

**DYNAMIC CAPABILITIES REVISITED: EXPLORING THE RESOURCE MANAGEMENT
PATTERNS OF PLATFORM-BASED ORGANISATIONS.**

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Abstract

The dynamic capability theory, the advanced version of the Resource-based View and a classic theory in the strategic management field, provides academics with an evolutionary perspective to understand organisational resource management. The dominant take of dynamic capability studies tends to emphasise top managers and the firm's leading role in reconfiguring organisational resources and creating new competencies to react to environmental changes. Thus far, I have a majority of dynamic capability studies adopting an inward-looking view that highlights profound decisions and systematic activities solely dominated by the firm. Nevertheless, a limited outward-looking view is adopted to study the phenomenon of the opening ecosystem. As an emerging phenomenon, the opening digital platform ecosystem has been attracting the attention of strategic management scholars. The main characteristic that differentiates the opening digital platform organisation from traditional organisations is that it requires us to see things from an ecosystem level and discuss the profitability of a loosely organised community rather than an individual. The idea of an opening ecosystem highlights the distributed responsibility of innovation and seizing opportunities. The platform organisation can benefit from complementary contributions and co-evolve with external parties by engaging various cross-industry members in the ecosystem. In addition, the basic component of a digital platform organisation—generative technologies facilitates the organisation to leverage external innovations and create a wide range of unpredictable applications. Thus, making the evolutionary path of a digital platform less fixed and depending more on emerging solutions and situated capabilities. Therefore, I argue that the extant firm-level logic of the dynamic capability view is insufficient for explaining the unique strategy of an opening digital platform. I need to shift the view to outside the organisation and incorporate more focus on the efforts of external parties in the value-creating process. I, thus, decide to react to the growing callings of further exploring the orchestration of ecosystems through the dynamic capability theoretical lens.

The primary purpose of my research is to understand what kinds of dynamic capabilities facilitate the growth of an opening platform ecosystem and how these dynamic capabilities sustain dynamism while encountering rapid growth and extreme uncertainties. My primary research questions are divided into two parts. First, I directly tackle how platform organisations build and sustain rapid growth. By road mapping the growing path of an opening digital platform, I tried to understand what dynamic capabilities allow the platform to incorporate external efforts and how it achieves fast growth. Second, I try to further unfold the internal process of a digital platform organisation by studying how middle managers' routines support the dynamic capability of a digital platform organisation. I further explore the internal activities that support the dynamism of an opening digital platform organisation. By trying to answer these two questions, I endeavour to unfold the mechanism of an opening digital platform ecosystem deeply.

I take processual studies of one of the top Chinese digital platform organisations—Tencent and deeply unfold its growing path and resource reconfiguration processes. I aim to generate context-specific, detailed and holistic explanations that are impossible to develop by quantitative research. Through my inductive single case studies, I uncover complex interactions among elements such as the organisation, members of the organisation and the ecosystem, projects, culture and behaviours of different actors in the context of a digital platform organisation. I choose the single case study because it allows us to focus on an extreme sample and conduct historical case study to observe interplays among different constructions within the phenomenon.

My findings are 19 process models, which reveal resource reconfiguration processes inside and outside the platform organisation. These process models show how resources are reconfigured during interactions among external parties, the platform organisation, managers and employees. I, therefore, contribute to the dynamic capability theory from the following perspectives. First, I submit that departing from the traditional firm-level logic, the value proposition of the digital platform organisation could be highly externalised. Rather than keeping the process

controlled internally and relying on the knowledge and experiences of top managers, issues and understandings of the market would gradually emerge as the platform shares resources with externals and gains feedback from them. Then, the new understanding of the market would, in turn, guide resource reconfiguration activities and create new competencies. Thus, the growth of a digital platform organisation is not a unilateral manager-led process; it is a highly malleable and interactive process engaging both the platform leader and external parties. Second, the leadership of the digital platform and top managers have depreciated significantly. The platform no longer plays the role of a “broker” and dominate the design of organisation strategy. Despite that, extant dynamic capability studies emphasise the power and control of the firm and top managers; I highlight that platform users and complementors are not entirely under control. Complementors are the external actors who interact with the focal firm to generate and commercialise innovations that benefit the end customer. Complementors provide the platform organisation with their resources, capabilities, and innovations to enable customers to utilise the final product, rather than the firm itself (e.g., Adner 2012; Adner and Kapoor 2010; Kapoor and Lee 2013). Consequently, the concept of the ecosystem aims to capture the connection between a core product, its components, and its complementary products/services (“complements”), which collectively enhance the value for customers. Such a shifting leadership requires the managerial focus to shift from controlling the activities of complementors to providing resources and facilitating innovations. I find that platform evolution is not an isolated activity conducted by the organisation. Instead, the evolution is interconnected with a diverse range of stakeholders. The responsibility of an opening platform is to align internal and external value-creation activities and achieve continuous growth while helping external parties grow, develop products and conduct innovations. Finally, yet importantly, I emphasise resource versatility rather than resource control. The traditional resource-managing logic of dynamic capability studies still focuses on controlling resources and developing an “isolating mechanism”. Instead, I argue that platform resources need to be shared around different actors in the ecosystem to

facilitate the development of market understandings and the creation of multiple applications. Platform leaders should focus less on controlling and isolating their resources and try to stimulate more peripheral innovations and contributions by supporting different actors with platform resources. Thus, avoiding the sticky nature of organisational resources.

Keywords: *dynamic capability, digital platform organisation, ecosystem, resource-based view*

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List of Abbreviations

MMs	Middle Managers
DC	Dynamic capability
VRIN	Valuable, Rare, Imperfectly Imitable and Non-Substitutable resources
IM	Instant Messaging
CMCC	Chinese Mobile Communication Company
ID	Identification
API	Application Program Interface
QR code	Quick Response code
IP	Intellectual Property
AI	Artificial Intelligence
RBV	Resource-based View
DPO	Digital Platform Organisation
IoT	Internet of Things
BIRP	Basic Individual Reaction Process
NEBIC	Net-Enabled Business Innovation Cycle
MSP	Multi-Side Platform
CSIG Tencent	Cloud and Smart Industries Group of Tencent
PCG Tencent	Platform and Content Group of Tencent
IEG Tencent	Interactive Entertainment Group of Tencent
WXG Tencent	WeChat Group of Tencent
CDG Tencent	Corporate Development Group of Tencent
TEG Tencent	Technology and Engineering Group of Tencent
KPI	Key Performance Indicators
OKR	Objectives and Key Results
To-B	Business to Business
To-C	Business to Customer
MandA	Merger and Acquisition
CA	Competitive Advantage

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Chapter 1 Introduction

1.0 Introduction

1.1 Theoretical overview

Organisation and strategy scholars have long recognised the crucial role resources play in driving firms' performance. Traditional wisdom holds that the nature of a firm is a bundle of resources so that the competitive advantage is obtained by possessing heterogeneous resources (Penrose 1959). Barney (1991) has pointed out the view of resources from an inside-out perspective, which maintains that the ownership and control of superior resources facilitate firms to become advanced in the competition. Certain studies further developed the view by proposing the "isolating mechanism". The isolating mechanism emphasises securing profits by creating a resource base that is difficult to imitate by competitors (Barney 1991; Rumelt 1991; Wernerfelt 1984), thus, cementing the possession and control over resources and making them exclusive to the organisation for a longer time.

The traditional view of resources is largely influenced by the Resource-based View (RBV). It has been emphasised by the theory of the Resource-based View that firms that possess superior resource positions can obtain a sustainable competitive advantage (CA) (Wade and Hulland 2004). Building on this underlying assumption, studies in the field of resource-based view endeavoured to identify different attributes of organisational resources. They suggest that these attributes lead firms to a superior market position, which involves concepts such as ex-post limits to competition, imperfect resource mobility, and ex-ante limits to competition (Peteraf 1993). Besides, researchers established the framework of VRIN, stating that organisations need to find and control resources which are valuable, rare, inimitable, and non-substitutable to gain advantages (Barney 1991). The resource-based view, one of the mainstream strategic management studies, has been given the most

attention to controlling and possessing premium resources in terms of navigating challenges and opportunities in the market.

The shifting attention to dynamic capabilities. Nevertheless, studies have been raising more criticism toward the resource-based view by arguing that possessing superior resources does not guarantee competitive advantages in the rapidly changing environment. I need more exploration of flexible managerial agencies to cope with environmental changes (Teece, Pisano and Shuen 1997; Armstrong and Shimizu 2007; Newbert 2007). As a result, increased emphasis is placed on the Dynamic Capability (DC) theory. Such a new focus highlights organisational capabilities to "*appropriately adapting, integrating, and reconfiguring internal and external organisational skills, resources, and functional competencies*" to react to the rapid environmental change (Teece, Pisano and Shuen 1997, p.515). As an advanced version of the resource-based view, the dynamic capability theory posits that the possession of resources can be "sticky" if the firm cannot reconfigure and leverage the resource base. That is to say, the firm might have to stick with whatever it has and live with whatever it lacks without the continuous development of new competencies (Teece, Pisano and Shuen 1997; Dierickx and Cool 1989). With a similar basis to the resource-based view, the dynamic capability theory essentially discusses the management of organisational resource bases. However, it has more attention on the fast-changing environment and multiple approaches to recombining resources and developing new capabilities.

Dynamic capabilities are generally impacted by two schools established by Teece, Pisano and Shuen (1997), Teece (2007) and Eisenhardt and Martin (2000). The strand of Teece, Pisano and Shuen (1997) emphasises the idiosyncrasy of organisational capabilities. Meanwhile, Eisenhardt and Martin (2000) take another perspective and strongly associate dynamic capability with the definable firm process. Irrespective of the debate between these schools, both schools tend to agree that the dynamic capability is embedded in managerial processes and routines inside the organisation that manipulate and reconfigure the resource base to react to environmental change (Peteraf, di Stefano and Verona 2013). Teece, Pisano and

Shuen (1997) submit that dynamic capability is the special competence that allows firms to identify the pattern of market changes and build up difficult-to-imitable capabilities by reconfiguring asset bundles (Kay, Leih and Teece 2018). Eisenhardt and Martin (2000) later pointed out that dynamic capability is an identifiable routine that could be broken down into managerial processes such as product development, decision making and alliance capability. They also highlight the "best practice" concept, suggesting that dynamic capabilities are equifinal. Thus far, dynamic capability literature includes topics such as managerial routines and processes (Eisenhardt and Martin 2000), resource reconfigurations (Teece 2007), structural innovations (Eisenhardt and Brown 1999; Galunic and Eisenhardt 2001; Verona and Ravasi 2003), knowledge management (Zollo and Winter 2002; Cepeda and Vera 2007), organisational learning processes (Easterby-Smith and Prieto 2008; Weerawardena, Mort, Liesch and Knight 2007), product innovation (Verona and Ravasi 2003) and organisational transformation (Rindova and Kotha 2001). It seems that most extant dynamic capability arguments are on the firm level and emphasise the dominant role of top managers, internal resource management and the control over resources and resource remixing processes. They still emphasise the "heroic" role of the firm and top manager to *"reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker (s)"* (Zahra, Sapienza and Davidsson 2006, p.918). The extant dynamic capability view tends to be mainly inward-looking and, to a certain level, subject to the predictability and static of the organisational strategy and external environment.

Many contemporary organisations, such as platform-based organisations, have unleashed novel opportunities and critical challenges for extant discussion around dynamic capabilities (e.g. Helfat and Raubitschek 2018; Shi, Li and Chumnumpan 2020). Running under a unique business strategy, the digital platform organisation differs from traditional organisations for the following reasons. First, the concept of digital platform organisation is often associated with ecosystem discussions (e.g. Teece 2018; Jacobides, Cennamo and Gawer 2018; Adner 2017; Altman and Tushman 2017). Departing from the traditional focus of individual nexus (Sarason,

Dean and Dillard 2006; Delmar and Shane 2003), the concept of open ecosystems highlights the distributed responsibility of innovation and seizing opportunities (Altman and Tushman 2017). Extant literature points out that an ecosystem focuses on establishing an economic community (Moore 1993) and engaging a group of diversified cross-industry members (Iansiti and Levien 2004). By orchestrating external entities and building interdependent relationships with external parties, the organisation should be able to form a profitable network system and co-evolve with ecosystem actors. In other words, the value of a digital platform organisation tends to be generated through an opening system and externalised value proposition instead of a firm-level logic. Secondly, according to existing theories, digital platform organisations are usually based on generative technologies (Gruber, MacMillan and Thompson 2008; Zittrain 2008). The generative technology is the key resource shared by the platform organisation to allow for recombination and redistribution of functionality (Yoo, Henfridsson and Lyytinen 2010; Zittrain 2008), which potentially creates unprompted changes and a wide range of future applications (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). While generative technologies enable more forms of resource utilisation, they also cause the platform evolution process to become less fixed and predictable (Linder, Jarvenpaa and Davenport 2003; Zittrain 2008; Arndt, Pierce and Teece 2017; Rindova and Kotha 2001). This brings significant challenges to traditional discussions that focus on predefined opportunities and executions. Thirdly, the opening-platform strategy requires the digital platform organisation to relinquish control over ecosystem actors. The digital platform tends to focus on enabling and encouraging external innovations and benefits from external contributions (Altman and Tushman 2017; Adner and Kapoor 2010; Gruber, MacMillan and Thompson 2008) rather than playing the role of a broker or "gatekeeper" who manipulates activities in the ecosystem. Nevertheless, studies have already pointed out that the unique characteristics of digital platform organisations could cause uncertainty and dynamism, which challenges the dominant firm-level logic adopted by extant dynamic capability literature (Helfat and Raubitschek 2018; Giudici, Reinmoeller and Ravasi 2018). Dynamic capability

studies have been highlighting the urgency of shifting the view from within the organisation to the external parties (Teece 2018; Giudici, Reinmoeller and Ravasi 2018) and understanding how dynamic capability enables and sustains the growth of the platform ecosystem (Shi, Li and Chumnumpan 2020).

1.2 Theoretical Gaps and main arguments

A small but growing number of dynamic capability studies have captured the unique features of platform organisations and their ecosystems. They have covered the discussions, such as the characteristic of platform organisations' capabilities (Mikalef et al. 2019; Siaw and Sarpong 2021; Helfat and Raubitschek 2018; Li and Chan 2019), interdependent relationship between complementors and platforms (Teece 2018), key factors affecting the efficiency (Haim Faridian and Neubaum 2021), unique firm-level processes (Shi, Li and Chumnumpan 2020; Giudici, Reinmoeller and Ravasi 2018), and the shifting leadership (Sunder M., Ganesh and Marathe 2018). Hence, the extant dynamic capability theory in the DPO context mainly focuses on identifying the idiosyncrasy of platform capabilities, firm-level processes of orchestrating resources, and top managerial agencies for designing and altering the platform ecosystem. Extant studies in platform organisational contexts show that dynamic capabilities may not reside within the organisation. Instead, it could also rely on external resources beyond the firm boundaries that are contributed and co-reconfigured by the external parties (Giudici, Reinmoeller and Ravasi 2018). However, with so many acknowledgements of the external parties of a platform organisation, the discussion of dynamic capabilities still significantly focuses on firm-level orchestrations and control over ecosystem resources. *The current dynamic capability theory has few explanations of the ecosystem-level dynamism where new competencies are co-created by platforms and their ecosystem actors.* Such a one-sided view would no longer sufficiently explain the mechanism of a digital platform organisation (Nambisan, Siegel and Kenney 2018; Chen, Donada and Perez 2017). We need a more comprehensive picture which involves more external actors, relational views and a more complex process of value creation.

I can proceed to a deeper unfolding of my main arguments and research purposes as I have shown a general picture of the current theoretical landscape and blank spaces.

Argument 1. With a highly externalised value proposition, the process of developing and altering a digital platform ecosystem is distinct from a traditional industrial firm. It is because a platform organisation's value creations tend to be based on the engagement of platform users and direct interactions among a group of significantly diversified, geographically dispersed and quickly evolving ecosystem actors. Relationships between the platform and its external partners are multilateral rather than bilateral (Gulati, Puranam and Tushman 2012). The platform needs to interact with all stakeholders and improve the business by coordinating all members. Certain studies found that a platform organisation could profit from encouraging direct interactions among different sides of users, which means the value of a platform to one group of users could increase as the number of other groups of users rises (Hagiu and Wright 2015). Hence, the logic of value creation of a digital platform organisation is beyond the firm level, which requires direct interactions among ecosystem players rather than a unilateral effort of a firm (Nambisan, Siegel and Kenney 2018; Chen, Donada and Perez 2017). Therefore, compared to the traditional firm-level logic, which observes the organisation inwards, the platform organisation needs different dynamic capabilities to grow and develop ecosystems (Giudici, Reinmoeller and Ravasi 2018; Helfat and Raubitschek 2018; Nambisan, Siegel and Kenney 2018).

Argument 2. Although the dynamic capability literature has mentioned the vital role of complementors for a platform organisation, discussions remain on the firm level. As mentioned in previous paragraphs, current views of platform organisations still maintain that the platform should be a "hub, broker and gatekeeper" of the organisation and have the responsibilities of designing the system and arranging the collaborations (Teece 1986; Teece 2018). The platform is responsible for controlling and orchestrating the ecosystem and creating profitability (Adner and Kapoor 2010). However, in the context of platform ecosystems, the platform profits from direct

interactions among ecosystem players, including diverse groups of users and unidentified complementors who are not fully controlled by the firm and allowed to conduct self-favoured business activities (Parker, van Alstyne and Choudary 2016). The platform can stimulate peripheral innovations through distributed leadership and benefit from external contributions (Boudreau 2012). Nevertheless, thus far, limited explanation of such a value-creating logic has been provided by dynamic capability studies. I need to understand how platform organisations grow without fully controlling ecosystem players.

Argument 3. Studies have suggested that digital platform organisations are primarily based on generative technologies which enable external developers to conduct innovations and contribute to the platform. The generative technology facilitates the platform organisation to create unprompted innovations and applications (Gruber, MacMillan and Thompson 2008; Zittrain 2008). However, the generativity results in quickly expanding organisational boundaries, "less fixed" growing processes, and incomplete plans (Arndt and Pierce 2018; Rindova and Kotha 2001; Cennamo and Santaló 2019; McIntyre and Srinivasan 2017). Therefore, the traditional firm-level explanations, which focus on top-managerial visions and firm-level "best practices", cannot fully explain explain how platform organisations and their ecosystems are orchestrated.

