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Abstract:

The growing adoption of platforms such as Uber and Airbnb has contributed to the emergence of an access economy, which has disrupted a number of incumbent industries in the process. In this study, we examine goCatch, one of Australia's largest e-hailing and ride-sharing multi-sided platforms. From our investigations, we find that the technology affordances of multi-sided digital platforms can help to deliver new commercial services and offerings to consumers of the platform, which enables new forms of consumption and, subsequently, disrupts the incumbent industry. Our findings provide the empirical premise for a model that illustrates the role of technology in enabling consumer recognition, consumer engagement, and consumer transposition in the e-hailing context. For theory, we build on extant literature to identify the forms of motivational affordances leveraged in disruptive platforms and technologies. For practice, we conceptualize the function of technology-enabled gamification as an emergent strategy that one can use to induce consumers to change their behaviors, develop their technical skills and drive innovation that plays a central role in enabling digital disruption. This study also clarifies the relationship between technology affordances and value creation against the backdrop of the emergent access economy.

Keywords: Digital Disruption, Multi-Sided Platforms, Technology Affordance, Access Economy.

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1 Introduction

The rising adoption of ubiquitous network technologies, location-based services, and mobile commerce on digital platforms democratizes access to services, skills, and information—often through disruptive models (Karimi & Walter, 2015; Lucas & Goh, 2009; Schor, 2014). Digital disruption, which occurs when technology makes a process more efficient or beneficial for customers, is a new and growing form of competitive innovation (McQuivey 2013) that is dramatically changing the ways in which businesses operate, individuals use public services, and companies build innovations (Schmidt & Cohen, 2010). TMforum (2014), a global trade association with over 24 years of history—has showcased the operational challenges and opportunities of delivering services in today’s disruptive market for the diverse players and innovators in the digital ecosystem. Academics have started to focus on digital disruption as well (El Sawy, Malhotra, Park, & Pavlou, 2010).

Many companies have traditionally perceived the threat of digital disruption as coming from high-tech start-ups that propose radically different ideas that are prone to viral uptake. Early observations would suggest that digital disruptions have the greatest impact on media-based industries and their products, such as physical books, music CDs, and photographic film. However, recent times have shown that digital disruptions do not come from any particular target or source and that they can affect emergent areas such as the taxi industry (goCatch, Uber, mTaxi, etc.) and payment platforms (PayPal, Apple Pay, etc.). More recently, mobile applications (mobile apps) have been a major source of these disruptions due potentially to the relatively low barriers to entry. In addition to these lower barriers to entry for start-ups in mobile app development, threats can also originate from much larger entities that compete to unsettle the incumbents or to maintain their market-leading position in the same space.

Although digital technologies are disrupting established ways of capturing value and doing business, relatively little research has studied the means by which digital disruption actually occurs. As such, we study how the transformation of technology platforms and their constituents enables digital disruption, which concurs with the calls for more studies that describe how technology develops and creates value (Hagiu 2007). We need such research to better understand how firms can extract business value from technology for the purpose of digital disruption by formulating new breakthrough strategies, designing compelling new products and services, and transforming management processes (Ramaswamy & Gouillart, 2010). Developing digital platform capabilities not only is crucial for accelerating digitization to ascertain value (Weill & Woerner, 2015) but also impacts the responses to digital disruption (Karimi & Walter, 2015). In particular, we need more insight into how multi-sided platforms (such as eBay and Uber) create value by enabling interactions among groups. In addition, several studies have highlighted the lack of a processual understanding of how companies that specialize in m-commerce and digital-related technologies build strategies and manage themselves over time (Gawer & Cusumano, 2008). We contribute to this growing stream of research. Specifically, we present a theory for understanding (Gregor, 2006) to explain how multi-sided platforms can creatively meet the needs of the taxi hailing industry via technology affordances in order to achieve digital disruption. At this point, we clarify our scope and terminologies to avoid potential ambiguities. In this study, taxi drivers provide taxi services to passengers. Taxi drivers consume and adopt the goCatch technology, and, should taxi drivers not widely adopt the technology, they would render passengers’ adopting it impractical. From the taxi drivers’ perspective, taxi driving is their personal business and their customers are passengers. However, because we do not address passengers’ view or reactions to the technology, when we talk about consumers, customers, or users, we refer to the taxi drivers only. In addition, references to the “taxi business” refer to goCatch.

Accordingly, we examine:

RQ: How does a disruptive platform leverage technology affordances to meet consumer needs?

To address this question, we conducted a case study of an Australia-based e-hailing platform (Hagiu, 2014) similar to Uber but that targets taxi drivers and their passengers. We draw evidence from accounts of how the firm established itself first as a mobile application platform in 2011 and subsequently diversified into a ride-hailing platform that offers online payments and other related mobile services. More importantly, we focus on formulating a high-level process model that demonstrates how disruptive technologies can meet stakeholder needs via appropriate information technology (IT) affordances. We hope our work can serve as the basis of a roadmap for future research that seeks to examine the relationships between IT-enabled disruption and business value.

2 Literature Review

2.1 Digital Platforms, Access, Consumption, and Disruption

Digital disruption broadly refers to the effect of digital technologies and the business models they enable on the value proposition of existing goods and services. The concept of digital disruption builds largely on Christensen's (1997), Christensen, Johnson, and Rigby's (2002), and Christensen and Overdorf's (2000) work. In their view, disruption refers to innovation that is pervasive and radical (Lyytinen & Rose, 2003) and that threatens a traditional business model (Lucas & Goh, 2009) and to technological ideas that dramatically change work processes (Elie-Dit-Cosaque & Straub, 2011; Sherif, Zmud, & Browne, 2006). In Christensen's (1997), Christensen et al.'s (2002), and Christensen and Overdorf's (2000) view, digital disruption tends to be exogenous in nature with the emergence of innovation that displaces an existing technology. However, according to McQuivey (2013), digital disruption can be endogenous as well when firms seek not to simply replace an existing process or outcome but new means of meeting a fundamental consumer need. In other words, one could achieve digital disruption through the deliberate and conscious use of existing and available, as opposed to novel and emergent, technologies (McQuivey 2013).

