be context- or organisation-specific (eg, regulatory regimes favouring sharing economy business models appear to be commonplace across the globe—see Cohen & Kietzmann, 2014). Nevertheless, the potential negative implications of the sharing economy for the digital options of incumbent firms that have not been uncovered in our study would certainly be a fruitful avenue for future research.

In summary, the objective of this paper is to address the research question: How do the "forces at work" associated with the sharing economy paradigm impact the digital options of incumbent firms? With our case study of Qiangsheng Taxi and how its IT capabilities have been affected by the emergence of ridesharing platforms, we believe that we have accomplished this objective. More specifically, our study suggests that the sharing economy can influence the digital options of incumbent firms through a process of digital attrition, which may be induced by a number of unfavourable contextual influences (ie, an unbalanced regulatory regime, the resourcing advantages of sharing economy platforms and evolving market preferences). Based on our case evidence, we have inductively derived a framework that depicts digital attrition as a process of three phases: (a) deinstitutionalization, (b) technological incapacitation and (c) competitive erosion. The key factors, influences and effects of each phase have also been specified in our framework. In doing so, our study suggests that digital attrition may culminate in IT-induced competitive disadvantages for incumbent firms, which in turn, could exacerbate the unfavourable "forces at work" to complete a vicious cycle that reinforces the negative influence of the sharing economy even further.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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APPENDIX A: SAMPLE INTERVIEW GUIDE

Thematic interview guide for interview with Deputy General Manager of Qiangsheng

History and culture of Qiangsheng

- What is the history of Qiangsheng?
- How as the business of Qiangsheng evolved over the years?
- How would you describe Qiangsheng's organisational culture?
- How does its status as a state-owned enterprise influence Qiangsheng's organisational culture?
- How does the national culture influence its Qiangsheng's organisational culture?

Evolution of Qiangsheng's business environment

- Who are Qiangsheng's competitors?
- Can you describe the state of the Shanghai taxi industry?
- How would you describe the regulations surrounding the taxi industry?
- What are the major business challenges to Qiangsheng over the years?

Impact of ridesharing on Qiangsheng's operations

- How has the emergence of ridesharing platforms affected your business?
- Which are the main ridesharing platforms operating in Shanghai today? Is there a difference between them?
- Why is it that many of your drivers are now both driving for you and other ridesharing platforms at the same time?
- What are the implications of a driver driving for both Qiangsheng and another ridesharing platform? Why cannot you simply ban your drivers from driving for these platforms?

Differences between ridesharing and traditional taxis

What is the difference between…

- … the level of service quality between a traditional taxi and a ridesharing car?
- … the customers who prefer traditional taxis and those who prefer ridesharing?
- … a taxi driver and a ridesharing driver?
- … the regulations imposed on a taxi business and a ridesharing platform?

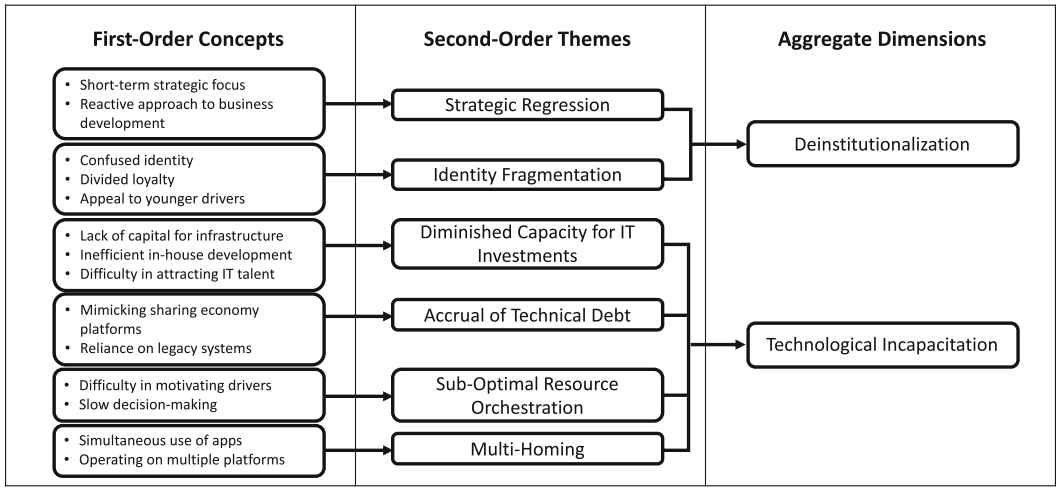
Responses of drivers to ridesharing

- What are the general traits of your taxi drivers?
- What are their views of the ridesharing platforms?
- Why do some drivers only drive for Qiangsheng and not the ridesharing platforms?
- How are these drivers different from those who drive for both Qiangsheng and the ridesharing platforms?