Argument 4. When discussing the micro-foundation of a platform organisation, the dynamic capability theory is also insufficient to explain the continuous evolution in such a context (Salvato and Vassolo 2017; Obstfeld 2012). It is because the dynamic capability literature largely adopts the firm-level premise that the organisational routine is a "rule" and "system" designed by the firm to guide the systematic renewal of competencies (Obstfeld 2012). There are limited interpretations of the collective and intentional effort within routines. It is also broadly agreed that the development of dynamic capability is path-dependent, which means it depends on managerial knowledge accumulation and the organisation's previous experiences of problem-solving and competence renewal (Teece 2007; Eisenhardt and Martin 2000). However, given the fast-evolving and extremely uncertain nature of a digital platform

organisation, it is risky to rely solely on the routines generated from previous experiences instead of considering the emerging situation (Eisenhardt and Martin 2000; Obstfeld 2012). We need to renew the dominant concept of organisational routines and obtain more understanding of how platform organisations continuously renew their routines to cope with the “ever-changing environment”.

Argument 5. The dynamic capability literature mainly attributes the modification of organisational routines to top manager decisions (Pandza and Thorpe 2009; Winter 2003; Biesenthal, Gudergan and Ambrosini 2019; Helfat *et al.* 2007). Researchers maintain that it is the top management team’s responsibility to learn from experiences and systematically re-design organisational routines to react to market changes. However, in the platform organisational context, which is constituted by a wide range of external parties and a distributed leadership (Katz and Shapiro 1986; Kende 1998; Morris and Ferguson 1993; Shapiro and Varian 1998; West 2003), top managers tend to have information asymmetries with the user-side. Therefore, it becomes risky to rely on the experiences and skills of a single group of members to solve a spectrum of continuously emerging issues (Noda and Collis 2001; Guth and Macmillan 1986; Wooldridge, Schmid and Floyd 2008). Thus, the extant dynamic capability literature is lacking in its ability to explain the mechanism of routine dynamism in a digital platform context. Nevertheless, we still have a limited understanding of how different agencies got involved in organisational improvement and how routine dynamism is formed under a loose leadership (Salvato and Vassolo 2017).

Argument 6. Since the digital platform organisation tends to inherit the nature of constantly morphing and generativity, it is challenging for a digital platform organisation to have a clear blueprint for the future (Li 2021; Rindova and Kotha 2001). Whereas the dynamic capability theory mainly emphasises top managers’ systematic design of routines and capabilities rather than a rapidly generated coping mechanism as the problem emerges (Obstfeld 2012). This issue makes the dynamic capability insufficient for explaining the routine dynamism of a digital

platform organisation. We need to further renew the dynamic capability theory by studying the digital platform routine and different agencies in such an organisation.

1.3 Research Purposes and research questions

To better define the ecosystem, the related literature has studied it from many different perspectives, such as the open network structure (Lee and Mendelson 2008), modular architecture (Baldwin 2007), complementarity (Jacobides, Cennamo and Gawer 2018), shifting organisational leadership (Altman and Tushman 2017), inter-organisational relationship (Kapoor and Lee 2013), structural interdependence (Adner 2017), and multilateral collaborations (Davis 2016). Incumbent studies have spent considerable efforts explaining the form of ecosystems (questions of what an ecosystem is). However, the question of *"how* an ecosystem is orchestrated" hampers a comprehensive understanding of the mechanism behind an ecosystem (Jacobides, Cennamo and Gawer 2018; Helfat and Raubitschek 2018). Therefore, my research questions would focus on the matter of "how".

I explore the reconfiguration process of an ecosystem in the platform context. The concept of platform echoes definitions of the ecosystem. As platform organisations usually relate to concepts of modular architecture (Altman and Tushman 2017), reduced control over external actors (Olleros 2008; McIntyre and Srinivasan 2017), the opening resource base (Boudreau 2010; Altman, Nagle and Tushman 2015; Dahlander and Frederiksen 2012), interdependent of platform users (Gawer and Henderson 2007), the multilateral organisational structure (Gulati, Puranam and Tushman 2012), and the dependency of network effect (Dyer and Singh 1998; Lavie 2006). To better define my *research context*, I extract three unique characteristics of the platform organisation, which are **1) the shifting leadership, 2) the externalised value proposition, and 3) the dynamic evolution process**. *Shifting leadership* refers to relinquishing authority and decision rights (Wareham, Fox and Cano Giner 2014), which used to be owned by the focal firm *exclusively*. *Externalised value proposition* mainly refers to network effects, opening systems, and externalised value creation processes (Lavie 2006). Lastly, the *dynamic evolution process*. Since

the platform establishes on a group of generative assets and evolves with external innovations, the platform business constantly needs to deal with flux organisational boundaries, incomplete product design and innovations (Lyytinen, Yoo and Boland 2016; Dattee, Alexy and Autio 2018; Nambisan 2017; Lyytinen, Yoo and Boland 2016). Then, by comparing the dynamic capability theory and the platform literature, I find that the dynamic capability theory fails to fully explain the mechanism of platform organisation because studies related to dynamic capability often miss the discussion on **1) the resource reconfiguration that largely involves demand-side economy, 2) the incomplete evolution path of platform organisations, 3) the ecosystem-level dynamism**. First, platform organisations tend to establish their businesses upon a demand-side economy because a platform's growth is highly dependent on the network effect, and the overall value of the platform organisation would increase as the installed base rises (Katz and Shapiro 1985). However, the dynamic capability still focuses on the firm-level perspective and emphasises managers' dominant role. Second, the platform organisation relinquishes control over the platform users and encourages the external parties to conduct innovation and contribute to the platform business (Wareham, Fox and Cano Giner 2014). Therefore, a platform organisation not only highly depends on the contribution of multiple users but also strategically relies on them to develop a unitive development direction and common ground to build up a platform. However, studies of dynamic capability have limited attention to platform users' rising value proposition and autonomy. A few discussions focus on reconfiguring the resource base to align the activities and value creation between the focal firm and external users (e.g., Giudici, Reinmoeller and Ravasi 2018; Zeng and Glaister 2016; Helfat and Raubitschek 2018). Last but not least, the platform organisation faces the challenge of evolution at an ecosystem level. It is because a platform organisation maintains an interdependent relationship with a diverse range of external partners (Zittrain 2008; Altman and Tushman 2017; Adner 2012; Adner and Kapoor 2010 2016; Kapoor and Furr 2015; Kapoor and Lee 2013). Instead of playing a zero-sum game, platform organisations should adopt a non-zero-sum strategy to create a "1+1>2" effect and

let the development of platform users contribute to the overall platform dynamism. However, the dynamic capability theory focuses on resources within the organisational boundary (Teece 2007). The dynamic capability theory fails to fully explain the resource reconfiguration in the platform ecosystem where the focal firm does not focus on surpassing and overpowering the external parties.

I find these three gaps hampering us in understanding the reconfiguration process within a platform organisation. I will have a deeper understanding of the mechanism of orchestrating a platform ecosystem by exploring how resources are obtained, distributed and recombined in the platform organisation. Some platform organisation studies have tapped into resource reconfigurations, but researchers still call for more understanding (Jacobides, Cennamo and Gawer 2018). *However, I still have a limited understanding of how certain resource mixes in a platform organisation are renewed.* I react to this broad trend by taking a close perspective and observing how a set of resource mixes is reconfigured, becomes a new set of resource mixes, and brings in new competence. By continuing to observe resource reconfigurations, I extract patterns from processes and find out the unique dynamic capability of platform organisations. I also roadmap the evolutionary journey for a platform organisation to build up an ecosystem.

Based on the main context and gaps I identified, I developed two main research questions that I would continue to investigate throughout the PhD program.

**1. How do platform organisations build and sustain continuous growth?
Investigating the dynamic capabilities that enable platform ecosystems to
evolve and grow continuously.**

To answer this question, I need to develop a thorough picture of the development path of a digital platform organisation. To fill the gaps identified previously, I need to find out how a digital platform involves the demand side in the growth path and how platform resources reshape during the process. I also need to find out how a digital platform organisation sustains its rapid growth by constantly reconfiguring resources and developing new capabilities. Most importantly, what dynamic capabilities allow

the platform to evolve continuously and facilitate the platform to grow bigger while navigating the distributed leadership, challenges and opportunities incurred by the platform business model? Although I have literature to explain the initial growth of a platform, I have limited studies to document the growth trajectory and provide a historical perspective (Zeng, Yang and Lee 2022). Therefore, I might not have a full explanation of how the platform evolves and what capabilities are involved during the process. Exploring this question fulfils research purposes of unfolding externalised value propositions, understanding ecosystem-level dynamisms, and understanding how platforms leverage generativity to manoeuvre incompleteness.

2. How do middle managers' routines support the dynamic capability in a digital platform organisation? Focusing on developing holistic understandings of the interplay of agencies, contexts and participants; and how they fuel the idiosyncrasy of routines and capabilities within the digital platform organisation.

In my arguments, I posit that top managers might not fully control the ecosystem activities in a digital platform business model. They might need to involve other agencies to orchestrate the platform and sustain the resource dynamism. I aim to study the inside activities of organisational routines of a digital platform, and I will try to find out how routines are constantly modified as the external environment changes. I want to explore how lower-level managers, employees and top-level managers play their roles in resource reconfiguration and routine renewal processes. By studying the micro-foundations of organisational routines, I would better understand how platform resources are managed and reshaped. I can also explain how uncertainty and strategic incompleteness are dealt with from an internal organisational perspective. By observing the project development and iterating activities of employees and middle managers, I will be able to jump out of the top-manager-centred perspective and understand how different internal agencies are involved in the orchestration of a complex and diverse system.

It is important to clarify why the dynamic capability of the digital platform organisation deserves further enrichment from middle managers' perspectives. First, extant dynamic capability theories focus on firm-level routines (e.g., Wilden and Gudergan 2015; Huang et al. 2013; Pavlou and El Sawy 2011; Gebauer et al. 2012; Koufteros et al. 2014). Such a focus lacks attention on the deployment and variation in different business conditions, such as different projects or participants (Biesenthal, Gudergan and Ambrosini 2013). However, the digital platform faces high rates of variation and flexibility as the generative nature often welcomes beyond-expectation contributions from every corner of the ecosystem (Zittrain 2008). Therefore, the capability dynamism of a digital platform organisation cannot be explained by solely focusing on the "rules" of the organisation. Middle managers responsible for implementing the strategies (Dutton, Ashford and O'Neil 1997; Dutton, Ashford, O'Neil and Lawrence 2001; Wooldridge and Floyd 1994) become important for explaining the DC in DPO. Their managerial processes reflect how routines are creatively deployed and shaped to cope with quickly emerging situations (Balogun and Johnson 2004; Boyett and Currie 2004; Wooldridge and Floyd 1994; Biesenthal, Gudergan and Ambrosini 2013). Second, a majority of DC studies focus on a top-management perspective that top executives are leading the process of designing organisational routines (Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). However, a digital platform organisation often operates under an opening business model and relinquishes the centralised authority over the external parties (Adner 2016; Giudici et al. 2018; Nambisan 2017; Armstrong 2006; Parker, Van Alstyne, and Choudary 2016; Rochet and Tirole 2003; Giudici, Reinmoeller and Ravasi 2018; West and Wood 2013). The openness causes very high information asymmetry between the local condition and the top-level members. Top managers' knowledge and capabilities are no longer sufficient for solving a variety of local issues (Noda and Collis 2001; Guth and MacMillan 1986; Wooldridge et al. 2008). Middle managers expose more directly to local issues (Natarajan, Mahmood and Mitchell 2019), and their managerial process facilitates an understanding of how local processes complement the top-level strategic design.

1.4 Research Settings and Methods

Philosophical paradigm. To conduct the research, I adopt the paradigm of constructionism. Constructionism emphasises that the social phenomenon is built up in the social context where social members interact and communicate and create their subjective realities (Easterby-Smith, Thorpe and Jackson 2015; Shotter 1993; Watzlawick 1984). The ontology of constructivism suits my research theme because my research is in the context of the ecosystem. As I highlight the diversity and autonomy of ecosystem actors, I am not pursuing a numerical outcome; instead, I aim for holistic explanations of their relations, processes of interactions and context. By investigating the development path of a digital platform organisation, which is constituted mainly by complex interaction processes among different players, I am looking for outcomes high in complexity and subjectivities instead of narrow meanings in a few categories or ideas (Creswell 2014). As the interaction and resource sharing proceeds, platforms and actors could endow meanings to their actions and decisions (Benton and Craib 2011) and, thus, construct reality. Thus, I generate my own interpretations of such a reality by observing the process of generating meanings and restructuring assumptions; and providing research outcomes from my special perspective (Benton and Craib 2011).

Research design. I adopt the inductive, single case study as my overall research design. As a widely adopted qualitative research method, case studies focus on uncovering interactions among elements such as the organisation, members of the organisation, projects, culture and behaviours in an identified context (Quinlan 2011). I try to use the case study method to investigate how ecosystem actors interact and reconfigure resources to generate competencies. Through this approach, I intend to obtain context-specific, detailed and holistic explanations and theories which cannot be developed through quantitative research (Mills, Wiebe and Durepos 2010). My research context is the opening-system digital platform (in my case, Tencent) fuelled by generative technology, which runs in a hyper-competitive industry and highly uncertain environment. My theoretical settings guide us to believe such a context

can yield fruitful outcomes in the dynamic capability field. In addition, it is essential to highlight that both single case and multiple case studies suit my study, and yet, the single case study is the better choice for us. Because the single case study enables us to focus on an extreme sample, it allows us to conduct historical studies to observe interplays among different constructions within the phenomenon. Studies also call such an approach the intensive case study through which researchers focus on the case per se and pursue holistic descriptions and interpretations (Mills, Wiebe and Durepos 2010). I aim to delve deeply into a digital platform organisation's growth path and resource reconfiguration process. The single case study allows us to interact deeply with actors on different levels, such as complementors, the focal firm, top managers, middle managers and frontline employees. I can comprehensively investigate their actions and motivations and understand how their interactions contribute to the evolution of the ecosystem. I use both primary data and secondary data for my case study.

Empirical settings. I choose the top Chinese digital platform organisation for my single case studies. Tencent stands for an instructive case for my research because it has established itself in a hyper-competitive industry while continuing to react to the market trend successfully and remaining at the top of the industry. I aim to find out how Tencent successfully adapted to market changes every time despite how fast the external environment shifted. It illustrates an exceptional case of a digital platform that quickly develops new capabilities and precisely fulfils market demands. Besides, Tencent fits closely with the type of digital platform I depicted in the theoretical part with its hybrid character and broadly established ecosystem. As a typical opening digital platform functions as both a marketplace and technology architecture, Tencent focuses on matching different businesses through its platform and encourages external innovations. Fuelled by generative technology, Tencent also shares its resource base with its ecosystem players to stimulate complementary contributions. By practising the opening-platform strategy, it manages to stay as the top Chinese platform for years and years and become a legend. Burawoy (2009) pointed out that although research could be conducted with different approaches, it

is always reliant on existing theories. Choosing a sample which fits the theoretical setting would largely facilitate generating valuable research outcomes.

Data collection. I collect both primary and secondary data. I use the three-stage process framework adopted by Plakoyiannaki, Tzokas, Dimitratos and Saren (2007), which systematically separates the data collection process into stages of "*Drifting, Designing and Probing*" (which is a modified version of Bonoma's (1985) framework). In the *drifting stage*, I collected a diverse range of secondary data from news, public releases, analytical articles on the professional website, published reports, journals, books and records of interviews. I aimed to have an overall understanding of the concept, locale and jargon of the phenomenon as it occurs in the field (Plakoyiannaki, Tzokas, Dimitratos and Saren 2007; Bonoma 1985). During the *Designing* stage, I collected primary data and further assessed and refined the research direction suggested by the preliminary data. I went on to conduct one-to-one semi-structured interviews with middle managers at Tencent. In the *probing* stage, I conducted 26 follow-up interviews by leveraging the snowballing technique. I selected interviewees by following the guidelines provided by Huber and Power (1985) in order to enhance the accuracy of retrospective reports.

Data analysis. I decided to use the Process Model because my research question is about "*how*" (Langley, Smallman, Tsoukas, and Van de Ven 2013; Langley, Smallman, Tsoukas and Van de Ven 2009; Mohr 1982). I endeavour to deeply unpack the complex practices underlying the idiosyncrasy of routines and capabilities. By deeply exploring a specific case, I aim to generate the knowledge of know-how to explain how constructs such as contexts, actions and participants interplay and eventually lead to the desirable result (e.g., Monin, Noorderhaven, Vaara, and Kroon 2013; Langley and Tsoukas 2010; Bresman 2013). Thus, creating new insights and perspectives or enriching the extant theory. I produce thick descriptions of a phenomenon and allow ourselves to immerse in my case to seek the patterns or unique characteristics of the case before the insights are established. I adopt the approach of coding to analyse my qualitative data as the coding approach is recognised as a systematic and rigorous way of generating theories, concepts and

relationships from data (Mills, Eurepos, and Wiebe 2010; Strauss and Corbin 1998). Eventually, I develop the process models which illustrate the evolutionary path and resource reconfiguration process in detail.

1.5 Main contributions

My research findings make several notable contributions to the literature on dynamic capabilities, platforms and middle managers.

1) Certain literature on dynamic capabilities insists that the systematic remixing of the resource base, which secures the continued competitive advantage of a firm, is supposed to depend on the skills, knowledge and experience of top managers of the firm, which develop in the past of problem-solving, routine designing and knowledge accumulations. Contrary to the majority stance of the literature on dynamic capabilities, my process models show that the value proposition of the digital platform organisation could be highly externalised rather than keeping resources controlled internally. Issues and market understandings gradually emerge during back-and-forth interactions among the firm, complementors and customers. This would, in turn, guide the firm to reconfigure the resource base within the platform ecosystem. I posit that dynamic capabilities in the context of digital platform organisation are no longer designed and created by the firm or top managers unilaterally in a manager-led process. Instead, dynamic capabilities are formed and re-formed through dynamic interactions among the platform, complementors, and customers. Resource configurations of platform organisations are co-created and co-developed by different actors.