The contemporary business landscape has begun to move toward a digitally disruptive access economy—a world in which everyone has the tools to bring their ideas to the market, test them, refine them, and eventually disrupt the status quo (McQuivey, 2013). In part, rising interest in innovative mobile commerce (m-commerce) platforms that drive new commercial services and offerings (which owe in part to the ubiquitous connectivity, personalization, and affordability of mobile devices and applications (Khansa, Zobel, & Goicochea, 2012) have fueled this disruption. Similarly, the demand for entertainment and information (Xu et al., 2011) and recent technological advances (e.g., GPS, NFC, etc.) have driven the massive growth in mobile applications, platform development, and consumer uptake (Rivera & van de Meulen, 2013). Network technologies today have an incredibly powerful ability to create rich personalized experiences, track interactions in real time, and aggregate, analyze, and make use of them when platform entrepreneurs who seek to revolutionize the value proposition of goods and services apply them. Such rapidly emerging platforms have enabled new consumption economies of products and services to emerge. For example, researchers consider collaborative consumption, an economic model based on sharing, renting, swapping or trading products and services with the benefits of ownership but without actual ownership, to be the next generation of consumption over a technology-mediated environment (Botsman & Rogers, 2010; Nguyen, 2014). Ride sharing (e.g., Zipcar, Uber), textbook rentals (e.g., Chegg, Zookal), and skill sharing (e.g., Techstreet, Tradeschool) represent just several examples of platforms that channel this emergent type of consumption, which reduces the cost of services and the burden of time and resources in the new access economy (Botsman & Rogers 2010; Nguyen, 2014).

Multi-sided platforms that disrupt markets generally operate as an IT-enabled commercial network of suppliers, intermediaries, and consumers (Cusumano & Gawer, 2002) and facilitate transactions between these different sides of the market to add value (Gawer & Cusumano, 2008). Notable multi-sided platforms include Yellow Pages for consumers and advertisers; eBay for buyers, advertisers, and sellers; Google and Facebook for advertisers and Internet users; and Alibaba for its large network of sellers, promoters, and buyers (Eisenmann, Parker, & Van Alstyne, 2006; Rochet & Tirole, 2003). Technology underpins these multi-sided platforms, and a slew of technological advances over the past decade have formed the basis of their growing usefulness and number of affordances (Boudreau & Hagiu, 2009; Hagiu, 2009b). At its core, these multi-sided platforms afford two functions: “reducing search costs incurred by the multiple constituents before transacting, and reducing shared costs incurred during the transactions themselves” (Hagiu, 2009a, p. 5). Thus, a multi-sided platform's ecosystem comprises a platform and the constituents specific to it (Boudreau & Hagiu, 2009; Hagiu, 2009b). Hence, multi-sided platforms must attract sufficient mass from participating groups and provide value to each group in order to achieve sustainable growth. These multi-sided platforms generate value by facilitating new forms of consumer interaction (Hagiu & Wright, 2013; Tiwana, Konsynski, & Bush, 2010), including facilitating the resurgence of traditional consumption patterns into the mainstream (Belk, 2010, 2014).

While research on platforms continues to grow, researchers have noted that this research is inadequate for several reasons. First, many studies focus only on pricing and competition between platforms. However, understanding how a platform (e.g., goCatch) and its consumers (e.g., the taxi drivers) can change consumers' behaviors in regulated markets could potentially help others develop new business models and strategies. Yet, this area remains relatively unexplored. For example, do platform businesses set out to disrupt markets, or do well-functioning and low-cost service platforms eventually do so due to

their success (Christensen, Raynor, & McDonald, 2015; Sampere, 2016) (or are both mechanisms of disruption equifinal)? Research has not addressed these questions. Second, one cannot readily apply the conventional coordination mechanisms found in the information systems (IS) development literature to practice because platforms have a significantly wider strategic scope than individual firms: that is, managing platforms entails interactions and interdependencies of wide variety of entities that exist outside individual firms' boundaries. Third, some researchers have called for further research on the technology aspects of competitive platform environments (Gawer & Cusumano, 2008, 2014) to better understand how multi-sided platforms can stimulate and channel innovation. According to Tiwana et al. (2010), research on platforms can bring the IT artefact into the core of theoretical development in relation to platform evolution and, in doing so, contribute unique insights that are distinct from strategy and economics.

2.2 Technology Affordances

Researchers have discussed affordances from myriad perspectives. In psychology, the concept of affordances draws on an ecological alternative to explain how one can directly perceive the inherent values and meanings of things in the environment and how individuals can link this information to possible actions that the environment offers (Bolanos, Fontela, Nenclares, & Pastor, 2005). In IS, the affordance concept centers on the effects of introducing technology to organizations (Volkoff & Strong, 2013). Various researchers assert that using affordances can inform one about IT-associated organizational change processes (Volkoff & Strong, 2013), lead to theorization on how technologies offer possibilities for action to work teams and organizational units (Malakedsuwan & Stevens, 2003; McLaughlin, 2003), and result in the creation of new organizational forms (Leonardi, 2011; Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007).

In this study, an IT affordance refers to a potential action (i.e., what individuals or organizations with particular purposes can do with technology or IS) (Strong et al., 2014). In a real-world domain, one can view IT-associated change as interacting strands of affordances that span time. These affordances can include basic (mandated or intended use), integration, standardization, control, analysis, and communication affordances (Volkoff & Strong, 2013). For example, technology affordances for learning include information accessibility, task automation, knowledge representation, and communication/collaboration with peers and experts (McCrary, Putnam, & Jansen, 2008). Healthcare-related technology that ranges from electronic health records and personal health records to decision support and telemedicine systems allow clinicians to access patient data and medical histories electronically and use this information to inform their pertinent healthcare decisions (Chad, 2011; Goldschmidt, 2005). As we explain in Section 2.1, some multi-sided platforms can potentially leverage advances in IT to afford functions such as reducing the search costs that multiple constituents incur before transacting and reducing the shared costs incurred during the transactions themselves. Different actors actualize affordances differently, and affordances can both enable and/or constrain (Jharkharia & Shankar, 2004). At the organizational level, actualization refers to the collective actions that actors take to take advantage of affordances through using technology to achieve outcomes in support of organizational goals (Russell & Hoag, 2004). Multiple affordances are present at the same time, and, therefore, understanding the nature of the relationships between affordances helps explain the way in which actualized affordances unfold (Jharkharia & Shankar, 2004).