Societal responsibilities of Qiangsheng

- Do you think that traditional taxi businesses will continue to have a role to play in the economy and society in the future?
- Can ridesharing platforms take over the role of traditional taxi businesses like Qiangsheng some day?
- How will the general public be affected if there are no more traditional taxis?

APPENDIX B: SAMPLE DATA STRUCTURE AND SUPPORTING EVIDENCE



First-order concept	Sample interview quote
Short-term strategic focus	"Because of low profits and stagnation, there is a need to reform their business or their (taxi) business will not be able to survive in the next 5 years… The focus is on short-term survival rather than long-term business viability."—Industry Analyst A
Reactive approach to business development	"Qiangsheng was diversifying into other businesses. For example, they are aiming to be a high-end commercial travel service provider, integrating transport, meeting facilities, advertising and travel services together… but this is just being reactive. These new businesses are hardly related to their original taxi business."—Industry Analyst A
Confused identity	"Sometimes I do not really know if I would call myself a taxi driver or a Didi driver. I am like a Didi driver who just happens to be driving a taxi."—Taxi Driver B
Divided loyalty	"When the Didi platform entered the market, our taxi drivers are not as loyal as they used to be. Many of them downloaded the Didi app and work for both Didi and Qiangsheng at the same time."—Communist Party Secretary
Appeal to younger drivers	"Young taxi drivers can adapt to new things easily. If something emerges in the market that are beneficial and profitable to them, they will go for it. Didi is a good example. Many young taxi drivers are signing up to be Didi drivers."—Deputy General Manager
Lack of capital for infrastructure	"Overall, we are facing a loss in our business. We are not competitive in the market anymore. We are facing a big challenge because we do not have the capital to invest in new infrastructure… This affects our ability to compete with the sharing economy platforms even more."—Deputy General Manager
Inefficient in-house development	"The speed in which we develop customer facing systems is too slow. Let me give you the example of our "Qiangsheng Travel" app (a ride-hailing app). For an app, systems development, product design, marketing and sales and customer feedback are all critical success factors. But for us, we are a state-owned enterprise… we are too inefficient in these aspects of systems development."—Information Department Manager
Difficulty in attracting IT talent	"In terms of IT research and development, we have a lack of IT specialists. This is our bottleneck. The reason why it is difficult to attract IT specialists is that… the pay we can offer to the talents are far less than privately-owned organisations. They are not willing to work for us."—Information Department Manager

First-order concept	Sample interview quote
Mimicking sharing economy platforms	"We are changing the way we operate… We want to incorporate more technological elements in our business. For example, we have developed an app called Qiangsheng Travel. Customers are able to use the app to call for our taxis, which is similar to the service that Didi offers to their customers."—Information Department Manager
Reliance on legacy systems	"In terms of the Qiangsheng Travel app we have, the (product) iteration is very slow… Much of the app is built on top of our legacy taxi radio dispatch system… Hence, if you look at the app, you can feel it is a little outdated."—Information Department Manager
Difficulty in motivating drivers	"We cannot tell our drivers to stop using Didi. We can only offer incentives like long service awards… and making house visits… to let the drivers know that their services are valued… But the effectiveness of these incentives is limited."—Deputy General Manager
Slow decision-making	"As a state-owned enterprise, there are more hierarchical levels of decision-making. Now without a clear (strategic) focus, it has only made the speed of decision-making worse… Qiangsheng is unable to allocate its resources efficiently and react quickly enough to the demands of the market."—Industry Analyst B
Simultaneous use of apps	"Whenever I am on my shift I have two mobile phones each running a separate app—the Didi app and the Qiangsheng app. But most of my fares are from the Didi app."—Taxi Driver B
Operating on multiple platforms	"Look at our taxi drivers. They carry multiple smart phones with them. They are working for multiple ridesharing platforms… They work for multiple platforms to maximise their earnings."—HR Manager