2) The current theorisation still highlights the possession and identification of superior resources, which can be understood as a perspective of viewing resources from the inside-out (e.g. Penrose 1959; Barney 1991). An outstanding resource position enables the first-mover advantages of the firm in the market (Peteraf 1993). It allows the organisation to exploit unique growth opportunities (Alvarez and Busenitz 2001) and, thus, gain superiorities in the competition. However, my research suggests that platform owners do not attempt to control or isolate their

database to establish resource-position barriers and subsequently secure exclusive economic rent in the traditional sense (Wernerfelt 1984; Barney 1991; Rumelt 1991). Conversely, the platform database is considered a versatile resource orchestrated through sharing and exchanging among the platform, complementors and customers, which are then reformed and analysed to make them more suitable for diverse business purposes. Therefore, my research offers a novel viewpoint that the resources of a platform are not controlled by the focal firm and do not remain static, but are dynamic and versatile. Instead, platform resources are dynamic and versatile.

3) Extant studies primarily recognise that the platform plays the role of a "hub" or a "broker" in the entire system (Teece 1986) and bears the responsibility of controlling and arranging the complementarities and designing their entry and positions (Adner and Kapoor 2010). On the contrary, the platform leaders/managers cannot fully predict the plan based on their experiences and profound vision. The next move is unpredictable, with so much central power distributed to ecosystem parties. The platform would instead let the data feedback generated from platform users (after using products and services provided by the platform) guide its resource reconfiguration activities and form new capabilities. Furthermore, the organisation needs to navigate the contributions from complementors, connect its resource base with ecosystem-level resources, and facilitate the interdependence and co-development among resources from different sources in the ecosystem. An increasing number of studies call for a better understanding of the mechanism for digital platform organisations to manoeuvre and grow (Amit and Han 2017; Nambisan et al. 2018; Nambisan et al. 2019). I, thus, respond to them by studying the resource reconfiguration of Tencent—the opening digital platform organisation.

4) Most dynamic capability studies depict managers' "omnipotent" leadership. They are dominators and creators of routines (Pandza and Thorpe 2009; Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). On the contrary, I find that, in the context of digital platform organisations, neither top managers nor middle managers can directly make decisions for forming or improving a routine because they cannot predict a blueprint

for the future. Instead, managerial levels usually make "*directional*" and "*nimble*" decisions which are incomplete ideas waiting for further experimentations and confirmations by other employees.

5) The majority of studies define the DC as the aggregation of carefully designed routines or top-down frameworks that fulfil the firm-level/top-tier entrepreneurial purpose of developing new capabilities and routines (Kay, Leih and Teece 2018). However, the systematically designed firm-level/top-tier micro-foundations could lead the DC toward erosion because the previous design could become rigidity in a fast-changing future (Dutton, Ashford and O'Neill 1997; Schon 1983; Garud, Kumaraswamy and Karnøe 2010). In contrast to the traditional DC studies, I deeply unpack the micro-foundations of routines and submit that non-entrepreneurial actions, referring to enactments and optimisations carried out by lower-level employees, are significant for maintaining routine dynamism as well. The digital platform organisational routine is not a top-down entrepreneurial designed framework as it is traditionally depicted (Kay, Leih and Teece 2018; Zollo and Winter 2002; Teece et al. 1997; Eisenhardt and Martin 2000). Instead, it is a dynamic organism co-formed by multiple ongoing feedback loops and creative actions by equally important actors from different levels.

6) I also enrich the current explanation of the strategic incompleteness of digital platform organisations from a dynamic operational perspective. Departing from the traditional approaches of thoroughly analysing the market and developing a comprehensive coping strategy (Romme 2003; Simon 1996), I find that middle managers' project development routine is an emergent and ongoing process that does not have an official end-point. I find this internal incompleteness of a digital platform process similar to the incompleteness of micro-foundations of the dynamic capability. The logic is highly similar to what was depicted by Collis (1994), and Teece (2007) has also pointed out that the micro-foundations of DC are naturally incomplete. Therefore, I find that the development of DCs and platform strategies is an ongoing process, and the logic of these processes is closely connected. I build a

model to simulate the similarity and contribute to establishing the connection between the concept of DC and the platform strategy.

7) *Additional discussions.* As I continue the analysis, I find that models built in cases 1 and 2 could be integrated and form a bigger picture of the ecosystem. The model of case 1 shows us how the platform interacts with ecosystem actors. The model of case 2 shows how managers and employees inside the platform organisation connect with different actors and how they develop projects and reconfigure internal and external resources. In this case, I consider models of case 1 to show the picture on a macro level and case 2 to show the micro level. When I integrate these models, they result in a more comprehensive model which illustrates a highly complex and resource reconfiguration process in a digital platform ecosystem. I find that strategic patterns of the macro-level and micro-level reconfiguration show a highly coherent and similar logic. I could potentially better understand the digital platform ecosystem by integrating them and obtaining a multi-level interpretation.

1.6 The outline of the dissertation

In the following sections, I will review the literature on dynamic capability, ecosystem and platform organisation in detail; and further explain the development of my theoretical framework, context, gaps, arguments and research questions in Chapter 2. Chapter 3 will unfold my research philosophy and methodology guided by it. In Chapter 4, I present two case studies to test my theoretical framework; I provide research findings in detail and thoroughly state my discussions and theoretical contributions. Chapter 5 includes the research conclusion, which would summarise my overall theoretical stance and contributions one more time.

Chapter 2 Literature review

1.0 Introduction

The purpose of this chapter. In this chapter, I endeavour to 1) systematically summarise the application of the dynamic capability theory in the past and present; 2) lay down basic definitions of key concepts; 3) and define my research direction in such a theoretical field (i.e. theoretical gaps/ research objectives) (Rindfleisch and Heide 1997). I focus on investigating the dynamic capability theory's role in opening digital platform ecosystems, and I try to allocate the part where dynamic capability theory becomes insufficient to explain the phenomenon. Through producing my theoretical framework, I try to clarify my process of reconceptualising the dynamic capability theory on the ecosystem level and the logic that brings us from key constructs to my arguments and specific research objectives.

The overview and the outline. My literature review elaborates on the extant dynamic capability theory and provides a general view of the traditional landscape of the dynamic capability theory. I offer a general introduction to the works of Teece (Teece, Pisano and Shuen 1997; Teece 2007) and Eisenhardt and Martin (2000), which are the most influential work in the field of dynamic capability. By studying their work, I intend to obtain a general understanding of the development, key components and underlying assumptions of the dynamic capability theory. I find that the traditional dynamic capability theory either focuses on the idiosyncrasy of organisational capabilities or top managers' intentions and managerial processes. In other words, the traditional dynamic capability theory emphasises firm-level logic and the dominant role of top managers. Then, after unpacking the traditional dynamic capability theory, the second part of the literature review introduces the ecosystem literature, which forms the basic idea of my research context. In the second part, I review the extant definitions and typologies of the ecosystem. Thus far, scholars have not reached a vastly agreed definition of the business ecosystem. Extant studies show some commonly recognised mechanisms, such as the network effect,

relational views, external actors/complementors, loose organisational leadership, resource sharing, business communities and externalised value propositions. In general, the concept of ecosystems shifts the attention of the internal organisation toward the external organisation. They tend to highlight the strategy of incorporating external resources and innovations into the value-creation process. The third part further specifies the research context and narrows it down to the category of platform organisation. I identify three characteristics of platform organisations: loose leadership, externalised value proposition and the dynamic evolution process. These unique characteristics further distinguish my research context from the traditional organisation and facilitate us to narrow my discussions down to a specific type of ecosystem—the opening digital platform ecosystem. By composing this part, I clearly define the area of my research, and I set a firm foundation for my research discussions and activities. Then I proceed to the fourth part of the literature review and develop the research objective. Before I develop specific research objectives, I first summarise the extant dynamic capability studies in the field of ecosystems and platform organisations. The extant dynamic capability studies have suggested that dynamic capabilities are essential for developing and maintaining a thriving platform ecosystem. However, these studies still primarily focus on the firm-level logic and emphasise the dominant role of the focal firm. Despite the ecosystem strategy highlighting the importance of incorporating actors beyond the firm boundary, the extant dynamic capability studies still adopt an inside-out perspective and stress firms' full control over the value creation process. Based on the main theoretical gap, I develop two main research objectives that are 1) investigating dynamic capabilities at the platform ecosystem level; 2) investigating the dynamic organisational routine of the digital platform organisation—how resources are reconfigured internally. Finally, in the last part of the literature review, I develop a theoretical framework to summarise critical constructs and the basic logic of my arguments. I conclude that my main research approach is to investigate the interactive process for a platform organisation to seek new resource mixes with external parties. I observe how a resource mix at stage A is renewed and becomes the new resource mix (and a new

competence) at stage B. Thus, I ultimately aim to have more understanding of dynamic capabilities in the opening digital platform ecosystem.

2.0 The dynamic capability theory

2.1 The Resource-based View

The theory of resource-based view (RBV) argues that firms in a superior resource position would be able to achieve a long-term competitive advantage (CA) (Wade and Hulland 2004). Scholars have been trying to categorise different resources and attach different attributes to them, such as ex-post limits to competition, imperfect resource mobility, and ex-ante limits to competition (Peteraf 1993). They develop frameworks like VRIN which states that the resource that is valuable, rare, inimitable, and non-substitutable can assist in gaining competitive advantages and should be controlled and leveraged by an organisation (Barney 1991). Additionally, according to Peteraf (1993), the superior heterogeneity of resources can lead to competitive advantage because it indicates that the company possesses varying capabilities and resources to compete in the market or survive.

In the sense of RBV, the aforementioned attributes and categories represent the specific types of resources that a company need to possess and control, hence, obtain a certain level of competitive advantages to survive and thrive in the market (Barney 1991). Therefore, the traditional resource-based view mainly focuses on discussions of 1) identifying the superior resource, 2) finding out the market where the resource can generate the most value, 3) figuring out the approach to utilise the resource in the most efficient way such as selling the relevant output to the market or selling the resource per se (Teece 1980; Teece 1982). Traditional discussions mainly focus on the identification of valuable resources and how to extract value from resources. However, studies bring more and more critiques into the conversation. They argue that the simple possession of resources with outstanding qualities does not guarantee the success of an organisation, and there are other factors to concern (Armstrong and Shimizu 2007; Newbert 2007), such as rapid environmental changes

and managerial agencies. Studies point out that the possession of resources can be "sticky" (Teece et al. 1997) and that the firm might not have the capacity to operate a complex process and develop new competencies (Dierickx and Cool 1989). Hence, firms might be "*stuck with what they have and may have to live with what they lack*" (Teece, Pisano and Shuen 1997, p.154). According to Teece et al. (1997), "stickiness" is caused by three reasons: 1) business development is naturally a highly complex process, and firms do not naturally endow the capability to develop new competencies (Dierickx and Cool 1989). 2) Some resources, such as tacit know-how and reputation, are not ready to be directly put into the market and turned into profits. 3) Even though a superior resource could be found and bought from the market, the profit generated from owning it might not surpass its cost (Barney 1986). For example, IBM was, for many years, unable to perceive the threat that industry metamorphosis would make its mainframe business obsolete (Majumdar, S. K. 2000). The obsolete organisational know-how/culture eventually become sticky and obscure the development. In the meantime, sticky resources also refer to physical resources that are durable, specialised, and untradeable. For instance, in Tencent's case, it suffered from the culture of trying to dominate the digital market and doing everything by itself during the pre-opening period. There was a very famous slogan in Tencent in 2005—"*serving people's lives like water and electricity*", through which we can see Tencent's ambition and goal of developing a significant product line and dominating the market. Such a strategy quickly drained Tencent's energy and put it in a hate-attracting position in the market, quickly leading it to the development block. The situation persisted until the platform opened, and Tencent changed its strategy from dominating to connecting and sharing. Tencent was able to have significant growth after opening up, and it fulfilled the ambition in a different way by sharing resources and participating in diverse businesses. Also, in terms of sticky physical resources, Tencent had accumulated an overwhelming amount of product lines which exhausted Tencent and cost it huge capital and tensions to just operate them. In 2001, Tencent already owned about 60 product lines, and it constantly found it difficult to run such an amount of products and had to restructure many times.

However, by opening the platform, Tencent was set free from such a burden and no longer had to do everything by itself (the storyline will be further unfold and explained in the case finding chapter). These resources (organisational culture and significant product line) are the “sticky resources” difficult to reconfigure or leverage, which would eventually become obsolete and obstruct organisation development. The organisation need the dynamic capability to alter the culture and renew the approach of competing in the market. In Tencent’s case, the way to seek dynamism is by opening the platform and accessing external resources.

Studies argue that although the resource-based view covers certain discussions to tackle the stickiness of resources, there are insufficient discussions to explain it fully. Topics such as managerial skills, learning processes and know-how mentioned by certain resource-based view discussions might become a more prominent theme than they used to be. The point is that organisations need to be able to develop new competence from the resources possessed by them (Wernerfelt 1984). In the meantime, the extant literature on RBV focuses on resources within the firm boundary rather than external resources (Helfat and Raubitschek 2018). Studies and literature on how an organisation leverages its external resources base from its strategic partners and coordinates the external activities to create value still leave a blank space to be explored.

Also, as the literature continues to be developed, modern business competition has changed its form gradually. Companies like Alibaba and Amazon increasingly compete on the ecosystem level by using big data and Artificial Intelligence (AI) technologies, which means certain categories of resources could have emerged and need to be identified. For example, one of the categories that is barely touched is the non-rivalry resource (Kraaijenbrink, Spender and Groen 2009). The non-rivalry resource is the counterpart of the rivalry resource. Different from traditional resources, non-rivalry resources can be leveraged by more than one firm for different purposes, and the more it is used, the more valuable it becomes (Kraaijenbrink, Spender and Groen 2009). For example, the customer data shared by a platform represents a vivid example of this resource type (Zeng and Glaister 2017). It requires

highly different management compared to the rivalry resources (Kraaijenbrink, Spender and Groen 2009). I would like to highlight that the value and characteristics of different resources are central to the resource-based view (Kraaijenbrink et al. 2009; Leiblein 2011; Nason and Wiklund 2018; Schmidt and Keil 2013), and we need to advance this concern by identifying different types of resources and study the unique way to leverage them.

With so many questions occurring in the resource-based view, recent studies have shifted the attention from the RBV to the usage of resources which is capabilities (Collis 1994). It has been stated that merely possessing the resource does not lead to competitive advantages. Instead, the managerial agency which is the capabilities of an organisation, is the key to a superior position (Collis 1994). As a subset of the theories of capability (Helfat and Raubitschek 2018), the dynamic capability theory stands for the capabilities of an organisation that reacts to the change in environment by *"appropriately adapting, integrating, and reconfiguring internal and external organisational skills resources, and functional competences"* (Teece, et al. 1997). The dynamic capability theory highlights the specific type of capability which allows the organisation to create new competence systematically and continuously. Literature in the field of dynamic capability insists that with the complex way of reconfiguring resources, the firm would obtain higher inimitability and have sustainable competitive advantages. To unpack the underlying mechanism of dynamic capabilities, Teece (2007) later developed micro-foundations of 1) sensing the opportunities and threats 2) seizing the opportunities through business model design and strategic investment, and 3) transforming the extant business model and strategies. From a process-related perspective, dynamic capabilities represent the capabilities to alter and modify the organisational resource base as per the markets emerge, collide, split, evolve, and die (Eisenhardt and Martin 2000). I will unfold the main discussions of dynamic capabilities in the following section.

2.2 An overview of the dynamic capability literature

The dynamic capability theories are mainly constituted by two strands which are respectively represented by the work of Teece (1997) and the work of Eisenhardt and Martin (2000) (Barreto 2010; Peteraf, Stefano and Verona 2013; Kay, Leih and Teece 2018). These two strands are considered as maintaining very different, even opposite, ideas of the definition of dynamic capability. At the same time, they are also seen as a reflection of the developing path of dynamic capability literature (Peteraf, Stefano and Verona 2013). The strand of Teece et al. (1997) emphasises the idiosyncrasy of organisational capabilities, whereas Eisenhardt and Martin (2000) take another perspective and strongly associate dynamic capabilities with the definable firm process. Although there is no doubt that these two papers (Teece et al. 1997; Eisenhardt and Martin 2000) made the biggest contribution in the field, they have their differences in terms of the perspectives of explaining dynamic capabilities. Thus far, the debate has yet to be concluded, and I have no intention of choosing one of them as my theoretical stance. In the following section, to get a more comprehensive view of the dynamic capability theory, I adopt this typology to present important incumbent studies in these areas. The following part will summarise the main ideas of these two strands and some of the important studies that relate to each strand.

2.2.1 Teece's dynamic capability theories

Teece's work in 1997 is considered a very important paper that brings up the emphasis and original theories of dynamic capabilities. The dynamic capability theory that is highlighted by Teece (1997) is to address the fundamental question of how to achieve competitive advantage. By reviewing three traditional theories of strategic management (competitive force, game theory and resource-based view), he concludes that these theories are either linking competitive advantage with the product market position or the resource position. These approaches are static, and they ignore the competition as processes of "*development, accumulation, recombination and protection of capability and skill*" (Teece, Pisano and Shuen 1997,

p.513). To enrich the previous strategic theories, Teece's dynamic capability theory emphasises the significance of managerial capability and knowledge management processes. It is set up in the context of Schumpeter's (1934) economy, where the environment tends to change rapidly, and firms need to adapt, integrate and reconfigure their internal and external resource to react to environmental changes. The purpose of studying dynamic capabilities is to bring about the understanding of the new source of competitive advantages by drawing on the research of *"management of R and D, product and process development, technology transfer, intellectual property, manufacturing, human resource and organisational learning"* (Teece, Pisano and Shuen 1997, p.510). It is claimed that the ease of imitation can decide the sustainability of competitive advantage. Therefore the dynamic capability theories aim to find how to build un-imitable competence and capability to sustain competitive advantage. Also, embedded in the organisation's routine and processes, the dynamic capability is considered shaped by the organisation's asset position and path of development (Teece et al. 1997).