On a more granular level, IT affordances include a motivational aspect. Motivational affordances include an object's properties that determine whether and how it can support one's motivational needs. According to Zhang (2008), technology can and should have motivational affordances such that the ultimate goal of designing and deploying IT for human use is "to achieve high motivational affordance so that users would be attracted to it, really want to use it, and cannot live without it" (Zhang, 2008, p. 145). Building on this perspective of IT affordances, Deterding (2011) conceptualizes situated motivational affordances to describe the opportunities for satisfying motivational needs that stem from the relationship between an artefact's features and a subject's abilities in a given situation. This relationship comprises the situation itself (situational affordances) and the artefact in its situation-specific meaning and use (artefactual affordances). Objects afford motivation when the relationship between an object's features and a subject's abilities allow the latter to experience the satisfaction of needs when interacting with the object. For example, "relative to my skills and knowledge, this Sudoku puzzle in front of me affords an opportunity to experience myself as competent when interacting with it" (Deterding, 2011, p. 2).

Based on the above, we conceptualize affordances as relationships between an individual's abilities and an information technology's features in the environment in which IT features function (Chad, 2011).

Affordances and technological change are invariably linked, and IT applications increasingly build on the knowledge and skills of professionals and day-to-day practices. IT-enabled solutions can simultaneously lead to new or improved capabilities and relationships and the better use of assets and resources (i.e., enhanced capacity to act). In summary, we apply the concept of affordances as a theoretical perspective to study how multi-sided platforms achieve digital disruption to satisfy the needs of their intended subjects. When viewing digital disruption as the satisfaction of business and consumer needs, IT affords the subject the opportunity to satisfy their motivational needs when interacting with the IT artefact or object.

3 Case Study Method

Given our research agenda, we adopted an interpretive case study methodology for several reasons. Recognizing that digital disruption forms an inherently complex and multi-dimensional phenomenon that can be embedded inside or outside of a firm's context, an objective approach might be difficult (Koch & Schultze, 2011). Thus, we examined the phenomenon by exploring the understanding that relevant stakeholders and technology users share (Klein & Myers, 1999). The case study research methodology also suits exploratory research well (Siggelkow, 2007). In particular, by using the method we adopted, we could delve into operational processes (Gephart, 2004) and address our "how" research question (Walsham 1995). Table 1 summarizes how we applied the principles for interpretive field research (as Klein and Myers (1999) propose) to study goCatch.com.

Table 1. Application of Principles for Interpretive Field Research (Klein & Myers, 1999)

Principle	Evaluative criteria for principle (p. 72)	How we applied the principle
Fundamental principle of the hermeneutic circle	<i>Requires that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form.</i>	We conducted interviews with co-founders, managers, and department employees of goCatch. These personnel had specific knowledge of the daily operations in their departments. We also conducted interviews with taxi drivers of the platform to gain a comprehensive understanding of the services and operations. With the responses to the specific questions we posed, we could move from a functional understanding to the larger study context.
Principle of contextualization	<i>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.</i>	We interviewed key groups from goCatch platform and user groups. The interviewees were vastly experienced personnel including goCatch employees and taxi drivers, and some had moved from other platforms. Besides the pertinent research questions, we discussed generic topics from milestones and critical growth phases of the company to daily operations and transactions.
Principle of interaction between researchers and subjects	<i>Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants.</i>	We employed an iterative interview strategy: findings from the first interview informed new questions that we used in the second interviews and so on. We shared our findings consistently with interviewees in a given context to obtain feedback; for example, the cofounder described a scenario pertaining to a passenger complaint, which we verified with the manager of customer services.
Principle of abstraction and generalization	<i>Requires relating the idiographic details revealed by the data interpretation through the application of Principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding ints, getting the</i>	We created a preliminary framework based on concepts derived from the literature relating to platforms and, subsequently, IT affordance to capture and organize field notes. During the interviews, we took field notes to relate specific instances and idiosyncrasies to theoretical concepts (although not forcefully).
Principle of dialogical reasoning	<i>Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.</i>	Findings challenged our preliminary conceptualizations during and after the site visit. These observations challenged our preconceptions and led to our making revisions to our original theoretical lens. We discovered an understanding of platforms from a motivational affordances perspective through this process.

Table 1. Application of Principles for Interpretive Field Research (Klein & Myers, 1999)

Principle of multiple interpretations	<i>Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study; similar to multiple witness accounts even if all tell it as they saw it.</i>	We applied the rule of triangulation to ensure that the interpretations of interviewees from different work areas converged. For example, we used follow-up and confirmation questions to clarify responses that contradicted those of other interviewees. We asked interviewees to describe or confirm their interpretations of critical events if needed.
Principle of suspicion	<i>Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.</i>	We sourced other data, such as official company releases, independent reports by consultancy firms, media releases and secondary data, to eliminate possible distortions and false interpretations by interviewees and researchers. We conducted several discussion sessions between ourselves to ensure we reliably and consistently interpreted the data

3.1 Case Selection and Description

Because we focus on digital disruption, the case organization we selected needed to be recognized as a digital disruptor. Thus, we selected goCatch for our study because it represents an emergent digital disruption in the taxi industry in Australia (Andrew, 2013). In recent years, taxi apps have attracted the attention of governments and public transport authorities worldwide and huge million-dollar investments from major technology companies and entrepreneurs (Josh, 2014; Michael, 2013). goCatch has had a similar impact in Australia to Uber globally (News.com.au, 2014), Hailo in the UK (Buvat & Subrahmanyam, 2013), and Didi Dache in China. In addition, we decided that our case organization should be a start-up for two reasons. First, start-ups have long been recognized as the key drivers of innovation and generally experimenters that are willing to try new models and approaches to make innovation work. They are also known to be more inclined to take risks in introducing disruptive technologies in spite of limited resources (Katila & Shane, 2005). The fact that they do not have an existing consumer base and, thus, do not need to comply with existing demands or cannibalize their existing product offerings often justifies this level of risk (Christensen, 1997). Second, the extant literature has examined technology-driven start-ups in a range of contexts (Gruber, MacMillan, & Thompson, 2008) and characterized these new ventures as comprising a combination of the individual(s) involved, the environment, the organization, and, most importantly, the process (Gartner, 1985). Start-ups also entail elements such as funding, business strategy, and the identification of market opportunities. These elements are particularly relevant given the digitization of the economy and the continually changing business environment.