Later on, Teece (2007) specifies his theories by adding the micro foundation to the dynamic capability framework. He defined the micro-foundations as *"(1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets"* (Teece 2007, p.1319). The dynamic capability is believed as the centre of a firm's success. It is the *"orchestration"* capacity of a firm that modifies the resource base and facilitates the innovation (Teece 2007). Generally, in Teece's theoretical context, the dynamic capability is defined as the special competence that allows firms to identify patterns and market changes. The dynamic capability enables the firm to build up its difficult-to-imitable capabilities and skills by reconfiguring its assets bundle to react to external changes and maintain competitive advantages (Kay, Leih and Teece 2018).

2.2.2 Studies surrounding Teece's work

The later studies following the work of Teece (1997) attempt to enrich the dynamic capability theories from different perspectives. For example, the influential work of Zollo and Winter (2002) specified the organisational learning mechanism as the combination of three sub-mechanism: experience accumulation, knowledge articulation and knowledge codification. These three steps, together, make up a deliberate learning process and illustrate the evolution of organisational competence. Zott (2003), on the other hand, focus on the specific attributes of the constitution process of dynamic capability, which are *the timing of resource deployment, costs of deploying resource and the ability to learn to reconfigure resource base through experimentation or imitation*. The study concludes by positing that these three elements moderate dynamic capability and firm performance. Other researches focus on the aspects of organisational structure (Verona and Ravasi 2003), capability life cycle (Helfat and Peteraf 2003), organisational routines and patterns (Winter 2003), knowledge management (Easterby-Smith and Prieto 2008), strategic management processes (Ambrosini and Bowman 2009). The researchers generally attempt to unfold mechanisms behind dynamic capabilities and explore factors that affect and constitute dynamic capabilities.

2.2.3 Eisenhardt and Martin's dynamic capability theories

Another strand of dynamic capability study is represented by Eisenhardt and Martine (2000) (Peteraf et al. 2013; Kay et al. 2018). They generally agree with the evaluation in the Resource-Based View that the theory is relatively static and insufficient to explain the mechanism of sustaining competitive advantage in a changing economic landscape. It is also agreed that the dynamic capability is embedded in managerial processes and routines inside the organisation that manipulate and reconfigure in resource base to react to environmental change (Peteraf et al. 2013). To address the criticism which pointed out that the definition of dynamic capability (e.g. "routines to learn routines") is vague and tautological (e.g., Priem and Butler 2001; Williamson 1999). Eisenhardt and Martin (2000) made efforts to specify the managerial process

where they break down the dynamic capability into *product development*, *decision making* and *alliancing capability*. Thus, the dynamic capability is identifiable specific routine. They also posit that despite the idiosyncratic details of dynamic capabilities belonging to different firms, there are commonalities among them (also called "*the best practices*"). The dynamic capability is homogeneous, fungible, equifinal, and substitutable. Additionally, they addressed the boundary condition of dynamic capability. They claim that in the moderate market, the dynamic capability relies on accumulated experience and detailed routines. In contrast, in the high-velocity market, the dynamic capability often depends on situation-specific knowledge rather than past experiences, and dynamic capabilities are embedded in simple routines. Regarding the definitions of routines and boundary conditions of dynamic capability, the view of Eisenhardt and Martin (2000) is different or even opposite to Teece's (1997) framework. To a certain degree, they reframe the original concept and framework and contribute by making the definition of dynamic capability clear and specific (Peteraf, Stefano and Verona 2013). They triggered another strand of dynamic capability study of internal organisational routines.

2.2.4 Studies surrounding Eisenhardt and Martin's work

Affected by Eisenhardt and Martin (2000), many studies, despite far less than the studies that follow the strand of Teece (1997), conduct research under their theoretical guidance (Peteraf, Stefano and Verona 2013). For example, Rindova and Kotha's (2001) study, based on comparing the growth path and performance of Yahoo! and Excite, shows that in a high-velocity environment, successful product development is based on simple routines. They use Yahoo! as an example that manages to obtain a competitive advantage by following simple rules which require to "put the product first", "enhance the customer experience", and "no joint venture that limits evaluability". In this case, Rindova and Kotha (2001) come to the conclusion which is opposite to Zollo and Winter's (1990) thesis (that dynamic capabilities are structured and persistent and the learning pattern is systematic) and claims that the dynamic capability of Yahoo! is more opened, flexible and constantly

evolving. Also, regarding the learning processes, Rindova and Kotha (2001) use the unsuccessful case of Excite, which frequently acquires companies while hiring and firing employees to reconfigure its resource base. They back up Eisenhardt and Martin's (2000) theories by arguing that the frequency of renewing knowledge and resource base is not the solution in an environment where the market changes quickly. Instead, the efficiency of selecting and leveraging knowledge and resource appears to be more important. Wheeler (2002) proposes a theoretical framework named Net-Enabled Business Innovation Cycle (NEBIC), which contains four capabilities (which are namely: *choosing new information technologies, matching economic opportunities with technology, executing business innovation for growth, and assessing customer value*) for firms to gain competitive advantages in the environment where the digital network has been broadly adopted. Wheeler (2002) views the four capabilities as the "simple capability" encompassing a series of organisational routines to form dynamic capabilities. Their evidence of IT companies learning and growing from failing projects also echoes Eisenhardt and Martin's (2000) view that the organisational learning routine includes practice, mistakes and experience, contributing to capability enhancement. Verona and Ravasi (2003) find a backup from the hearing aid industry, proving the commonalities in terms of dynamic capability in an industry. Galunic and Eisenhardt (2001) suggest the simplicity of managerial processes by showing the few rules for managers to organise multiple divisions and reconfigure resource bases in a big computer technology corporation. Backing up Eisenhardt and Martin's (2000) theory in a subtle way, Altman and Tushman (2017) explored organisational leadership. They explained that the transition of a company's overall strategy is processes-centric, emphasising the integration of internal and external resources. This study also reflects the importance of certain specific managerial processes to the organisational evolution and competitive advantage.

All in all, the studies inspired by Eisenhardt and Martin (2000) highlight the importance of searching for specific firm-level managerial routines and processes with the primary purpose of explaining how an organisation develops dynamic

capabilities and gains competitive advantage. Most of the research mentioned above shows the commonalities of dynamic capability and agrees that similar dynamic capabilities can be achieved through different processes. More importantly, they agree with the boundary condition settled by Eisenhardt and Martin (2000) that in the high-velocity market, the dynamic capability would encompass simple routines, real-time knowledge and moderate structure (which is contrary to Teece's (1997) thesis). They often use empirical cases to back up the theory.

Although Eisenhardt and Martin's (2000) ideas are highly different from Teece's (et al. 1997; 2007), they generally emphasise the importance of managerial capabilities, routine and processes. This means that simply owning rare, valuable, non-substitutable and robust resources (the VRIN framework from the Resource-based View) does not guarantee an organisation's competitive advantage. Their theories appear to agree on the necessity of constantly renewing and reconfiguring the resource base (an evolutionary view) to achieve flexibility, adaptability and sustainable competitive advantage (although Eisenhart and Martin disagree with Teece regarding the direct link between dynamic capability and sustainable competitive advantage).

3.0 The Ecosystem Theories

3.1 General introduction

The word "ecosystem" was originally a biological concept delivered by British botanist Arthur Tansley in 1930. In biology, an ecosystem represents a nature community constituted by different organisms interacting with each other and the environment (including the water, soil, air and other natural elements); they collaborate and compete while sharing resources. Later in 1993, "ecosystem" was brought into the business context by James Moore. He defined the business ecosystem as "an economic community supported by a foundation of interacting organisations and individuals — the organism of the business world". He maintains

that a company should not be considered a single actor in the industry; instead, it is supposed to cooperate with cross-industry partners and pursue co-evolution. Adner (2016) also stresses that the idea of the ecosystem reflects the increasing concern about interdependences across organisations and activities. Eamonn Kelly's (2015) definition echoes the formers, submitting that the ecosystem is a dynamic community where actors share and create resources through collaboration and competition.

3.2 Different Typologies—and general picture of extant ecosystem literature

The ecosystem comprises a broad set of concepts that could relate to studies such as organisational design, strategic management/leadership, network structure and innovation, multi-side market and platform. To get a more systematic view of the broad range of ecosystem studies, there are many different typologies presented by different scholars. For example, Jacobides, Cennamo and Gawer (2018) posit three streams of ecosystem studies: business ecosystem (emphasising the "shared fate" among different parties in the ecosystem), innovation ecosystem (conducting innovations by collaborating with external partners), and platform ecosystem (focal/hub firms connect with multiple parties by opening up their platform infrastructures and resource bases). Ander (2016) advocates that the ecosystem concept can be divided into two divisions which are ecosystem-as-affiliation (consider the ecosystem as a network and having a variety of connections among different parties) and ecosystem-as-structure (study the activities and their value propositions). Altman and Tushman (2017) also provide the typology by categorising the ecosystem into 1) the platform (addressing the definition of Multi-Side Platform Business Models that profit from cross-network effect), 2) open innovator (represent the focal companies that intensively associate with external parties and benefit from their innovation, selection and productions), and 3) ecosystem (partly overlapped with the other two categories but involve more complexed structure and interactions).

The typologies mentioned above differ, which might result from the authors' differences regarding perspectives and academic purposes. The typology provided

by Jacobides reflects the general study streams of the incumbent ecosystem literature; Ander's typology tends to be more focused on the structure of the whole ecosystem network, and Altman and Tushmans' typology reveals the different organisational designs and leadership. In the meantime, these typologies partly overlapped, exposing certain main characteristics of the ecosystem. First, the ecosystem highlights interconnections among different actors in an economic community (Moore 1993; Teece 2007) where individuals and parties affect and nurture each other (Altman, Nagle, and Tushman 2015; Dahlander and Frederiksen 2012) and seek to achieve the co-evolution (Iansiti and Levien 2004). Second, through the cooperation among different actors, a firm in the ecosystem can grow and innovate by leveraging the resource and knowledge of external complementors (e.g. Kapoor and Agarwal 2017; Teece 2018). Third, the ecosystem also emphasises the diversity of the actors because it breaks down the traditional boundaries of industries and links complementors from different domains together (Adner 2017). Other elements are commonly mentioned, such as the "hub" firms, network/cross-network effect, multi-side platform/market and modularity. All in all, these elements and characteristics show the ecosystem's organic mechanism and externalised (open) structure, which allows collaboration between actors with diverse identities to happen creatively.

3.3 The Modular Architecture—-independent and interdependent relationships among actors

The underlying condition of the ecosystem is the modularity architecture. This structure allows actors in the ecosystem to be interdependent while highly independent (Jacobides et al. 2018). The modularity allows one sector in the system to focus on its task (which could be very sophisticated) without the worries of handling the information and skill of the other modules (Baldwin 2007). Modules are separated by the "thin crossing point" (hidden knowledge), and each of them remains relatively isolated from the other modules in the system (Baldwin 2007); each module in the ecosystem maintains relatively high autonomy in designing its product and

services (Jacobides et al. 2018). The focal firm does not necessarily need to be concerned about how these modules should be finally assembled. It only needs to know what these modules specifically do, how they would fit in and what makes a good modular, and then mix and match them to cope with the set of problems the firm is currently facing (Baldwin 2012). Also, before organising and reconfiguring modules, the firm has to set up a set of "common ground" to guide their activities (innovation, production and selling). Firms must make sure there is no clashing between modules and that they are in a coherent structure and evolve alongside the path designed by the focal firm (Baldwin 2012). As Baldwin (2012) posits, modularity facilitates the organisation to evolve. In other words, the isolation and competition among different modules increase the system's dynamism, and the focal firm has vast options to re-organise the modules to achieve innovations. The modularity undergirds the diversity of ecosystem actors and their interdependent, independent, cooperative, and competitive relationships (Jacobides et al. 2018); additionally, the disintegration of different modules and the high level of autonomy result in increasing complexity and variety of the system.

3.4 Different forms of collaborations

Modularity allows actors in the ecosystem to maintain certain levels of independence and interdependence (Jacobides et al. 2018; Baldwin 2007). However, modularity is insufficient to form an ecosystem; it also requires certain sets of complementors to maintain specific relationships and form collaborations in a non-authority structure (Jacobides et al. 2018). Accordingly, the complementaries are usually organised around a final product (Hannah and Eisenhardt 2018), and the relationship between complementors has to be both unique (defined as A cannot function without B) and super-modular (considered as A's value increase as B's value raise) (Jacobides et al. 2018). The relationships among different complementors provide the basic rules for managers to choose and organise the actors in an ecosystem. Still, under these fundamental principles, different types of organisational design and ecosystem

structures aggregate the actors in different ways. The following part introduces two types of ecosystems most frequently mentioned in the literature: platform and open innovator (Altman and Tushman 2017).

The concept and organisational form of the platform are frequently linked with the ecosystem (e.g. Teece 2018; Jacobides et al. 2018; Adner 2017; Altman and Tushman 2017). The characteristics of a Platform Company, such as interconnection with external parties, open access (to the infrastructure and resource base), enabling, multi-side, and network effect, reflect some of the important elements of the ecosystem (Hannah and Eisenhardt 2018). Teece (2017) categorise platform company into two types: transactional platform and innovation platform. The transactional platform usually acts like a "multi-sided market" (Jacobides et al. 2018) that enables different groups of users to conduct transactions on it. Some of these types of platforms encourage direct interactions between different sides of users and indirectly profit from the "affiliation" with them (Hagiu and Wright 2015). The platform's utility by one group of users would increase as the number of other groups of users grows. This type of profit model is called the cross-group effect (Hagiu and Wright 2015) or consumption externalised (Katz and Shapiro 2007), which underlies the business model of Multi-sided Platforms (MSP) (Hagiu and Wright 2015). The second type of platform, which is the innovation platform tends to share the basic/core technology and product with the peripheral businesses and let the outside innovators build their product or service based on it, thus, contributing to the platform's complement asset (Linder, Jarvenpaa and Davenport 2003). The platform usually requires a hub firm (Jacobides et al. 2018) to orchestrate the series of complementors and set up regulations by using the tools such as standardisation (Eisenmann, Parker and Van Alstyne 2009), patent and licensing (Teece 2017) to ensure the coherence of the organisational structure.

Another type of ecosystem is open innovators. This type of business also requires a central operator who integrates different innovators outside of the company and, together, develops a final product. The focal company interact with the outside partners directly, and it can either play a vital role (controlling the innovation process

and selecting the final product) or a role that is more behind the scene (externalise most of the innovation and selection processes) (Altman and Tushman 2017).

3.5 Network effect on the ecosystem

Traditional network theories. Anderson, Hakansson, and Johanson (1994) point out that business networks can refer to a group of connected firms (e.g., Astley and Fombrun 1983; Miles and Snow 1992) or a set of connected relationships between firms (e.g., Cook and Emerson 1978; Hakansson and Johanson 1993). Inspired by the social network theories (Lavie 2006; Wasserman and Faust 1994), network theories in business contexts pay attention to the ties and relationships among different individuals in the network. Salancik (1995) posits that the network is constructed when individuals interact. These interactions are necessary for resources and information to follow and exchange among actors in the network system, thus, facilitating actors to evolve. Similarly, Wasserman and Faust (1994) submit the idea that the attributes of individuals should be considered less important than relationships and ties that exist among different actors. Individuals need to connect to networks to fully exert their potential value through connecting to other actors. Some scholars highlight the "relational view" and submit that the interconnection with external partners helps organisations generate relational rent rather than the Ricardian rent (Dyer and Singh 1998; Gulati 1998). Later, related to the relational view, many studies also begin to realise the benefit of relationships with external partners and network effects. For example, Rothaermel (2001) illustrates that the performance of the biopharmaceutical industry increases when it utilises the external complementary technology that comes from providers. Stuart (2000) also found that external partners' innovation capabilities can facilitate a semiconductor firm's internal innovation.

The duty of orchestrating the network lies on the focal firm, which often takes deliberate and purposeful actions to extract value from the network (Anderson, Hakansson, and Johanson 1994; Dhanaraj and Parkhe 2006). The traditional network theories and organisations primarily focus on the focal firm's hierarchical

control of the network actors and resources (e.g. Miles and Snow 1992; Iansiti and Levien 2004; Gulati, Puranam and Tushman 2012; Hagiu and Wright 2015). However, certain studies have realised that the benefit comes from the network system's "loose" structure and flexible relationships (e.g. Kazi and Shapiro 2007; Nambisan and Sawhney 2011). Wasserman and Faust (1994) claim that the "weak ties" and "open" networks are more likely to introduce opportunities and new ideas compared to the "closed" networks. Nambisan and Sawhney (2011) specify the meaning of network openness as "structural openness" and "decisional openness". The former reflects the ease of joining and leaving a network; the latter means the decision right that is distributed to the actors in the network. They claim that certain levels of openness can facilitate resource leveraging and sharing between the focal firm and partners. Other scholars such as Iansiti and Levien (2004) and Hagiu and Wright (2015) also highlight the "loosely-coupled" structure and actors' autonomy in the network. Regarding network resources, Lavie (2006) submits that ownership of resources might not secure a competitive advantage; instead, weak resource control may benefit value creation. He maintains that firms can create value from inter-firm connections and generate rent by partly sharing their resources with external partners. Lining up with Lavie's (2006) idea, Nambisan and Sawhney (2011) also claim that sharing resources and information can help the network evolve. The main point is that the recent studies of the network theories have become more open and raised the emphasis on sharing resources and co-evolving with partners.

The network effect of an ecosystem. As network theories increasingly emphasise concepts of openness and symbiote, Iansiti and Levien (2004) start to define a business network as an "ecosystem", referring to an array of peripheral actors organised by a focal firm. Such a network system is "characterised by many loosely interconnected participants who depend on each other for mutual effectiveness and survival" (Iansiti and Levien 2004, p.5). On the other hand, Ansari, Garud and Kumaraswamy (2015) define an ecosystem as a network claiming that "industry ecosystems are business networks of interconnected firms that depend on one another for their mutual effectiveness and survival" (Ansari, Garud and

Kumaraswamy 2016, p.3). Adner (2017) defines an ecosystem as a form of "affiliation" which sees ecosystems "as communities of associated actors defined by their networks and platform affiliations" (Adner 2017, p.2). The network of ecosystems reflects breaking down the boundaries of industries and building relationships with a wide range of external partners (Adner 2017). It emphasises the mutually beneficial relationship between the focal firm and the partners. The focal firm shares its resources to encourage the partners' growth, and the external actors contribute to the firm's asset base by building up their capabilities and products based on the shared resource (Nambisan and Sawhney 2007; Lee and Mendelson 2008). Also, it profits from network externalisation (Kazi and Shapiro 1985), which is also called the "cross-group" effect, "indirect network" effect or "multilateral" network structure (Hagiu and Wright 2015). This structure stands for loose relationships between the focal firm and the peripheral actors that the focal firm does not need to connect to the actors. Instead, it encourages the direct interaction between the actors in the network and profits from enabling the transaction to happen; on the other hand, to connect to different actors, the players need to invest their resources to maintain the link with the focal firm (Hagiu, and Wright 2015, Adner 2017).

So far, the ecosystem network has been explored by many studies (e.g. Kazi and Shapiro 2007; Salancik 1995; Azzam, Ayerbe, and Dang 2017) in terms of the form (Kazi and Shapiro 2007; Adner 2017; Jacobides et al. 2018; Adner and Kapoor 2010; Hagiu and Wright 2015); the function of network and significance of interaction (Gerald R. Salancik 1995) and the specific managerial capability to stabilise the relationships (Azzam, Ayerbe, and Dang 2017). Generally, network theories can be a theoretical lens to facilitate the understanding of the overall form of ecosystem networks. The factors such as the diversity of actors, resource sharing, network structure and network innovation highlighted in the network theories also apply to the ecosystem context.

Network externalisation. The ecosystem network is highly externalised, while in terms of network management, the network theories are still paying considerable attention to the authority of the central organisation. For example, according to the

early summary by (Miles and Snow 1992), there are three types of networks: stable, dynamic, and internal. Firms that adopt the stable network tend to assemble a group of component firms and build direct ties with them using contractual agreements. This type of network is usually tightly controlled by the focal firm, and the component firms are integrated to serve the final product. The dynamic network often co-functions with the divisional organisation form. A firm temporarily recombines different divisions (units within the firm or other independent firms) according to the needs of a specific project, in this way, to exert the value of different divisions and achieve product or service innovation. This type of network emphasises the moderate autonomy of the actors and the focal firms' ability to orchestrate the divisions. The internal network usually builds up a value-sharing system that sets up an internal market to allow different parties to trade resources inside the network; this type of network emphasises the knowledge following and the sharing of scarce resources among different members. These traditional forms and operational logic of the network still highly rely on the control of the focal firm, and members are often directly linked with the focal firm. The dynamic of the whole network is highly dependent on the orchestration and strategy choice of the central firm. There is limited attention to the interactions between different external parties and the diverse identity of these parties. Another piece of evidence that shows the highly centralised management style is the resource dependency theory (according to Salancik (1995) and Anderson et al. (1994), this theory is closely related to the network theories). Thus far, the traditional resource dependency theory still maintains the fundamental belief that firms need to gain control of other firms by owning resources not available elsewhere. On the other hand, firms must reduce the constraint from other firms by gaining key resources through alliance, merger and acquisition (MandA) and board interlock (Davis and Cobb 2009). The advice for top managers is to "Choose the least-constraining device to govern relations with your exchange partners that will allow you to minimise uncertainty and dependence and maximise your autonomy." (Davis and Adam Cobb 2009, p.6). In other words, firms need to control resources to remain strategically independent and gain control over their relationships with

outsiders. Furthermore, Gulati, Puranam and Tushman (2012) posit that the hierarchy structure is still necessary for the meta-organisation (multi-side network), despite the agreement upon loosely-coupled structure. The network still needs the upper tiers (members with more decision rights) to control, organise (planning and scheduling) and motivate (through incentives) the lower tiers (members with fewer decision rights). Literature generally insists on a more centralised government model of the network (despite the study trends upon open and loose organisational forms). However, the ecosystem is operated by a much more decentralised model (Teece 2007). The focal authority has to be decreased, and the overall structure should be un-hierarchy (Jacobides et al. 2018). some of the organisations even begin to "shrink their core" and "expanding their periphery" (Gulati and Kletter 2005). In the ecosystem network, the organisation highly depends on the value of external partners. Managers are encouraged to focus on enabling certain sets of groups to interact with each other and seek to profit from the activities that happen among different actors (Adner 2017) instead of simply pursuing control. Therefore, viewing the network from a decentralised perspective is worth exploring in order to understand the orchestration of the ecosystem, which is not clearly stated so far (Helfat and Raubitschek 2018).

Diversification. James Moore (1996) submit that the members of an ecosystem include "suppliers, lead producers, competitors, and other stakeholders." which also highlights the diversity of ecosystem members and the importance of involving the stakeholders. On the other hand, the incumbent studies tend to assume that the interaction among different actors is homogeneous. Many studies have provided solutions for managing ecosystem members, such as knowledge sharing (Wasserman and Faust 1994; Dyer and Singh 1998; Dhanaraj and Parkhe 2006; Gulati, Puranam and Tushman 2012), trust cultivation (Miles and Snow 1992; Dyer and Singh 1998; Iansiti and Levien 2004; Gulati, Puranam and Tushman 2012), and third-party enforcement of agreements such as legal contracts (Dyer and Singh 1998) and patent (Azzam, Ayerbe and Dang 2017). These studies commonly ignore the diversified interactions among actors that they only offer general solutions to all of

the members but do not discuss the solutions that might affect different actors in different ways.

4.0 The platform organisation and platform ecosystem

Based on the decrease in information storage costs and improving communication technology, the platform business has become increasingly pervasive and frequently discussed by academics (Altman, Nagle, and Tushman 2015; Brynjolfsson and McAfee 2014). So far, the platform strategy has powered many of the most profitable enterprises, such as Airbnb, Amazon, Alibaba and Tencent. The platform organisation is distinct from the other types of organisations with its distinctive resource utilisation. They interact with diverse external entities and derive value from them (Altman and Tushman 2017; Helfat and Raubitschek 2018; Kwak, Kim and Park 2018). By opening the resource base, a platform keeps building up the outside organisation communities and nurturing them to keep these communities growing (Boudreau 2010; Altman, Nagle, and Tushman 2015; Dahlander and Frederiksen 2012). Departing from the opposite side of close strategies, platform companies run their businesses by sharing their core technologies and enabling external innovations (Adner 2006; Adner and Kapoor 2010; West 2003). Platforms open the database to connect actors and facilitate transactions (Parker, Van Alstyne, and Choudary 2016; Rochet and Tirole 2003; Zhu and Iansiti 2012). In addition, the platform company holds loose leadership. The word “loose” comes from the idea of “loosely coupled coalitions” (Provan 1983, p83) refers to “a situation in which elements are responsive, but retain evidence of separateness and identity” (Weick 1976, p3). The word “loose” also stand for no hierarchical controls by top managers in an organisation or a network. A platform adopt a “loosely coupled” network endows significant autonomy and limited control over the development of external parties (McIntyre and Srinivasan 2017). It allows its partners to enter the platform by their own decisions and self-select the tasks and the platform resources to use in their businesses (Olleros 2008; Busquets, Rodon, and Wareham 2009, Yoo, Henfridsson and Lyytinen 2010). Meanwhile, as top management teams embrace these designs,

they should carefully transform their leadership to align with more externally focused, open, and relation-oriented approaches (Altman and Tushman 2017). This is what I called “loose leadership”. In contrast to traditional businesses engaging supplier networks, alliance strategy, merger and acquisition (MandA), which are more transactional and bind the partners through contracts, the platform strategy has less attention to controlling external resources (Olleros 2008). Instead, they focus on developing a wide range of interdependent partnerships to improve their competence by absorbing the external contribution (Zittrain 2008; Altman and Tushman 2017). External parties and the focal firm form a modularised and non-hierarchical organisational structure, which allows complementary innovations to be leveraged (Altman and Tushman 2017).

The platform strategy is challenging the traditional principles of using resources and providing a different logic for businesses to manoeuvre in the competitive environment and reconfigure resources. The ultimate goal for a platform organisation has shifted from winning the competition by controlling superior resources and capabilities to building up an ecosystem to achieve value co-creation with external parties. As a result, the open structure and diversification of external partners cause a continuous evolution of the platform company (Shi, Li and Chumnumpan 2020; Kapoor and Agarwal 2017; Gruber, MacMillan, and Thompson 2008). Also, because of the unique source of evolution, the evolution of a platform organisation is highly difficult to be predicted, and the blueprint for an overall ecosystem cannot be fully designed at the very beginning (Dattée, Alexy and Autio 2018; Nambisan 2017). The evolutionary feature of the platform largely heightens the complexity of managing it and the difficulty of orchestrating resources.

The following section will review the previous literature and discuss how platform companies manage and orchestrate their resources. I choose three perspectives to unfold my discussions which are 1) the platform leadership 2) the externalised value proposition, and 3) the evolutionary path of a platform organisation. These three perspectives would help us reveal the platform business's unique features and the uncertainty and complexity caused by its unique ways of using resources.

4.1 The loose leadership

The leadership of a platform company is not controlled or acquiring any of the resources. Instead, it focuses on enabling and encouraging external innovation and benefits from the contribution of the external parties (Altman and Tuschman 2017; Adner and Kapoor 2010; Gruber, MacMillan, and Thompson 2008). A platform could be the core of an innovation network and the fundamental technology support for the peripheral innovations (Adner 2006; West 2003), or it could be a platform infrastructure that allows external businesses to conduct transactions and collaboration (Armstrong 2006; Adner and Kapoor 2010). An open platform relies on complementary contributions, so it endows significant autonomy and limited control over the development of external parties (McIntyre and Srinivasan 2017). It allows its partners to enter the platform by their own decisions and self-select the tasks and the platform resources to use in their businesses (Olleros 2008; Busquets, Rodon, and Wareham 2009, Yoo, Henfridsson and Lyytinen 2010). The external business partners/complementors are directly connected to the market and improve their products and services as the market changes (Wareham, Fox, and Cano Giner 2014). By reducing the control of external parties, the platform leader encourages individual developers to be more creative and scale up faster, thus, helping the platform to evolve quickly (Wareham, Fox, and Cano Giner 2014; Hagel and Brown 2005). The main task for platform leaders is to provide directions and common grounds to guide the development of external parties. In turn, they provide innovations, products and services to the platform business (Adner 2017). On extreme occasions, platform users could be the designer and selectors of platform businesses and play the dominant role in platform development (Altman and Tuschman 2017).

A platform leader is also responsible for building a fertile environment for external partners to grow and generate innovation (Morris and Ferguson 1993). Since the principle of the platform business is to seek an interdependent and mutually

beneficial relationship with the platform users, the platform leader needs to focus on building a resource system to help the development of external parties. Studies have suggested that as the platform builds up exemplary architecture and lets the platform resources engage with the businesses of external partners, the external parties will be able to sustain their competitive advantage and benefit from the platform (Kapoor and Agarwal 2017). Therefore, the platform leader must continuously communicate with users and understand their needs and demand. Studies have discussed many ways for platforms to interact with users, such as designing interfaces (Garud, Kumaraswamy and Sambamurthy 2006; Gawer and Cusumano 2002), sharing core technologies (also called "coring") (Gawer and Cusumano 2008), using decentralised organisational structure (Olleros 2008), and opening the resource base (West 2003).

It seems that the leadership style of a platform organisation is highly different from the ones of traditional organisations, as the primary goal for a leader is to distribute the central power, sustain the interconnected relationship and nurture the growth of external partners. This type of leadership causes great complexity and difficulties in orchestrating the platform and resources. It is because, on the one hand, the platform will interact with a diverse range of parties who possess a high level of autonomy; the unpredictable activities of the partners/complementor result in significant uncertainty. On the other hand, it is also difficult for a platform to detect the demands of many users and build an adaptive and fertile ecosystem to cater to their growth. To reconfigure resources in the platform organisation and develop new competencies, the focal firm needs to adapt a highly dynamic and interactive process and focus on the health of the overall ecosystem to support the external partners and deepen the interdependent relationship.

4.2 The externalised value proposition

The interactions with external parties are essential for a platform company to gain competitive advantages (Boudreau and Jeppesen 2015; Cennamo and Santalo

2013). Unlike traditional organisations, platform organisations tend to face the challenges of moving innovations to the outside (Lakhani, Lifshitz-Assaf, and Tushman 2013; Powell, Koput, and Smith-Doerr 1996). Studies have discussed many different forms of externalised innovation, such as crowdsourcing (Howe 2008; Afuah and Tucci 2012), open-source software (Foss, Frederiksen, and Rullani 2015; O'Mahony and Bechky 2008) and open innovation (Baldwin and von Hippel 2011; von Hippel 1986). These studies commonly reflect that platform users design, produce and operate the product or services, which used to be the responsibility of the focal firm. Focal firms functions to develop and distribute generative assets to facilitate peripheral innovations (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). Alternatively, they provide open interfaces and standardisation and let different parties collectively produce components to develop products and services (Baldwin and Clark 2000; Furlan, Cabigiosu, and Camuffo 2014; Pil and Cohen 2006).

The generative technology is the key resource shared by the platform organisation to allow for recombination and redistribution of functionality (Yoo, Henfridsson and Lyytinen 2010; Zittrain 2008), which potentially creates unprompted changes and a wide range of future applications (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). As Yoo, Henfridsson and Lyytinen (2010) explained, the generativity of technology comes from its usability to a large number of heterogeneous designs and the capability of attaching to different components. They provide the example of the digital camera, which can be used as a photo editor, video player, Internet client, and in many alternative ways. In addition, in a business network, the generative potential of certain resources or technologies can be unlocked when they are paired with different organising logic of different business actors who may aim to fulfil their own innovation strategies (Yoo, Henfridsson and Lyytinen 2010). In the case of Tencent, some of the resources shared by it are generative. For example, the *customer data* accumulated by WeChat Pay can be used by Banks to run their loan services. This specific customer data can reflect customers' consumption capability and their ability to repay loans, and this information can help a bank assess its customers more

precisely and provide better financial products and services. Additionally, the customer data of WeChat Pay can also be used by e-commerce companies as it reflects customers' consuming habits and preferences. As different business actors continue to explore the value of this specific set of data provided by WeChat Pay, they can use it for advertising services, operating small businesses, making business decisions, risk control and designing mobile applications...etc. The most important point is that Tencent opens its platform and shares its resources with external parties, and allows them to use the resources to pursue their own innovation goal. The generative potential would be largely unlocked when Tencent's resources are attached to different design logic and components. In other words, Tencent's data and technologies are used by heterogeneous actors to fulfil different business purposes and fuel multiple products and services.

In addition, a distinguishing feature of platform organisation is the network effect, where the value accruing to network users arises from the size of the installed base, i.e., the number of other users with whom they can interact in the same network (Katz and Shapiro 1985). In a typical cross-network effect, the value of parties on one side of the platform is affected by the value and quality of the parties on the other side (Hagiu and Wright 2015; Helfat and Raubitschek 2018). For example, Airbnb connects the travellers who book rooms with the providers who have spare rooms to rent out for a short term; the more travellers using Airbnb, the greater the platform's value to the renters, thus, increasing the overall value of the platform. The positive network effect does not come automatically. The platform organisation needs to build a positive effect by establishing structures which determine what kind of external users are allowed to enter the platform and how these users interact with each other (Helfat and Raubitschek 2018). It needs to develop the resource base that ties every party to the platform, and it also ought to encourage efficient and frequent resource exchange among different parties.

The externalised innovation and network effect shift the strategic focus from the internal organisation to the external. As a platform company, a single firm's resources and capabilities become inadequate to obtain competitive advantages.

Instead, connecting the external parties and encouraging complementary innovations is more important. A platform organisation need to figure out how a attract more external partners into the platform and how to leverage the resources from outside organisations to build up a profitable ecosystem.

4.3 The dynamic evolution process—the uncertainty

The platform organisation is continuously evolving because of the loose leadership and the focus on the demand side. The evolving process is highly dynamic and complex because it differs from traditional organisations; a platform organisation grows by spanning its firm boundary and attracting more platform users (Altman and Tushman 2017; Kapoor and Agarwal 2017; Shi, Li and Chumnumpan 2020). As the platform organisation involves a larger range of external parties, it would face significant challenges in making changes because any division of the platform renewed or improved will affect the other parties on the same platform (Adner 2006; Adner and Kapoor 2010; Altman and Tuschman 2017). The focal firm must consider the ecosystem-level evolution, which involves many external players who work interdependently on the platform.

Also, an ecosystem of a platform cannot be seen and pre-designed, which makes it highly difficult for a platform organisation to conduct innovation and fertilise growth. Certain studies have explored multiple ways for a platform to evolve. A platform organisation can guide the evolution by providing a blueprint to the external partners and leading them to a particular strategic direction (Adner 2012; Baldwin and Clark 2000; Edelman 2015; Iansiti and Levien 2004). Also, they can clearly define the core asset of the platform and, based on the asset, design a technological and social interdependence by choosing the right partners to enlarge the ecosystem (Adner 2012; Adner and Kapoor 2010 2016; Kapoor and Furr 2015; Kapoor and Lee 2013). However, a study also points out that evolution can be planned if the insights and asset substantially exist before it is applied to the organisation (Dattée, Alexy and Autio 2018). In contrast, the fact is that a platform ecosystem faces a fast-changing environment which results in plenty of unexpected factors and events. Also, given

the unique character of the platform organisations, they tend to evolve alongside a less-bounded path (Nambisan 2017). Since the platform is established on a group of generative assets and evolved with external innovations, the platform business would constantly need to deal with flux organisational boundaries, preliminary product design and innovations (Lyytinen, Yoo, and Boland 2016). The innovation will quickly expand as large, varied, and uncoordinated developers enter the platform and generate unprompted contributions (Zittrain 2008). The point is that the evolution path of platform organisations could be highly cumulative and path-dependent (Parker, Van Alstyne and Choudary 2016; Tiwana, Konsynski, and Bush 2010). On many occasions, the platform company need to grow without a pre-existing insight and clearly defined assets. A platform must cope with high uncertainty and fluctuating resource base to co-evolve with external parties.