For the above reasons, we identified goCatch as an appropriate case organization. GoCatch is a mobile application development firm based in Sydney, Australia. The company launched the first iteration of the goCatch cross-platform mobile application in 2011, and, in three years, the app gathered more than 150,000 passengers globally and over 15,000 registered drivers. A government start-up grant from New South Wales Department of Trade and Investment also supported it. According to *The Sydney Morning Herald* (2012), the company was valued at AUD\$19 million in 2014 and was backed by notable business owners and venture capitalist firms in Australia. By late 2015, passengers had ordered more than two million taxi rides using the goCatch app from which taxi drivers realized over US\$43 million worth of business income. The app's significant user base establishes goCatch as a substantial community, the core functionality of which depends on the interaction between different entities (i.e., drivers and passengers). According to its website, goCatch has 30,000 registered drivers and 3.1 million app downloads as of 2016, and it announced its first rideshare service in Sydney in February 2016.

3.2 Data Collection and Analysis

The case study commenced in May, 2013. We conducted interviews with goCatch executives, employees, and taxi drivers over a two-year period between mid-2013 and mid-2015. We conducted ethnographic interviews (Spradley, 1979) with taxi drivers during jobs over a span of twelve months. Table 2 presents a list of the interviewees and the topics discussed. We used one-on-one (Frey & Fontana, 1991) semi-structured interviews as our primary means of collecting data. The semi-structured interviews (Taylor & Bogdan, 1998) provided a qualitative view of IT's role in goCatch's development. As an example, one

question we asked employees was: what features did you introduce or improve to increase user engagement and what were the issues facing users of the platform service? One question we asked users of the service included: how have you benefitted from the use of goCatch? We coded and analyzed the interview transcripts to conceptually distinguish between the various stages of goCatch's growth in which the company leveraged distinct technology affordances to satisfy consumer needs. We contacted random individual taxi drivers as we took taxi rides (akin to convenience sampling) (Marshall, 1996). We selected only taxi drivers who had installed and used goCatch. In total, we contacted 13 taxi drivers, and their interviews provided immersive and rich accounts for our study. We recorded all interviews and gathered supporting evidence from a variety of sources, including news articles, videos, observations, and site visits. We selected data sources based on their potential to provide a solid foundation for understanding the context under study (Myers, 2009) and address the research question.

Table 2. Summary of Interviewees and Topics

No.	Interviewee	Topics addressed in key questions
1	Co-founder/co-CEO	Business idea, creation of app and platform, venture capital/funding, firm history, culture, milestones, future initiatives.
2	Head of engineering	Geospatial mapping, real-time data, app functionality, technologies implemented, future initiatives.
3	Head of mobile development	Geospatial mapping, app design, data analytics, app functionality, future initiatives with taxi drivers.
4	Software engineer	Application functionality, internal IS, technologies implemented.
5	Head of user experience and design	App design, business intelligence/data analytics, app functionality.
6	Support officer	User issues, user feedback, internal processes, future initiatives.
7-19	Taxi drivers (1-13)	Driver attitude towards goCatch, strategies for getting fares, driver and passenger experiences, value of app, interactions with goCatch.

While we collected data, we analyzed it in the form of open, axial, and selective coding (Strauss & Corbin, 1990). We analyzed the data concurrently while collecting it (Eisenhardt, 1989) so we could compare the preliminary findings of the case against our theoretical lens to shape our initial theorizing. We then constantly switched between analyzing subsequent interview data, our theoretical perspectives, and the relevant literature and sources to build an explanation (Walsham, 2006). During open coding, we assigned conceptual labels to the data to capture the essence of goCatch's operations and how the taxi drivers used the technology and, thus, to reduce the data into a manageable number of categories and identify recurring themes. Our theoretical lens offered some conceptual labels, including "situational affordances", "artefactual affordances", and "motivational affordances", while the data revealed others, including "gaming elements" and "competition". Next, we linked similar concepts from the open coding to form axial themes; for instance, "driver levels" and "goPoints" were mechanisms for encouraging "gamification" among constituents. We also identified patterns to gain a fuller understanding of how goCatch achieved digital disruption. Based on the emerging data, we also sought to discover patterns and develop further mappings of the coded responses and theory through selective coding. We compared the mappings with our conceptual model to shape how we interpreted the e-hailing phenomenon and refine our model iteratively. We repeated the process until we reached theoretical saturation (Glaser & Strauss, 1967).

4 Case Findings and Discussion

In this section, we present our empirical observations and representative quotes associated with our theoretical arguments to delineate how a disruptive platform can leverage technology affordances to meet consumer needs. We support our narration of goCatch's journey with quotations from our informants and excerpts from other sources of evidence and intertwine it with theory to demonstrate the close connection between the empirical evidence and the emergent theory (Eisenhardt & Graebner, 2007). The arguments presented in the paper are based on the above-described iterative process in which we corroborated the emerging model with our data and the relevant literature to address our research question. We present our findings by summarizing the background of the case study before we discuss how goCatch disrupted the Australian taxi industry over three distinct phases and the technology-induced changes in consumer behavior in each phase. In Section 4.5, we present a table that summarizes our findings and a model that visually represents our theoretical arguments (Eisenhardt & Graebner, 2007).

4.1 Background: The Australian Taxi Industry

In Australia, a taxi must be affiliated with an authorized taxi operator or network, such as Yellow Cabs and Silver Top Taxi Services, which facilitates a range of functions including taxi fit out, booking services, safety monitoring, and other compliance activities. Taxi drivers are independent contractors and can use any service or even multiple services to acquire passengers. Cabcharge, established in 1976 by the taxi industry, is a financial services provider for the industry. Its primary business involves providing an alternative electronic payment system to cash for the majority of taxis in Australia according to the Cabcharge corporate website. Cabcharge also owns a subsidiary that provides booking and dispatch services, vehicle leasing, loans, insurance, smash repairs, and driver training for the major taxi operators in Australia. Due to the increase in the use of e-hailing and ride-sharing platforms services such as Uber, Ingogo, and goCatch, the Australian taxi industry is in a state of flux, and various Australian states and territories have implemented or reviewed regulatory reforms. For instance, the New South Wales and Australian Capital Territory Governments have moved to regulate ridesharing in 2015 (Deloitte, 2016). The Western Australia and the Tasmanian Governments have also signaled that they will review their regulations. The Point-to-Point Transport (Taxis and Hire Vehicles) Act clarifies the states' plans to regulate ridesharing towards a sustainable, safe, and equitable market.

4.2 Consumer Recognition: An Industry Alternative for Consumer

Prior to the inception of e-hailing apps such as goCatch, Cabcharge Australia held a virtually monopolistic position in the setup required to operate in the taxi industry, particularly in the area of financial services. As Taxi driver 1 noted: "When we fit the taxi, we have to use them [Cabcharge] for payment". The existence of monopolistic conditions presents several shortcomings in the existing practices. In particular, one primary limitation relates to the inefficiencies in acquiring passengers for the taxi drivers, including street hails, taxi ranks, and traditional taxi networks. As a goCatch support officer noted: "They [drivers] don't get terribly good service from it [taxi radio networks], and they don't trust that the passengers will be there. It's old technology, taxi networks hate them, and the taxi industry is a mess." Taxi driver 13 added: "Taxis are very much into total market domination, and I believe they would not be beyond punishing drivers who are subscribed to their dispatch system but actively promote another service". This situation presented an opportunity to provide an alternate service to meet user needs and, in particular, motivation for more business (for drivers) and lower transaction costs.

Hence, goCatch's founders set out to design a service platform to connect taxi drivers and passengers directly and, thus, offer transparency into the taxi-hiring process. The company's co-founder explained the design of its mobile application:

We wanted to build an app that went peer-to-peer, from drivers' phones to passengers' phones and that you could book and pay for taxis.... We hatched the idea for a mobile phone app that lets you see where your taxi is approaching in real-time and with the business model of taking payments through the application, and dis-intermediating Cabcharge.

Through the platform, passengers can connect and communicate directly with the drivers and vice versa. In addition, providing the location and registration plate of the taxi via the application significantly benefits passengers. According to taxi industry reports, anonymity in existing methods of connecting drivers and passengers has frequently contributed to crime and fraudulent activity, such as fare evasion, overcharging, or misreporting of fares (Davies, 2014; Transport for New South Wales, 2016). The alternate technology to track the route of the ride and record the vehicles' details before pickup and in-journey reduces anonymity and the potential for crime and, thus, enhances safety and transparency for both riders and drivers. Furthermore, the technology provides recourse to passengers who believe their drivers took unnecessary detours and prevents passengers from evading fares (Davies, 2014; Transport for New South Wales, 2016).

Soon after goCatch launched, many taxi drivers and passengers quickly realized that the goCatch platform was a superior alternative to the existing taxi-booking practices and services. Taxi driver 2 noted: "Today, [I use] about twenty percent goCatch, twenty percent Ingogo, besides the traditional [booking] system". Many drivers we spoke to found that the platform was fundamentally different and more efficient in terms of taxi-booking, payment, and dispatch services as compared to the traditional taxi radio networks. In addition, by augmenting the taxi drivers' experience and knowledge of routes, the platform affords them the means to develop competence in satisfying their users' needs. On the other hand, goCatch does not have to manually roll out its platform in individual cities before locals can use it as long

as the number of drivers and passengers is sufficient. According to the co-founder: “We [goCatch] took a more viral and open marketplace approach to the application, so you [users] can use it anywhere in the world”. This approach motivates users to use the goCatch app more in order to connect and communicate. In summary, the goCatch platform addresses extant problems in taxi hailing for all network constituents (i.e., drivers and passengers) and breaks Cabcharge’s monopoly to better address their users’ needs.

4.3 Consumer Engagement: The Function of Gamification for Consumer

goCatch’s rapid growth in user base is a core contributor to its success as a disruptive innovation, but it also presents goCatch with the challenge of engaging new users who are unfamiliar with appropriately using the mobile platform. The co-founder explained:

We thought we’d just build an app and people would use it and it’d be great. What we didn’t foresee was it is a massive challenge to actually get people taxis! Taxi drivers cherry pick the best fares [and] ignore the short fares. It’s very difficult to get drivers to pick up passengers during peak periods of demand too. So you get these huge spikes of demand, and then troughs again, so we had to solve that problem.

Taxi driver 6 explained drivers’ motivation for using the new platform for their business: “It is a good system but it’s hard as jobs are usually on the other side of town when they are offered to me”. As the co-founder and the head of user experience explained:

It took us quite a long time to get the initial vision out the door, couple of years, and then what we found was, what we had to build was supporting infrastructure.... It gets more and more complicated the further we go. When we were at the early stages, the product was quite small. We’ve really followed the lean start-up approach and built a MVP [minimal viable product] and got it out there, it was as minimal as we could make it.

The situation presented the team with an opportunity to improve on the platform’s technology primarily to incentivize and recognize drivers that take up certain jobs and to improve passengers’ participation.

The co-founder explained:

We came up with a system that rewards drivers for picking up the short fares, so what we do now is that we give points [called goPoints] to drivers for picking up jobs, and those points translate to status, so the driver will go from bronze, to silver, to gold, and then when the valuable jobs come through, the \$80, \$100 fares and the airport runs, we dispatch those jobs to the gold drivers first.

These “small wins”, as several drivers noted, motivated them to engage with the goCatch app more frequently. However, some reports have suggested that not all the game elements are universally compatible with all users (Lee, Goh, Chua, & Ang, 2010). Following the development of the app, goCatch processed the available data in order to select which game elements it should use more frequently and to understand how those elements would affect the hailing process. An IT vendor provided a system that affords decision making (which job for which driver) and the coordination of driver allocations (picking the nearest job). The goCatch head of mobile development explained:

With the new job dispatch algorithm, we should’ve gotten you a taxi that was closer, so that’s a combination of things that we can do to fix that—driver engagement, keeping drivers engaged in the application, but also not dispatching the job too far away.

These findings illustrate how gamification improves the engagement of users on a platform, an emergent characteristic of digital disruption. goCatch recognized the importance of engaged users and them to actively engage with its service. goCatch itself compared its own gamification elements (goPoints) with frequent flyer schemes, which indicates its awareness about applying gamification (Jager, 2013). The head of mobile development explained: “It’s been the constant iteration of the goCatch system, a lot of the [user interface] around feedback of drivers—important for goPoints, getting the level-ups information is pretty key for [the user experience of] the driver”. The algorithm and improved user interface behind goPoints encouraged regular interactions between the drivers and goCatch. The goCatch head of mobile development stated: “We want drivers to keep the app in the foreground so we want drivers to pick up short fares, for example, badges for picking up five short fares, so they get the badge, and get some points”. In fact, in 2016, goCatch partnered with Qantas—one of the world’s largest airlines in terms of

fleet size, flights, and destinations—to encourage passengers to use the app by linking it to Qantas frequent flyer memberships. These measures all focused on deepening the taxi driver passengers' engagement with the platform.