The evolution path of the platform company is different from the traditional ones, which have stable and clearly-defined boundaries surrounding a group of products and services. To continuously gain a competitive advantage, platform businesses have to embrace the uncertain and blurry future and gradually build up the ecosystem while accumulating more experience. This causes great difficulty and complexity in growing a platform ecosystem and reconfiguring the resource base.

4.4 The platform ecosystem

The platform ecosystem study is a popular topic among platform studies. As an emerging literature, the platform ecosystem literature draws on many traditional theories, such as system competition (Katz and Shapiro 1994) and value appropriation (Teece 1986). Notably, it heavily draws on the studies on network externalisation, which emphasise the type of organisation that benefits from a more extensive install base (Katz and Shapiro 1985; Farrell and Saloner 1985). It often places the study in the context of information technology and the internet sector (Thomas, Autio, and Gann 2014). Regarding theoretical influence, the platform ecosystem study mainly addresses product family and market intermedia (Thomas,

Autio, and Gann 2014). The product family stream considers the platform complex of multiple components (Bresnahan and Greenstein 1999). The focal firm possesses the bottleneck technology and designs a concomitant technological interdependence with the peripheral parties (Dattée, Alexy and Autio 2018; Cusumano and Gawer 2002). The focal firm organises and harnesses the complementary contribution by designing modular architecture, interface and standardisation (Baldwin and Clark 2000). The digital platform organisation is fuelled by generative technology (Zittrain 2008). According to Zittrain (2008), generative technology is "a function of a technology's capacity for leverage across a range of tasks, adaptability to a range of different tasks, ease of mastery, and accessibility." (Zittrain 2008, p.1981). Based on an opening architecture, the digital platform shares multiple aspects of its innovation and technical progress with external parties (Boudreau 2010) and, in turn, obtains unfiltered contributions from complementors (Zittrain 2008). The generative mechanism continues to bring about new applications (Garud, Jain and Tuertscher 2008) and create momentum for more innovations (Schilling 2009, Shapiro and Varian 1998, West 2003). It also makes the strategic design of digital platforms naturally incomplete and less predictable (Garud, Jain and Tuertscher 2008). Besides, digital platform organisations need to relinquish control over resources and the platform infrastructure to benefit from the advantages of generative technologies (Katz and Shapiro 1986, Kende 1998, Morris and Ferguson 1993, Shapiro and Varian 1998, West 2003). This stream of theories follows the basic logic of the resource-based view and highlights the control of crucial resources (Thomas, Autio, and Gann 2014).

The market intermediary stream emphasises the business transaction and value exchange enabled by the platform (Bresnahan and Greenstein 1999), which focuses more on the logic of market dominance (Thomas, Autio, and Gann 2014). the digital platform organisation is often surrounded by a two-/ multi-sided market, where it connects and matches different groups of users and profits from enabling transactions, innovations, economies of scale and scope (Helfat and Raubitschek 2018; Hagiu 2008). The platform is more attractive to one side of actors if the number

of actors on another side grows (Hagiu 2008; Armstrong 2006; Caillaud and Jullien 2003). In this case, the competence drawn from a multi-sided market largely depends on cultivating healthy relations among different actors and attracting various parties to get on board (Hagiu 2008; Hagiu and Wright 2015). Thus, to benefit from such a trait—network externalisation (Hagiu 2008; Rochet and Tirole 2003; Armstrong 2006), it often requires the platform to partially loosen the control over the interaction and encourage direct connections among different parties using the platform (Hagiu and Wright 2015). Besides, the platform also needs to adopt the model of opening that incurs the availability of the platform resource base (Economides and Katsamakas 2006) and lower entry barriers (Karhu and Ritala 2021; Karhu, Gustafsson and Lyytinen 2018) to stimulate more interactions on the platform. Nevertheless, the platform ecosystem could be a complex synthesis (Altman and Tushman 2017), including the logic of both product facility and market intermediary (Thomas, Autio, and Gann 2014). A platform organisation can reduce the control over the modules and components and, in the meantime, act as a collaboration enabler that encourages the external parties to interact with each other and use the components to build up different products.

The concept of a digital platform ecosystem could be an aggregation of the previous characteristics, that it could be a technological architecture (Cennamo and Santaló 2019; Tilson, Lyytinen, and Sørensen 2010; Yoo, Henfridsson, and Lyytinen 2010) and a system for sharing and connections (Gawer 2014; Thomas, Autio, and Gann 2014). By sharing the resource base, innovation and problem-solving processes with autonomous external parties (Murthy and Madhok 2021; Giudici, Reinmoeller and Ravasi 2018) and learning from customer data feedback (Gregory, Henfridsson Kaganer and Kyriakou 2021), the digital platform ecosystem continues to seek value co-creation and co-evolution with its stakeholders (Adner and Kapoor 2010; Kapoor 2018).

The overall concept of the platform ecosystem matches with the overall background settled by us (the loosened leadership and externalised value proposition). It emphasises the focus on the interdependent relationship with the external partners

and renewing the resource base during the interactions. Besides, it indicates an open and collective path for the platform organisation to evolve. This concept bridges the literature between platform organisation and ecosystem and provides a theoretical angle to explore.

5.0 Toward the objective of my research—the dynamic capability in a digital platform ecosystem

I study the ecosystem in a platform organisation context and adopt the dynamic capability as the theoretical lens to explore the resource reconfiguration process and evolutionary path of platform organisation. The dynamic capability theory is a small but recognisable theme of platform organisation study. *It considers the platform organisation as a synthesis that consists of multiple resources and capabilities, which are rapidly recombined and reoriented by the organisation to adapt to the fast-changing environment.* Such a logic properly mirrors my research objective of unfolding the mechanism of integrating and leveraging the platform resources to generate value. I do not focus on the internalisation and possession of valuable resources. However, I try to understand how value is continuously generated through connecting and enabling network/cross-network effects to trigger complementary contributions. I adopt this logic in my studies and focus on exploring the process for platform leaders/managers to quickly reconfigure its internal and external resources to develop new capabilities and competencies.

As mentioned in the review, the platform organisation distinguishes itself from the traditional organisation with its intense focus on value creation outside the organisation and its highly flexible ways of organising and combining external resources. The unstable nature of a platform resource base raises difficulties in understanding the mechanism behind the ecosystem. We need more studies on the reconfiguration process of platform resources to deepen the understanding of how platform businesses and their ecosystem work. In this case, the dynamic capability theory is a suitable lens for my studies since it essentially focuses on the reconfiguration of the resource base and the capability to generate new competence

and more capabilities (also called the higher-level capability). Also, the platform organisation faces a competitive market environment fuelled by industry convergence and interdependency (Sawhney and Mohanbir 1998), low entry barriers (Porter 2001), imitable capabilities and resources (Shapiro and Varian 1998), and empowered customers owing to low switching costs and more substitute services (Porter 2001). Therefore, the platform must quickly evolve and generate new resource mixes to react to market opportunities and challenges. Therefore, instead of relying on the resource endowment, the platform needs to "*integrate, build, and reconfigure internal and external competencies to address rapidly changing environments*" (Teece, Pisano and Shuen 1997, p.516). Dynamic capability is considered one of the sources of competitive advantage (Teece 2007). As an extended version of RVB, it highlights the change in managerial processes and routines, which enables companies to recombine better and integrate internal and external resources to react to the competitive market (Eisenhardt and Martin 2000; Zahra, Sapienza and Davidsson 2006; Teece 2007). I consider that platform companies need dynamic capabilities to achieve and maintain competitive advantage because they constantly share and enrich the resource base and face a competitive environment (Zeng and Glaister 2016; Helfat and Raubitschek 2018). Additionally, the nature of the continuous evolution of dynamic capability echoes the evolutionary nature of platform organisations. *Collis (1994) pointed out in his study that organisational capability must constantly evolve and form an infinite regression.* The capability that lacks changes will soon become hazardous and encumber the organisation's development (Eisenhardt and Martin 2000; Zollo and Winter 2002). Thus, an organisation must continuously search for new capabilities and competitive advantages. A platform organisation involves a range of external parties loosely organised by an un-hierarchical architecture (Olleros 2008; Baldwin 2007; Armstrong 2006). It needs to continuously re-organise these external parties to enable efficient collaboration and value exchange. As the market changes quickly, platform leaders are responsible for encouraging external innovation and continuously enriching the resource base and capabilities by leveraging complementary contributions.

Therefore, the dynamic capability provides a matching angle to observe the evolutionary path of a platform organisation and its ecosystem.

However, the dynamic capability theory is insufficient to fully explain the platform phenomenon and concepts because they ignore the external partners' diversity and still emphasises the centralised firm-level governance style. The previous thesis either follows the theoretical framework of the sensing, sizing and reconfiguration capabilities (Teece 2007); or seeks the routines that facilitate new resource configuration as the market "*emerge, collide, split, evolve, and die*" (Eisenhardt and Martin 2000, p.1107). It appears that managerial attentions are mostly inward-looking; the changes in resource base and capabilities depend on experience, managerial learning capabilities and managers' intentional effort to create the change (Ambrosini and Bowman 2009). However, the management of platform companies is more outward-facing. On the one hand, platform companies open up their resource base to encourage more external innovations (Gawer and Cusumano 2008; Boudreau 2010). On the other hand, the platform concept is often linked with the ecosystem where the focal firm involves many peripheral complementors (Helfat and Raubitschek 2018). Recently, studies of dynamic capabilities have started to bring managerial attention to the peripheral factors (Teece 2007; Ambrosini and Bowman 2009) and discuss the managerial capabilities to incorporate external partnerships (Helfat and Raubitschek 2018; Giudici, Reinmoeller and Ravasi 2018). Nevertheless, I still need more insights to understand how organisations largely involved with external partnerships are orchestrated (Nambisan, Siegel and Kenney 2018; Helfat and Raubitschek 2018). As a result, the current dynamic capability theories are insufficient for unfolding the mechanism behind a platform company. By deeply exploring the issues, I potentially enrich the dynamic capability theories from an outside-in perspective.

Broadly speaking, I aim to make two contributions through this dissertation. First, I enrich the concept of dynamic capability. I want to uncover what is different about the dynamic capability that helps the platform to grow over time. I endeavour to understand how platform organisations manoeuvre the externalised value

proposition and the generative nature, and how it involves diverse actors in the value creation process. Secondly, since the dynamic capability is essentially about managing resources, I intend to see whether the form and function of the resource would change or not when it follows among different actors on the platform. In the following section, I will further review the extant dynamic capability discussions in the context of ecosystems and platform organisations. Through this view, I will highlight theoretical gaps that hamper the explanation of platform ecosystem dynamism. Then, the theoretical gaps would lead us to my research objectives which would also be thoroughly elaborated.

5.1 The extant dynamic capability studies in the ecosystem context

Regarding the ultimate objective of exploring how firms manage their ecosystem, I use dynamic capability as the primary theoretical lens to discuss and attempt to understand the orchestration of the ecosystem. The incumbent dynamic-capability-related theories cover the studies of resource reconfiguration (Teece et al. 1997), internal-organisation managerial processes (Eisenhardt and Martin 2000), organisational learning (Easterby-Smith and Prieto 2008; Weerawardena, Liesch, and Knight 2007), knowledge management (Zollo and Winter 2002; Cepeda and Vera 2007), product innovation (Verona and Ravasi 2003), organisational transformation (Rindova and Kotha 2001) coordination and integration (Teece et al. 1997; Teece 2007; Wheeler 2002) and structural innovation (Eisenhardt and Brown 1999; Galunic and Eisenhardt 2001; Verona and Ravasi 2003). Hence, it offers a large firm-level-management literature base and diverse perspectives to study the resources and capabilities of management in the ecosystem. However, it seems insufficient to fully explain the mechanism behind the ecosystem because it barely includes an ecosystem-level view to explain the orchestration processes. The following section shows and compares the related literature and studies of the ecosystem theories, platform ecosystem theories and dynamic capability theories to illustrate the echoing parts and blank spaces between these two theories.

First, the ecosystem involves a diverse portfolio of actors (Moore 1993) and highly externalised value propositions. The dynamic capability theories, as well, have realised the importance of aligning with different partners (e.g. Teece et al. 1997; Eisenhardt and Martin 2000). They emphasise that in the competitive environment where new products are introduced frequently, firms must integrate external resources and capabilities (Teece 2007) to strengthen their capability. They also highlight differences in firm-level collaboration routines (Clark and Fujimoto 1991). Nevertheless, most studies focus on the alliance with crucial component suppliers at the firm level (Adner and Kapoor 2010). For example, early studies reveal that an 18-room air conditioning plant coordinates with its key partners, the factories and component producers, by gathering and transferring customer information among them, thus, increasing the profitability and competitive advantage of the focal company (Garvin 1988). Verona and Ravasi (2003) also point out that the traditional product development process in the technology industry simply integrates the component suppliers who produce different parts of the final product. Whereas, in the case of the ecosystem, the diversified peripheral partners (usually called the complementors) are also considered significantly important. Teece (2018) posits that in an ecosystem, the value of the focal firm is affected by the amount of different external complementors. Ceccagnoli, Forman, Huang and Wu (2012) submit that platform companies can increase their value by encouraging innovations of multiple third parties, such as customers, research companies, business partners and universities. Kapoor and Lee (2013) also point out that the way a focal firm organises different types of complementors (such as technology developers and service distributors) affects its ability to capture value from new technologies. Furthermore, as aforementioned, one of the most obvious characteristics of ecosystems is their diversified resource and external actors, reflected by the complementary-firm business model (Clark and Fujimoto 1991), open membership (Gulati, Puranam and Tushman 2012) and open structure (Linder, Jarvenpaa and Davenport 2003; Lee and Mendelson 2008). It is suggested by many studies that the ecosystem highly depends on the supply of external complementors (e.g. Iansiti and Levien 2004;

Azzam, Ayerbe, and Dang 2017; Teece 2018; Helfat and Raubitschek 2018). However, the question of how these external actors are managed is due to be answered (Helfat and Raubitschek 2018; Jacobides, Cennamo and Gawer 2018). As shown by the literature review, both dynamic capability theories have limited discussions on diversifying external resources and partners. They either ignore the diverse member identities (e.g. Garvin 1988; Teece et al. 1997; Bowman and Ambrosini 2003; Verona and Ravasi 2003; Davis and Cobb 2009) or the diverse ties among members (e.g. Miles and Snow 1992; Wasserman and Faust 1994; Dyer and Singh 1998; Galunic and Eisenhardt 2001; Iansiti and Levien 2004; Dhanaraj and Parkhe 2006; Gulati, Puranam and Tushman 2012; Azzam, Ayerbe and Dang 2017). Therefore, to further understand how the ecosystem is orchestrated and managed, this theory should answer how firms manage their diversified internal and external resource and actors. Also, given that the dynamic capability theory is an extended version of the Resource-Based View (Zeng and Glaister 2017), I can assume the resource-related nature of the theory. Although the extant dynamic capability literature emphasises reconfiguring internal and external resources, it still lacks an explanation of how firms manage their diversified partners and relationships in the ecosystem by orchestrating and renewing their internal and external resources. Therefore, despite the dynamic capability theory having touched on managing external resources and partners in an ecosystem context, it needs to include a broader range of actors that interdepend with the company. The extant studies of dynamic capabilities tapped on the external resource reconfiguration still focus on resources within the firm boundaries and fully under control. In contrast, the ecosystem-level perspective requires researchers to shift their sights beyond the firm boundary and involve more ecosystem-level resources shared and reshaped by ecosystem actors.

Second, although the dynamic capability literature has shed light on various approaches to recombine the resource base, it is still relatively static compared to the ecosystem theories. Given the firm-level nature of dynamic capability theories, studies continuously pay a considerable amount of attention to the firm's internal

actors and managerial activities. For example, using the case of a hearing-aid company, Verna and Ravasi (2003) submit that in technology companies, an "open structure" where professionals in different departments can freely choose to participate in the project that suits their knowledge area and professional skills. The study illustrates that without the strict rules and boundaries between different departments, knowledge can be shared, integrated and reconfigured within the organisation, hence, fully exerting the potential of the professionals in different departments. Although this study has touched on the mechanisms of "structural openness", which is, later on, considered one of the traits of the ecosystem, the main discussion still focuses on the resource and interactions inside the firm and the executive management have the full power to allocate resource and decide which project to choose. In another study, Galunic and Eisenhardt (2001) attempt to link modular architecture with dynamic capability. They use the case of a large IT technology corporation to illustrate how moderate autonomy and frequent recombination of divisions result in dynamic capability and lead to competitive advantages. In this case, the divisions get to design their approaches to solve their tasks. Different divisions can share their solutions and resources with others, and they can also compete with the divisions with similar products and target markets. The executive managers assign different responsibilities to the divisions with the matching knowledge and capabilities to better react to the market needs. The study submits that this type of modularity structure high in autonomy and flexibility generates dynamism and competitive advantage. Again, the paper has shed light on some of the critical elements of the ecosystem, such as modularity architecture, autonomous membership and evolving structures. However, divisions in this case, are still within the corporate; and the top manager in the focal firm still maintains full control (through allocating resources and assigning responsibilities) over the divisions. Nevertheless, the ecosystem usually involves diversified external parties. Organisations tend to outsource their internal processes or substitute the inside divisions with outside partners (Gulati, Puranam and Tushman 2012), which means it is insufficient to explain the ecosystem's operation by only considering the internal

actors. Hence, the dynamic capability needs to shift the attention toward outside the organisation. Also, the structure of an ecosystem is un-hierarchy and unauthorised, which means the peripheral parties do not necessarily under the full control of the focal firm (Hagiu and Wright 2015). The role of the focal firm tends to shift from employing the resources and capabilities to enabling the resources and capabilities of different parties to exchange and follow (Adner and Kapoor 2010). Echoing this thesis, Adner (2016) also advocates that the focal firm in an ecosystem does not necessarily have a direct connection with the actors. Instead, it creates value by mainly enabling activities in the structure. Therefore, to explain the mechanism behind the ecosystem, dynamic capability theories ought to figure out how to shift into a more decentralised business model, where the focal firm does not have direct control over the related parties and allows actors to interact with each other freely.