4.4 Consumer Transposition: Empowering Consumer with Technology

Through using elements such as scoring and competition in the platform, drivers adopted different strategies to acquire passengers and become motivated. Taxi driver 11 explained: “I get 10 to 30 percent more jobs. I would've thought money would be a priority (instead of points).” This example shows how driver behavior changed due to the logic integrated in the platform, and many other drivers we spoke to echoed a similar reflection. goCatch rewarded drivers for desirable behavior (by gaining goPoints) and punished them for undesirable behavior (e.g., losing points for dropped bookings) (Lee et al., 2010; Santhanam, Sasidharan, & Webster, 2008). The goCatch support officer explained the competition among drivers:

You find with a lot of the drivers that they are so points driven, they don't care. It's not even about the monetary value of the jobs they get. It's about being able to get better jobs and regular clients.

Taxi driver 3 added: “We [taxi drivers] compete with the points. We discuss how to get more points.”. Thus, the increased consumer engagement with the goCatch platform for largely a non-economic motivation (points) also inadvertently fostered a community that demonstrated patterns of resource sharing (Belk, 2010, 2014). This peer-to-peer sharing of knowledge among users (i.e., taxi drivers) through the platform is akin to the emergent collaborative consumption phenomenon (Hamari, Sjöklint, & Ukkonen, 2015) and provides goCatch with an opportunity to influence behavior.

According to our findings, taxi drivers also enjoyed a sense of achievement and empowerment through elements such as earning badges or “leveling up” through stages. As the support officer noted: “It's [goCatch application] changing the mindset of these passengers, who've had nothing else to use beforehand, and had to rely on these taxi networks”. One can clearly see how the system influence and conditioned how users interact. The drivers' embracing of points over monetary value and their practice of actively providing feedback to goCatch constitute unusual empirical corroboration for the idea that such influences may extend outside the realm of a service such as goCatch (Jercic et al., 2012; Toups, Kerne, & Hamilton, 2011). Taxi driver 4 stated: “Customers (referring to his passengers) like the rating system and so do I. All discussions I have had with the passengers regarding goCatch have been positive.”. The head of mobile development summarized the scope of this influence on driver behavior as follows:

I think they really embraced the service from day one. That's the really awesome thing about [the goPoints system]—the drivers understood it intuitively. We didn't have to call them or explain and train them, they just saw it, “ooh, points”, and they grab the points.

From the findings, we posit that the goCatch platform has shifted drivers' motivation from monetary value to points and from competition to collaboration. Through open communication channels between the drivers, the goCatch platform has fostered an altered sense of competition and, at other times, cooperation (Toups et al., 2011). Communication between constituents of a multi-sided platform, such as through chats, groups, or forums, is especially useful for fostering game-like communities (Romero et al., 2012). Drivers' offering solutions through the goCatch platform evidences that, when applied to learning activities, these types of platform can influence the nature of user learning outcomes (Santhanam et al., 2008). Once companies such as goCatch implements and assesses game-like processes, they can identify failures and areas for improvement (Liu, Li, & Santhanam, 2013). From there, goCatch could review its processes more comprehensively to develop further designs that better satisfied its users' needs.

4.5 Disruption through IT-enabled Recognition, Engagement, and Transposition

Through the case study of goCatch, we identify that a multi-sided platform can disrupt a market via IT-enabled consumer recognition, engagement, and transposition. We also illustrate the situational and artefactual affordances and how their actualization in each stage helped goCatch disrupt the taxi market in Australia. By using motivation affordances, which comprise situational and artefactual affordances, we capture the relationship between an object's features and a subject's abilities that allow the latter to experience the satisfaction of needs when interacting with the object. We summarize our findings in Table

3 and Figure 1. The model outlines a roadmap of how a multi-sided platform can leverage technology affordances to enable digital disruption. We summarize and discuss our summary model.

Table 3. Summary of How the goCatch Platform Leveraged Technology Affordances to Disrupt the Taxi Industry¹

Study themes	Phase 1 observations	Phase 2 observations	Phase 3 observations
Situational affordance: the situation itself.	Monopolistic service market conditions.	Unfamiliarity among consumers of platform service.	Competition among consumers for resources.
Artefactual affordance: the artefact in its situation-specific meaning and use.	To connect and communicate openly with consumers on platform application.	To incentivize and encourage consumers to participate on platform application.	To habituate and empower consumers on platform application.
Actualization: actions taken to take advantage of affordances through artefact use.	Alternating between traditional networks and platform application.	Interacting with gamification elements on platform application.	Conditioning behavior through feedback on platform application.
Outcome	Consumer recognition of platform application.	Consumer engagement with platform application.	Consumer transposition through platform application.

In the first phase, the situational affordance of monopolistic service market conditions presents an opportunity for the platform provider to develop an artefact that affords connectivity and open communication between its consumers. The motivational affordances here represent opportunities to satisfy motivational needs through the relationship between an artefact's features and a subject's abilities in a given situation (Zhang, 2008). We posit that the relationship between the goCatch artefact's features and subjects' abilities (such as the taxi drivers' ability to choose optimal routes and openly communicate feedback about the artefact) allows the latter to satisfy their motivation needs over time through their actions (actualization). This actualization represents the alternating between traditional networks and the new platform in the case of goCatch. Ultimately, this actualization leads to lower transaction costs and better consumer recognition of the platform.

In the second phase, the situational affordance of unfamiliarity among consumers about the platform leads to an opportunity for the platform provider to develop an artefact that allows consumers to participate in the use of the platform more effectively. The actualization of motivational affordances is represented by experimentation with gamification elements in the artefact. This actualization demonstrates that one can implement features to provide consumers with previous experience with other applications to deepen their engagement with the platform. In our case, the goCatch application and points system allowed drivers to experience and become competent in earning points when interacting with it. The goPoints system introduced game elements, such as scoring (Charles, Charles, McNeil, Bustard, & Black, 2011), challenges in progression difficulty (Toups et al., 2011), and competition (Romero et al., 2012), which engaged both drivers and passengers and motivated them to use the service for longer and expend more effort on it (Liu et al., 2013). More specifically, the function of IT-enabled gamification—an emergent strategy in practice that goCatch used to engage taxi drivers to change their behaviors, develop their skills and drive innovation (Gartner, 2014)—played a central role in its strategy to engage taxi drivers and passengers. The literature generally supports the use of gaming elements to engage consumers (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011b). Ultimately, this actualization of motivational affordances leads to greater consumer engagement with the platform.