Further unfolding the un-hierarchy feature of the ecosystem. Previous studies significantly focus on the central power of top management and their capabilities of remixing and renewing the resource base. Such a theoretical focus is still based on the authority and hierarchy within the organisation. In contrast, limited studies have explored the system beyond the firm boundary based on the connections and ties among the resources, individuals and business partners. Thus far, many studies related to the dynamic capability theory emphasise the hierarchical structure of an organisation. The dynamic capability theory has a long history of highlighting it. Early mentioned Teece (et al. 1997; 2007) that a firm's capability should be considered in terms of its organisational structure and managerial process. Eisenhardt and Martin (2000) also point out that the organisational structure is necessary for any circumstance. The ability to reconfigure the organisational structure to react to market change is considered evidence of having dynamic capability by many studies (e.g. Eisenhardt and Brown 1999; Karim 2006; Teece et al. 1997; Teece 2007). In terms of external resources, Anderson, Håkansson and Johanson (1994) claim that a network is built up by structured actors. Holm, Eriksson and Johanson (1999) submit that the structural view provides a distinct and fruitful angle to study the business network. Lavie (2006) points out that an effective alliance governance

structure can affect the network's profitability. However, as shown in the literature review, both of these theories are still undergirded by the centralised governance style (e.g. Miles and Snow 1992; Galunic and Eisenhardt 2001; Verna and Ravasi 2003). The system is hierarchical (Gulati, Puranam and Tushman 2012), and focal firms have high authority (Davis and Cobb 2009). Focal firms still play the role of a designer and broker positioned on top of the organisation to manage resources and internal and external actors. However, the ecosystem is based on a modular and un-hierarchical structure (Jacobides et al. 2018). It has open membership (easy to join/leave, and members maintain the right to make decisions) (Gulati, Puranam and Tushman 2012), indirect complementary-firm connections (Jacobides et al. 2018; Adner 2017) and cross-group/ cross-network effects (Hagiu, and Wright 2015; Helfat and Raubitschek 2018). Therefore, current theories are insufficient to explain the orchestration of the ecosystem because they do not fully cover the indirect control by the focal firm upon the complementors and the diversified interaction and relationships among different actors in different structural locations (Adner and Kapoor 2010; Adner 2017). To understand how ecosystem structure is constructed and managed, it is essential to extend the current dynamic capability theory and answer how focal firms navigate opportunities and challenges caused by un-hierarchical relationships between the platform and the external players. I explore how interdependent relationships with diverse ecosystem players impact the platform organisation's dynamic capability; and how such a shifted relationship affects the value-creation mechanism (Adner 2017).

5.2 The extant dynamic capability studies in the digital platform organisation context

It has been suggested that a platform organisation need "higher-order capabilities" (Winter 2003) to maintain a competitive advantage (Ciborra 1996; Thomas, Autio, and Gann 2014). Thus far, a small but growing amount of dynamic capabilities studies have shifted their focus from large industrial organisations and transaction cost logic to the unique mechanism of platform organisations and their ecosystems

(e.g. Thomas, Autio, and Gann 2014; Zeng and Mackay 2018; Teece 2018; Helfat and Raubitschek 2018). Such a group of extant dynamic capability studies generally assumes that the platform organisation is constituted by a bundle of resources and capabilities rapidly recombined and restructured to react to market demands and opportunities (Thomas, Autio, and Gann 2014). Some of the current dynamic capability literature have captured special features of platform organisations and their ecosystems, such as the characteristic of their capabilities (Helfat and Raubitschek 2018; Li and Chan 2019), interdependence relationships between complementors and the focal firm (Teece 2018), the underlying logic of resource sharing and opening system (Giudici, Reinmoeller and Ravasi 2018) and the shifting leadership (Sunder and Marathe 2018; Haim Faridian and Neubaum 2021). Studies mainly focus on identifying the idiosyncrasy of platform resources and capabilities. They explore the strategic pattern for a focal firm to design the system and develop inimitable capabilities. For instance, Helfat and Raubitschek (2018) posited three critical dynamic capabilities: innovation, environmental scanning and sensing, and integrative capabilities for platform leaders to create and capture values. They highlight the engagement of a wide range of complementors and cross-network effects while emphasising a platform leader's responsibility to design, articulate and alter an ecosystem. The field research conducted by Giudici, Reinmoeller and Ravasi (2018) developed an insightful argument for the value co-creation between the platform organisation and external players. This processual study shows how a platform organisation orchestrates the ecosystem to enhance its network members' searching activities and, thus, affect their sensing capabilities. The outcomes of this research indicate that the dynamic capability may not reside exclusively within the organisation. Instead, it could be co-created relationally with the external parties (Giudici, Reinmoeller and Ravasi 2018). As Teece (2018) also emphasised in a recent publication, in the context of the digital era and platform organisations, complementarities tend to play a much more critical role than they used to be, and organisations need to focus on leveraging enabling technologies and inspire more downstream usages. Such slowly but continuously growing studies reflect that

dynamic capability views have been shifted from the internal organisation to the external organisation by acknowledging parties beyond the traditional firm boundary and their relational efforts of co-creating value with the platform leader (Helfat and Raubitschek 2018; Teece 2012). Dynamic capability studies have explored approaches to manoeuvre external resources and navigate challenges and opportunities in the new business setting. The platform organisation, also considered the platform leader, is recognised as the central actor. Platform leaders are responsible for learning continuously and orchestrating ecosystem actors and resources to generate value.

Additionally, certain studies in the field of dynamic capability have highlighted the "ever-changing organisational context" faced by digital platform organisations (Zeng and Mackay 2018). From a historical perspective, the platform organisation needs constant morphing capabilities to sustain growth and competitive advantages (Rindova and Kotha 2001). Zeng and Mackay's (2018) empirical study of transaction platforms stresses the importance of external contingent factors complementing the organisation's core dynamic capabilities. They pointed out that managerial insights should arise from the constant internal and external sensing activities, which means the development of dynamic capabilities is continuously affected by external environmental factors. Acknowledging the ongoing evolution of the platform ecosystem, Shi, Li and Chumnumpan (2020) point out that the ecosystem study could benefit from more processual research. They argue that extant studies only capture snapshots of the unique mechanism of platform ecosystems. To complement the extant literature, they conducted a longitudinal study to identify four dynamic capabilities (innovation leverage, market exploration, quality control, and appropriation) which facilitate the platform ecosystem development. This argument provides great inspiration for my research. It is because, with significant recognition of the importance of external agencies and the uncertainty of the platform ecosystem (Helfat and Raubitschek 2018), the dynamic capability framework needs a more vibrant view to capture the value creation in a fast-changing environment constituted by a mass of ever-evolving players. The unique setting of a platform ecosystem

indicates that it is less likely to have a clear vision of the development pattern and future design of systems. Hence, I am more likely to generate a comprehensive understanding with a "continuously unfolding view" that covers a longer period and more relational factors.

5.3 Research objective 1—Investigating dynamic capabilities at the platform ecosystem level

5.3.1 The demand-side economy

The value proposition of a platform ecosystem is highly externalised, which means the value creation is based on the participation of customers and direct interactions among a group of significantly diversified, geographically dispersed and quickly evolving ecosystem actors. The externalisation of value creation runs beyond the firm-level logic, and it depends more on direct connections among external users instead of the unilateral commitment of a firm or individual (Nambisan, Siegel and Kenney 2018; Chen, Donada and Perez 2017). In this case, to develop a platform ecosystem, the organisation might require different types of dynamic capabilities to leverage the external resource and orchestrate a diverse range of ecosystem players (Giudici, Reinmoeller, and Ravasi 2018; Helfat and Raubitschek 2018; Nambisan, Siegel and Kenney 2018).

The platform organisation hands over some responsibilities outside the focal company, such as innovations, product design and production. The externalised activities are different from traditional outsourcing because, first, a platform's growth is highly dependent on the network effect, where users from the demand side of the platform drive the value creation. Traditional outsourcing activities are mainly focused on producer/supplier side inter-organisational networks, where the focal firm focuses on developing a dominant relationship. Second, the relationship between the platform and demand-side users is multilateral (Gulati, Puranam, and Tushman 2012). The platform organisation needs to interact with all stakeholders and improve the business by coordinating all members. In contrast, traditional outsourcing and

inter-organisational networks mainly focus on bilateral relationships regulated by relational contracts (Dyer and Singh 1998; Lavie 2006). Third, producers or complementors "employed" by platforms are not often established firms but include individual contributors. Instead of exerting tight control on the time and quality of a product with established outsourcing partners, platforms relinquish the control to platform users (Lehdonvirta, Kassi, Hjorth, Barnard, and Graham 2018; Parker, van Alstyne and Choudary 2016). Decision rights are more distributed, and all organisation members are responsible for collaborating and improving the platform (Gulati, Puranam, and Tushman 2012). This loose structure stands on the opposite side of traditional outsourcing activities. Thus, a platform not only highly depends on the contribution of multiple users but also strategically relies on them to develop a unitive development direction and common ground to build up a platform.

The dynamic capability theory seems insufficient to fully explain how platform businesses which largely connect their fate with demand-side users, reconfigure the resource base and obtain dynamic capability, thus creating competitive advantages. Dynamic capability studies tend to emphasise the dominant role of the top-management team (Teece 2007; Ambrosini and Bowman 2009; Helfat and Peteraf 2003). They insist that top managers are responsible for learning from experience (Zollo and Winter 2002), generating knowledge (Zott 2003) and designing the systematic resource reconfiguration process (Winter 2003). Studies of dynamic capability have limited attention to platform users' rising value proposition and autonomy. They have a few discussions focusing on reconfiguring the resource base to align the activities and value creation between the focal firm and external users (e.g. Giudici, Reinmoeller and Ravasi 2018; Zeng and Glaister 2016; Helfat and Raubitschek 2018). The limited attention to the dynamism contributed by the demand-side cause significant theoretical and empirical gaps between the dynamic capability literature and platform organisation literature. Hence, I need more studies to explain how a platform company reconfigure resources and renews the resource base by co-working with the platform users and generating dynamic capabilities and competitive advantages.

5.3.2 The incompleteness and the uncertainty

The digital platform organisation faces uncertainty compared to the traditional organisation (Helfat and Raubitschek 2018) for two main reasons: First, the digital platform organisation is fuelled by generative technology (Zittrain 2008). Based on an opening architecture, the digital platform shares multiple aspects of its innovation and technical progress with external parties (Boudreau 2010). In turn, it obtains unfiltered contributions that are contributed voluntarily by complementors (Zittrain 2008). This makes the strategic design of digital platforms naturally incomplete and less predictable (Garud, Jain and Tuertscher 2008). Second, the digital platform organisation often relates to the concept of the ecosystem (e.g. De Reuver, Sørensen and Basole 2017; Iansiti and Levien 2004; Gawer 2014). The important point for the digital platform ecosystem is to develop a continuously evolving “shared structure of interaction” among various stakeholders and seek value co-creation and co-evolution with different parties (Adner and Kapoor 2010; Kapoor 2018). The large externalisation of the value proposition weakens the dominant position of the digital platform (Murthy and Madhok 2021; Dattée, Alexy and Autio 2018), which makes the “blueprint” of a platform ecosystem highly un-foreseeable (Dattée, Alexy and Autio 2018).

Often, an open platform organisation cannot be fully designed with pre-existed insights. In contrast, the platform organisation grows alongside a highly cumulative and path-dependent process (Dattée, Alexy and Autio 2018; Nambisan 2017; Lyytinen, Yoo, and Boland 2016). First, the platform organisation tends to relinquish control over the external partners and let the platform users decide whether they will join the platform and self-select their tasks (Olleros 2008; Zittrain 2008; Altman and Tushman 2017). With less control over the external resources, the platform organisation face higher difficulties in tracking and predicting the activities of the external parties, and thus, the platform encounters more uncertainty. Second, based on generative technologies, the platform ecosystem could potentially create

unprompted changes and a wide range of future applications (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). As the platform organisation quickly expands the organisational boundaries through constant morphing (Rindova and Kotha 2001), the pattern of resource management becomes less fixed, which counters the logic of “best practices” (Arndt, Pierce, and Teece 2017). Although extant studies have covered the explanation of the initial growth of a platform organisation, I need more understanding of what capabilities facilitate platform ecosystems to evolve continuously over time (Cennamo and Santalo 2019; McIntyre and Srinivasan 2017). Third, as the platform organisation tends to scale up quickly, the growth process becomes less bounded (Nambisan 2017). The platform quickly attracts more external parties and spans its firm boundaries, and its resource base needs to be reconfigured continuously (Zittrain 2008). Products and services tend to be frequently re-designed to adapt to the fast-changing internal and external environment (Lyytinen, Yoo, and Boland 2016). Therefore, the design of the platform organisation is inevitably incomplete and does not follow a linear development path. Instead, the direction of evolution could be persistently changing, and the platform needs to continuously re-organise the resource base as the development process of platform organisations gradually unfolds.

The dynamic capability theory tends to have little explanation of the incompleteness of platform organisations. First, dynamic capability literature largely maintains that top managers can design a systematic resource reconfiguration process (Zollo and Winter 2002; Easterby-Smith, and Prieto 2008; Zott 2003; Helfat and Peteraf 2003). The extant literature stresses that it is a firm’s responsibility to play the role of a broker who designs and arranges interfirm collaborations to obtain a higher proportion of profits generated during the process (Teece 1986). In the meantime, the firm should also keep the right of gatekeeping to select ideal complementors and control their activities in the system (Adner and Kapoor 2010). Many dynamic capability studies highlight the importance of experience. Thus, the platform organisation will gradually learn the solution for forthcoming challenges as they solve problems with patterns (Winter 2003). In the context of platform ecosystems, the

platform encourages direct value creation involving a community of users and unidentified complementors who are not fully controlled by the focal firm (Parker et al. 2016). The organisation could stimulate positive network effects by relinquishing control to complementors and allowing them to access platform resources (Boudreau 2012). However, many dynamic capability studies neglect that a platform organisation might evolve without substantially pre-existed insights into the challenges because it evolves fast and challenges become less patterned (Dattée, Alexy and Autio 2018; Nambisan 2017). Thus far, literature in the field of dynamic capabilities has limited explanations of such innovative approaches which counter the uncertainty resulting from the unique features of the platform ecosystem. Second, the dynamic capability literature often only reveals a snapshot of the resource reconfiguration and new capability development (Obstfeld 2012; Zahra, Sapienza and Davidsson 2006). Certain dynamic capability studies tend to assume that the organisation will be able to solve future issues by developing a dynamic capability (Winter 2003). However, as mentioned, the platform organisation constantly encounter new issues which can be unpredictable, and managers need to develop new competence to cope with the issue. Thus, the dynamic capability of a platform organisation can be considered a continuously changing process. The dynamic capability studies have few explanations for the persistence of the change (Zollo and Winter 1999; Obstfeld 2012). Although a small but growing amount of studies have highlighted the importance of continuing the changes, they have less explanation of how to achieve it in a platform context. Hence, the incompleteness of platform organisational design provides a fruitful angle to enrich the dynamic capability theory; I ask how managers frequently renew the resource base and dynamic capability to cope with new challenges as the platform emerges, grows and grows and thrives.

5.3.3 The ecosystem-level dynamism

The platform organisation needs a different resource dynamism than traditional organisations. Instead of reconfiguring the internal resource base, a platform

organisation must pursue the dynamism of external resources in the platform ecosystem. It is because, first, a platform organisation maintains an interdependent relationship with a diverse range of external partners (Zittrain 2008; Altman and Tushman 2017; Adner 2012; Adner and Kapoor 2010 2016; Kapoor and Furr 2015; Kapoor and Lee 2013). While the external parties join the platform organisation to access platform resources and infrastructure, the externals also contribute to the platform by developing complementary products, conducting innovations and transferring market information. Therefore, the platform should focus on building a fertile environment to facilitate external innovations, products and services development and seek mutual benefit relations with the externals so the platform would grow as the externals diversify and evolve. Instead of playing a zero-sum game, platform organisations should adopt a non-zero-sum strategy to create a "1+1>2" effect and let the development of platform users contribute to the overall platform dynamism. Second, as members in a platform organisation tend to interrelate with each other, the change of one division of a platform might affect the other divisions (Altman and Tushman 2017; Adner 2012; Adner and Kapoor 2010). For example, a change in the design of an aircraft in an airline company will cause the challenges of changing the design of aircraft components, infrastructures that accommodate the aircraft, and the aircraft crew's safety procedure and training process. Hence, the development of a platform organisation should be an improvement that includes relevant members in the ecosystem rather than being isolated.

The dynamic capability falls short of explaining the ecosystem-level dynamism. First, the dynamic capability theory focuses on resources within the organisational boundary (Teece 2007). The basic principle of the dynamic capability theory, as established by Teece et al. (1997), highlights that to achieve a competitive advantage, the firm must constantly reconfigure and integrate its internal and external resource base to respond to environmental change. Collis (1994) defines the "higher-ordered capability" as the rate of change, and the improvement of capability could be an "infinite regress". Priem and Butler (2001) posit that the

evolution of resource and capability is the static element which forms the basis of competitive advantage; and echoing with the antecedents, Winter (2003) claims that as long as the capability is "dynamic", it leads to changes and evolution. Seemingly, studies of dynamic capability largely emphasise controlling the resources and developing outstanding and inimitable capabilities to obtain competitive advantages (Rindova, and Kotha 2001; Teece 2007; Wheeler 2002; Galunic and Eisenhardt 2001). Scholars have studied the evolution of firms from many different perspectives, such as product innovation (Verona and Ravasi 2003); capability lifecycle (Helfat and Peteraf 2003); knowledge management (Zollo and Winter 2002) and learning processes (Easterby-Smith and Prieto 2008). Nevertheless, most of these studies reside within the firm boundary. However, in the platform organisation, the dynamism comes from the outside organisation, and the platform will only grow when the externals thrive. A platform organisation is not looking to surpass or restrict external partners. It is, instead, pursuing to grow together with them. So far, I have limited studies focusing on the interdependent relationship between the focal firm and external parties (e.g. Giudici, Reinmoeller and Ravasi 2018; Zeng and Glaister 2016; Helfat and Raubitschek 2018). Again, when exploring the evolutionary process of a firm and its ecosystem, both of these theories overlook the ecosystem's unique elements. Such as the diversity of participants, the various ties, and the non-authority structure (e.g. Galunic and Eisenhardt 2001; Verona and Ravasi 2003; Dhanaraj and Parkhe 2006; Azzam, Ayerbe and Dang 2017). Therefore, I need more explanation of how the platform company reconfigure the resource base to benefit every ecosystem member and deepen the interdependent relationship. Second, the dynamic capability theory also failed to highlight the interdependence among all the organisation's members. While discussing the change of resource base, it failed to discuss the co-created changes and how an organisation copes with opportunities and challenges of maintaining an interdependent relationship with a wide range of unfiltered ecosystem players.