In the third phase, the situational affordance of competition amongst consumers for limited resources, such as points in our case study, presents an opportunity for the platform provider to habituate and empower taxi drivers on the platform. This ties in closely with the motivational affordance to drive consumer uptake and effectively compel the subjects to interact with the artefact, potentially suggest it to others, and consequently drive overall acceptance. The actualization reflects conditioning behavior through feedback via the platform, which may entail directly soliciting consumer feedback, encouraging consumer-initiated feedback, or indirectly observing the consumers' actions. While these outcomes can be considered positive, they are not necessarily expected or predictable at the point of introduction.

¹ As we note earlier in the manuscript, we do not address the passenger view or reactions to the technology; any reference to consumer, customer, and users unless otherwise qualified refer to the taxi drivers only.

Extending the effects of deeper consumer engagement, it is clear that it also affords a change in consumer behavior to optimize the effects of gamification. Similarly, the maturity and sophistication of gamification require an effective use of rewards and feedback to ultimately deliver consumer transposition to a wider audience. Consumer transposition through a platform describes the ability of an artefact to alter the key aspects of the consumers' behavior.

Finally, our model suggests that traversing the three stages would represent a platform provider's successfully creating business value via actualizing situational and artefact affordances. This trajectory can cause a digital disruption as the continued development of a user base materially detracts from the traditional ways of creating value in an industry. In our case study, the goCatch platform added to competition and provided a different service as compared to the traditional players in a regulated market. According to OzCabbie.com, an independent online magazine for Australian taxi drivers, taxi drivers in Sydney that have used e-hailing applications have reported an increase in earnings of 20 to 30 per cent, and many have claimed that they have obtained twice as many bookings using an application such as Uber, Ingogo, or GoCatch in addition to traditional networks as compared to exclusively using the latter (Davies, 2014; Deloitte, 2016). One can consider technology as disruptive, although not intrinsically (see Christensen, 1997), if it alters value, revolutionizes an organization's business model, and/or fosters radical change in an industry or industries (Utesheva, Simpson, & Cecez-Kecmanovic, 2015). While our study may focus on a specific context, the derived model may nevertheless apply to other cases of digital disruption because if a digital disruptor can establish a significant user base by better meeting an existing need, it is unlikely for the same user base to persist with previous technologies and practices. Although it is possible that digital disruption could increase a user base by acquiring new users via catering to previously unmet needs, digital disruption can cater to existing users who now have a better means of satisfying an existing need as well (McQuivey, 2013).

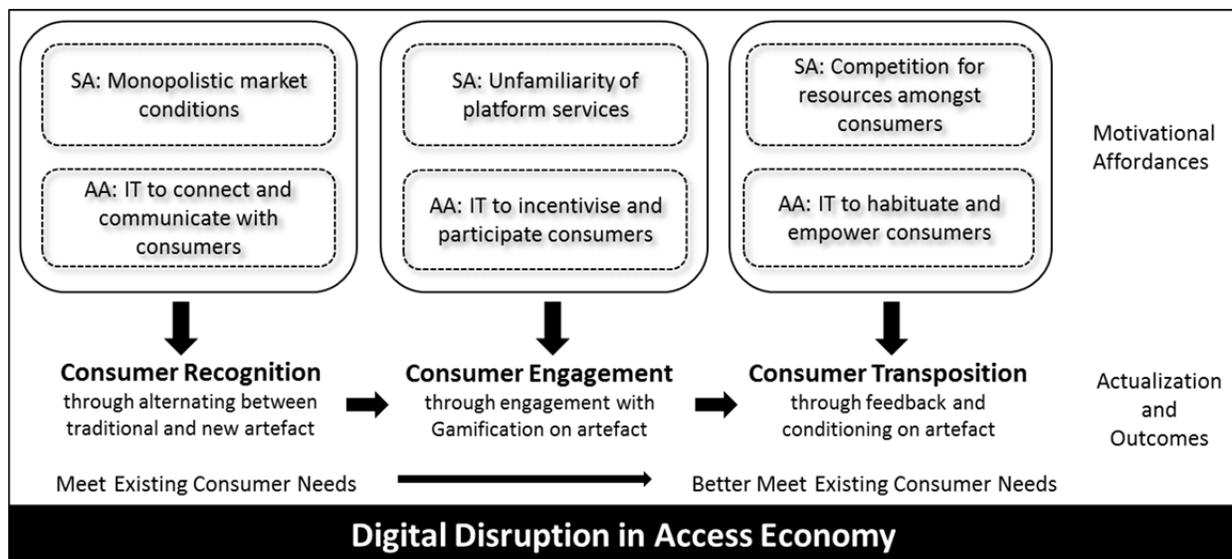


Figure 1. A Summary Model of How a Disruptive Platform can Leverage Affordances to Meet Consumer Needs in an Access Economy²

5 Implications and Limitations

Our study contributes to both practice and theory. In terms of practical implications, our case study provides insight into the contingencies that entrepreneurs should especially consider when seeking to bring an innovation to market and grow a platform—particularly the need to understand the business environment in which they base a potential start-up (Gruber et al., 2008). According to the U.S. Bureau of Labor Statistics and the Australian Department of Industry, a significant number of entrepreneurial ventures fail to progress beyond five years of operation despite offering high-tech breakthrough innovations. Inherently, focus must remain on start-up survival (Bayus & Agarwal, 2007) as firms need to

² SA: situational affordances; AA: artefactual affordances.

extend their best efforts to maintain their ongoing operations and strive for continual growth in order to achieve their organizational aims and goals. While Christensen et al. (2002) propose a series of tests to assess the opportunities for a new business to disrupt an existing market, their prescriptions lack detail on how one might form a disruptive new business. goCatch represents a new market disruption that seeks to replace an incumbent by developing a radically different offering (Christensen & Raynor, 2003). Our study augments the state of existing knowledge by suggesting several new ideas that surround the adoption strategy of disruptive innovations. Assuming that incumbents and their consumers are willing and able to adapt to changes (Elie-Dit-Cosaque & Straub, 2011), our findings can also provide indications for incumbents that opt for significant change.

Our study also reveals that the decision to develop and deliver a disruptive innovation has its challenges. More specifically, success depends on the collaborative effort of both the business that develops/delivers the platform and the consumers that adopt/use the technology. In addition, the barriers to adopting a disruptive technology are specific to its nature and context. Other potential hindrances that research has described include limited consumer adaptation (Elie-Dit-Cosaque & Straub, 2011), unpredictable business potential (Constantiou, Papazafeiropoulo, & Dwivedi, 2009), organization size (Garrison, 2009) and existing organizational culture (Tellis, 2006). Our study also has wider implications on the understanding of adopting disruptive technologies. For example, although substantial evidence in the literature suggests that the adoption of disruptive technologies is the practical and feasible choice for start-ups or smaller-sized firms (Garrison, 2009), larger organizations can potentially also adopt and/or deliver a disruptive innovation (Carlo, Lyytinen, & Rose, 2011). However, given that organizational flexibility is a key factor in a firm's ability to adopt new and innovative technologies, smaller firms tend to support and develop disruptive technologies (Charitou & Markides, 2003). Start-up firms such as goCatch have fewer hindrances to adopt such technologies because they lack inertia and established processes. Our empirical results support the notion that firms need to build digital platform capabilities to reinvent core functions to accelerate digitization and derive value (Weill & Woerner, 2015) and that these capabilities also impact how users responds to digital disruption (Karimi & Walter, 2015).

In terms of theoretical contributions, our study advances our knowledge on the use of affordances in the digital context. From a situated motivational affordance perspective, the goCatch e-hailing platform has provided taxi drivers with artefactual affordances that they need to actualize situational affordances in the industry and satisfy their motivational needs. Although we do not introduce the proposed situated motivational affordance model as a step-by-step guide for how all multi-sided platforms develop, it provides a theoretical foundation for a specific context and has several practical implications. Striving for digital disruption while maintaining alignment with long-term business objectives is not trivial. For example, several studies have illustrated the importance of consumer empowerment in the context of m-commerce innovations (Andersson, Rosenqvist, & Ashrafi, 2007). At the very least, our study shows that, to effectively actualize technology-based affordances, firms need to understand what the process seeks to achieve. Firms can base this understanding on a certain level of game data analysis (including instructions, levels, and points data analysis), which will allow them to select the elements that best influence the desired outcome. This study highlights the need to understand how firms actualize affordances as a capability to leverage buyer-seller relationships. Our findings also illustrate, that unlike most markets where price plays a central role in competition among platforms, in point-to-point transport, prices (either in taxis or in ridesharing) are largely fixed; hence, competitive forces take hold in connecting people through the platform (Deloitte, 2016). This competition requires the business focus to shift, however, from simple cooperation to value creation, which demands more deeply interdependent relationships and trust (Lenox, Rockart, & Lewin, 2007). In other words, our model forms a foundation for the development of more nuanced theories (Gregor, 2006) that help better explain the underlying causes for platform development and to predict digital disruption and to describe theoretical constructs and the relationships between them.

To our knowledge, this study is also one of the first to apply an affordance perspective to gamification's role in enabling digital disruption. Our study contributes to the gamification literature by demonstrating how incorporating game elements such as levels, badges, rewards, progression, and points into a mobile application enhances a broad range of business processes (Deterding et al., 2011b). The case study provides empirical evidence about how a firm can incorporate gaming elements to develop disruptive capabilities over time and to better satisfy consumer needs. We illustrate that the use of game elements and game design techniques in non-game contexts can have strategic implications and, when applied to real-world business objectives, be a source of competitive advantage (Werbach & Hunter, 2012). Our study also supports the view that, in order to successfully implement gamification, firms require skills in

managing innovation (Broer & Poeppelbuss, 2013) and selecting gaming elements that best suit their intended purpose(s) (Leigh, 2012). Furthermore, although some studies have outlined the use of gaming elements as part of the gamification of IS (Deterding, Dixon, Khalen, & Nacke, 2011a), none provide a comprehensive list of recommended gaming elements. From our perspective, such lists are not necessary because these elements simply form the building blocks of gamification such that their actual application depends on a developer's intention for the IS and the targeted metrics that one intends the gamification process to improve. To date, gamification implementations have obtained unexpected results for firms (Fitz-Walter, Tjondronegoro, & Wyeth, 2011). Contrary to suggestions that one should view the gamification process as a secondary or supportive function for a service activity rather than a core capability (Liu, Alexandrova, & Nakajima, 2011), our study shows that incorporating gaming elements can have a significant appeal to consumers who can become engaged and motivated to interact with the artefact.

Our study has several limitations. First, we conducted our study based on a single case study, and researchers have criticized such approaches for poor generalizability (Walsham, 2006). While single case studies are a "typical and legitimate endeavor" (Lee & Baskerville, 2003, p. 231) in IS research, we acknowledge that generalization in a statistical sense is impossible with our research design. However, we contend that one can generalize our study beyond its singular context because we grounded the model we developed in goCatch case's empirical reality and corroborated it with some of the most established works in the literature on digital platforms and technology affordances. As such, this study invokes the principles of "analytic generalization" (Yin, 2003, p. 32) or what Lee and Baskerville (2003, p. 235) refer to as "generalizing from description to theory". Nevertheless, future research could statistically validate the propositions of our study to better define the boundary conditions of the model.

Second, we focused only on the motivational affordances that goCatch leveraged and their impact on only a single type of platform consumers (i.e., drivers). However, a disruptive platform may include many types of platform consumers (e.g., passengers in the case of goCatch), and the motivational affordances relevant to other platform consumers may differ. While it is certainly impossible to exhaustively account for all possible motivational affordances that pertain to the various types of platform entities in all possible forms of disruptive platforms in a single case study, examining the motivational affordances that are relevant to other platform entities could be a fruitful avenue for future inquiry. Investigating the motivational affordances in disruptive platforms that have a different configuration or business motive could yield important insights, too. While they fall beyond our scope here, future studies in these areas would certainly provide a more complete picture of the role of motivational affordances in disruptive platforms.

6 Conclusion

In conclusion, digital disruption is dramatically changing the way in which businesses operate, individuals use public services, and companies build innovations. Despite the recognition that platforms are disrupting established ways of capturing value and doing business, the way in which firms achieve digital disruption remains relatively understudied. We address this research gap in studying the goCatch platform by leveraging situational and technology affordances and competition principles such as gamification to create value and foster consumer interaction. From our results, we develop a summary model of how multi-sided platforms can leverage motivational affordances to enable digital disruption. Our study suggests that the development of digital disruption and value in an m-commerce context is not straightforward. It also sheds some light on the relationship between situational and technology affordances, digital disruption, and value creation in an m-commerce business.

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