5.4 Research objective 2—a managerial system view of the digital platform organisation-how are resources reconfigured internally

After a thorough review of the extant dynamic capability literature relevant to the concept of ecosystem and a diverse range of external parties, I also look at the resource reconfiguration and dynamic capability inside the digital platform organisation. As highlighted by the literature, the resource reconfiguration process and routine within an organisation is also essential for us to understand the overall understanding of unique mechanism of an organisation. Studies pointed out that with the environment and organisational strategy changing drastically, the internal activities and processes would be modified accordingly (Hanelt, Bohnsack, Marz, and Antunes 2021). A comprehensive understanding is hindered when one only considers a single perspective, as opposed to actively observing the organisation from various viewpoints (e.g. Huang, Henfridsson, Liu and Newell 2017; Visscher, Hahn and Konrad 2021; Geels 2002; Walrave et al. 2018; Kemp, Rip and Schot 2001). Therefore, by paying significant attention to both external resources and actors, as well as understanding the internal routines of an organisation (Li and Chan, 2019; Hanelt, Bohnsack, Marz, and Marante, 2021), I would be able to achieve a more comprehensive understanding of the resource dynamism within a platform organisation.

5.4.1 Managerial routines embed Dynamic Capabilities

Dynamic capability is a "high-level routine" (Winter 2003). Others call it the "routine to learning routine" (e.g., Priem and Butler 2001; Williamson 1999) or "higher-order organisational capabilities" (Collis 1994). The counterpart of the higher-level routines and capabilities is the zero-order capability (Winter 2003), or other studies also call first-order capabilities (Danneels 2002), ordinary capabilities (Teece 2014) or substantive capabilities (Zahra, Sapienza and Davidsson 2006). Compared to the dynamic capability, these capabilities are more basic and static, with the simple concern of surviving and earning revenues (Winter 2003). The ordinary routine refers to a set of repeated actions, whilst the routine stands for changes and renewals of

the resource base. In a very basic sense, ordinary routines emphasise the "automatic repetition" of a series of actions and ultimately aim for "stability" (Nelson and Winter 1982). Echoing the previous definition, Feldman and Pentland (2003, p.95) define it as "*repetitive, recognisable patterns of interdependent actions*", and Gersick and Hackman (1990) point out that it refers to the aggregation of predictable inputs, intermediate steps, and outputs. The ordinary routine requires a limited amount of changes and emphasises the persistence of clearly stated operational procedures.

It is also important to notice that the ordinary routine does not systematically support the organisation to change. Although ordinary routine also gets stretched and modified, it is more of an incremental evolution depending on the tactic accumulation or sporadic changes that react to market requirements (Nelson and Winter 1982). Hence, this type of routine suits a more stable environment where opportunities and challenges appear less often and dynamic capability is unnecessary. In the rapidly changing environment, the ordinary routine would quickly become hazardous and encumber the organisation's development (Eisenhardt and Martin 2000; Zollo and Winter 2002). Routines that embed dynamic capabilities complement the shortcomings of ordinary routines in this specific context. This routine is elaborately developed for systematic changes in operational processes and resource base. Organisations need to build up facilities such as a sophisticated learning process (Zollo and Winter 2002), flexible organisational structure (Verona and Ravasi 2003) and knowledge management skills (Easterby-Smith and Prieto 2008) to enable the routine. Routines that embed dynamic capabilities would allow the organisation to continuously and persistently adapt to environmental changes (Zollo and Winter 2002). It is essential to point out that the reactions to the novel market changes, which are not systematically learned and repetitively happening, cannot be considered a dynamic routine.

Additionally, yet importantly, many studies have pointed out that the dynamic capability could be a situated phenomenon, which means it needs to be updated over time, and so has the routine. Collis (1994) maintains that the higher-order

capability refers to "the rate of change" of capability that enables capabilities to iterate to maintain dynamism. To obtain competitive advantages, the firm needs to build up a structure that can generate the structure that allows generating better capabilities. In other words, the firm reaches the point of "infinite regression". This viewpoint aligns with the idea put forth by Zollo and Winter (2002) that even high-order capabilities must continuously renew themselves. It has been pointed out that owing to time and environmental changes, the dynamic capability cannot guarantee the new resource-based advantage (Danneels 2008; Ambrosini and Bowman 2009). Therefore, organisations need to constantly incorporate non-routine activities into the routines to react to the external environment. The improvement of routine per se is also part of the "dynamic". As Obstfeld (2012) pointed out, routines are insufficient for constructing a comprehensive picture of the organisation; the non-routine activities might coexist with the routines and contribute to the overall strategy, or sometimes, they even form new routines. That is to say, the routine and the dynamic capability are also situated and need to be updated. It is better to view the "higher-level-routine" as an ongoing renewal process, which echoes the quotation of Collis (1994) in the previous section.

Let's take Tencent as an example. The routines that embed dynamic capabilities are the process by which a team quickly and systematically renews its routines. Tencent, they have a strict meeting system that includes daily meetings, weekly meetings, monthly meetings, mid-year meetings, annual meetings, and stand-up meetings. During these meetings, managers and employees share their work progress and project results. They then discuss whether the current strategy is effective or not. If it is not, they quickly determine how to make changes and improve their customer service. Routines, resource allocations, and strategies are modified based on the outcomes of these meetings, bringing more dynamism to the team. Managers can call for meetings at any time when they sense a need for change, and these meetings occur almost every day due to the rapidly changing market. As one manager at Tencent stated, *"I have new things to do every day."* *"We have small meeting rooms to facilitate frequent small meetings... anyone with a new idea can call for a quick*

meeting." (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group, Served for 4 years.) This meeting system represents a type of dynamic routine for Tencent, characterised by a high "rate of change" and systematic improvement of routines and resource allocations. On the other hand, the ordinary routine for Tencent involves the day-to-day operational activities conducted by managers and employees. Some of these activities include checking the system and reviewing data feedback every day (both managers and employees must perform these tasks), as well as fixing any system bugs. Occasionally, they may discover ways to iterate the system and products, and in such cases, they complete these iterations promptly. This routine is relatively repetitive, and changes occur sporadically and slowly.

5.4.2 The path-dependent nature of routines.

As previously mentioned, dynamic capabilities are generally impacted by two schools established by Teece, Pisano and Shuen (1997), Teece (2007) and Eisenhardt and Martin (2000). The strand of Teece et al. (1997) emphasises the idiosyncrasy of organisational capabilities, whereas Eisenhardt and Martin (2000) take another perspective and strongly associate dynamic capabilities with the definable firm process. Irrespective of the debate between these schools, both schools emphasise organisational routines, which are the trajectory (Obstfeld 2012), rules (Becker 2005) and system (Zollo and Winter 2002) spanning individuals and groups to alter the firm resource base (Teece et al. 1997; Eisenhardt and Martin 2000). Accordingly, the organisational routine for dynamic capability is *path-dependent* (Teece 2007; Eisenhardt and Martin 2000), and the routine is developed through the systematic codification (Eisenhardt and Martin 2000; Zollo and Winter 2002) of the extant knowledge (Vergne and Durand 2011). Thereby, the organisational routine highlights the predictability (Nelson, and Winter 1982) and the stability (Simon 1945, March and Simon 1958; Cyert and March 1963) of organisational inputs, processes and outputs (Gersick and Hackman 1990).

Thus far, many studies including Teece and Eisenhardt, have already recognised that the path-dependent nature of dynamic capabilities may hamper the understanding of developing new routines and strategies (e.g. Obstfeld 2012; Salvato and Vassolo 2017). Eisenhardt and Martin (2000) have already pointed out that in the "high-velocity" market where the future state is unpredictable, the dynamic capability inevitably relies less on the extant knowledge, and they need to create new knowledge that relates to the current situation rapidly. As a result, many studies tend to emphasise that the routine is necessary but not significant to create new capabilities. Instead, there are creative actions within routines (Feldman and Pentland 2003; Teece 2007; Nelson and Winter 1982). However, while studies have suggested that the routine is for both stability and change (Feldman and Pentland 2003; Pentland and Feldman 2005), we have a limited understanding of how changes happen within routines (Wenzel, Danner-Schröder, and Spee 2020; Sargis-Roussel, Belmondo, and Deltour 2016). This omission makes it challenging for the dynamic capability theory to explain the dynamism of routines in highly uncertain environments, where organisations cannot solve issues simply based on experience.

In this case, the extant dynamic capability literature still cannot sufficiently explain the unique mechanism of the digital platform organisation. It is because the digital platform organisation faces relatively higher uncertainty compared to the traditional organisation (Helfat and Raubitschek 2018). It is difficult to understand the dynamism of a digital platform organisation simply depends on its path-dependent attributes.

Digital platform organisations face high uncertainty due to certain reasons. First, the digital platform organisation is fuelled by generative technology (Zittrain 2008). Based on an opening architecture, the digital platform shares multiple aspects of its innovation and technical progress with external parties (Boudreau 2010). In turn, it obtains unfiltered contributions that are contributed voluntarily by complementors (Zittrain 2008). This makes the strategic design of digital platforms naturally incomplete and less predictable (Garud, Jain and Tuertscher 2008). Second, the digital platform organisation often relates to the concept of the ecosystem (e.g. De

Reuver, Sørensen and Basole 2017; Iansiti and Levien 2004; Gawer 2014). The critical point for the digital platform ecosystem is to develop a continuously evolving "*shared structure of interaction*" among various stakeholders and seek value co-creation and co-evolution with different parties (Adner and Kapoor 2010; Kapoor 2018). The large externalisation of the value proposition weakens the dominant position of the digital platform (Murthy and Madhok 2021; Dattée, Alexy and Autio 2018), which makes the "blueprint" of a platform ecosystem highly un-foreseeable (Dattée, Alexy and Autio 2018).

Studies have suggested that digital platform organisations need dynamic capabilities to obtain and sustain competitive advantages. It is because the digital platform organisation operates in a highly turbulent digital market (Zeng and Mackay 2018) featured by intense competition (Helfat and Raubitschek 2000), fast innovation speed (Teece 2018) and highly complex network system (Helfat and Raubitschek 2018; Hagiu 2006). A small but growing amount of dynamic capability studies have revealed the mechanism of a digital platform from aspects of value co-creation (Giudici, Reinmoeller and Ravasi 2018), value capturing (Helfat and Raubitschek 2018), and the emergence and evolution of platforms (Shi, Li and Chumnumpan 2020). However, limited research has addressed *the conflict between the digital platform organisation's uncertainty and the dynamic capability's path-dependent nature*. We urgently need to understand how dynamic capabilities featuring path-dependent organisational routines support the digital platform organisation in a turbulent market.

5.4.3 Dynamic capability as the organisational routine vs dynamic capability as the managerial actions

Inspired by the drawbacks of the path-dependent nature of dynamic capability in a highly uncertain environment, many studies have explored the source of the dynamism in-depth. This raises an important argument for the current understanding of organisational routines—the routine cannot fully cover the explanation of dynamic capability. The question of how creative activities occur within routines has not been

sufficiently explored in the literature, and researchers are calling for a deeper understanding of the performative aspect of routines (Salvato and Vassolo 2017; Obstfeld 2012). The argument could be divided into two perspectives. First, discussions of organisational routines for dynamic capabilities usually remain on the firm level that the routine is defined as "rules" or "systems" that are generally adopted by every member within the organisation (e.g. Winter 2003; Biesenthal, Gudergan and Ambrosini 2019; Helfat et al. 2007). Lower-level individuals tend to be considered the automatic mechanism to accomplish the routine. They use repetitive solutions to solve certain issues (Zollo and Winter 2002). Such a definition means that the entire organisation can only wait until the organisation experiences a sufficient amount of "searching" activities (Zott 2003) or encounter a significant entrepreneurial opportunity (Kay, Leih, and Teece 2018) and create the "next big change" of the organisation routine (Obstfeld 2012). That is to say, the definition leaves limited space for incremental alterations within the routine, which is quite in conflict with the argument by Feldman and Pentland (2003) that the routine can support organisational stability and flexibility. The significant emphasis on the firm-level routine could eventually make the established routine become the "core rigidity" of an organisation, especially in the rapidly changing environment (Leonard-Barton 1992; Danneels 2010). Second, the dynamic capability theory has been given the main credit to the top-management team in designing and redesigning the organisational routine (Teece 2007; Adner and Helfat 2003; Helfat and Peteraf 2015). The development of new resource mixes and routines is associated with the unique decision-making skills of a single group of members in the organisation, while the diffused efforts of other individual employees who enact the strategic decisions are largely ignored (Salvato and Vassolo 2017; Salvato 2009; Winter 2003). It seems that the extant understanding directly connects the decision of top managers to the result of firm-level routines while having less explanation of the complex process of implementation and practising (Salvato 2009). The source of creativity within an organisation, in this case, is restricted to the intelligence and experiences of the top executive group and gives limited attention to the complex process of actual

enactment, which offers limited space for more heterogeneity to be developed (Argote and Ingram 2000; Nahapiet and Ghoshal 1998; Salvato and Leif 2008).

Seemingly, the simple focus on either firm-level routines or top-management-level capability would eventually lead the organisational routine to the "path-dependent trap". The routine might be "*trapped*" by the significant focus on experiences and knowledge of a single group of members and the lack of attention to incremental changes within routines. Extant routines could quickly become obsolete in a fast-changing environment and become the rigidity of the organisation.

More importantly, this focus generally leaves lower-level employees' intentional actions outside the discussion (Salvato and Vassolo 2017). However, studies have pointed out that the collective efforts provided by lower-level employees who deeply engage with the problem-solving process and strategy enactments facilitate creative ideas and changes to emerge (Murthy and Madhok 2021; Salvato and Vassolo 2017; Felin, Foss, Heimeriks, and Madsen 2012). Additionally, Feldman and Pentland (2003) also posit that the routine has both *ostensive* and *performative* aspects. It means that the enactment is as important as having a "template" or "rule" to be designed (Biesenthal, Gudergan and Ambrosini 2019). Moreover, as Becker (2005) points out that the "rule" of a routine and the actual "action" of the routine are not directly connected. Many other works have reflected that to achieve the desired result of a routine. It could involve a series of complex actions conducted by participants from different levels and groups (e.g., Edmondson, Bohmer and Pisano 2001; Feldman 2000; Howard-Grenville 2005). Therefore, it could hamper a comprehensive understanding of dynamic capability, especially understanding the source of continuous "dynamic" for routines, by ignoring those detailed and complex actions conducted intentionally by lower-level individuals (Salvato and Vassolo 2017).

Such a lost angle has put the continuous achievement of organisational change at stake (Schreyögg and Kliesch-Eberl 2007) and urgently requires more unpacking of the dynamic capability (Wenzel, Danner-Schröder and Spee 2020; Peteraf and

Tsoukas 2017). Therefore, under such arguments, the perspective of micro-foundations (which refers to practices and enactment of routines) of organisational routine has been highlighted by studies (e.g. Wenzel, Danner-Schröder, and Spee 2020; Parmigiani, and Howard-Grenville 2011; Felin, Foss, Heimeriks, and Madsen 2012). The micro-foundation perspective proffers that instead of studying the organisational routine as an abstract framework, studies need more explanations of internal activities carried out by members on different levels (Salvato 2009; Salvato and Vassolo 2017). It is because these internal activities develop and maintain the idiosyncrasy of a routine (Easterby-Smith, Lyles and Peteraf 2009; Grant and Verona 2015; Parmigiani and Howard-Grenville 2011). Thus far, the discussion of internal routine dynamism has covered themes such as cross-level analysis (Salvato 2009), trial-and-error learning process (Rerup and Feldman 2011), interpersonal interactions among lower-level employees (Felin, Foss, Heimeriks, and Madsen 2012; Salvato and Vassolo 2017), power and conflict within changing processes (Safavi and Omidvar 2016; Salvato and Rerup 2018). Nevertheless, limited studies have covered the actions and routines of lower-level managers (Ambrosini and Altintas 2019) who are also responsible for enacting routines and contributing to organisational changes (Wooldridge, Schmid, Floyd 2008; Teece 2007; Teece 2016).

5.4.4 The middle manager perspective –a lens to observe the micro-foundations of routines.

5.4.4.1 The middle manager literature

First, I use Wooldridge, Schmid and Floyds' (2008) explanation to define the underlying assumption of middle management literature. To reveal the uniqueness and fundamental meanings of the middle management perspective, Wooldridge, Schmid and Floyd (2008) separate the strategic studies into two categories, namely "Choice Perspective" and "Social Learning Perspective". The former stand for the upper-level management perspective and the latter stands for the middle-level management perspective. The category of *choice perspective* stands for the earlier mainstream research that adopts an upper-echelon view and follows the *top-down*

research logic. These studies focus on exploring the strategic decision-making process by the top manager groups, and the related research questions usually revolve around the discussion of making better managerial decisions. The role of middle management is to implement strategic decisions, which is separated from the strategic decision-making process. Later, the social learning perspective gradually emerged with critiques of the top-down logic. According to Mintzberg (1978), the lower-level actors in the organisation also play important roles in strategy formation, and the implementation should not be separated from the overall strategic formation process. Many studies also recognise the influence of middle-level managers that they function to improve the quality of decisions (Wooldridge and Floyd 1990), support the strategic decision (Bartlett and Ghoshal 1993), jointly formulate a strategy with the top managers (Burgelman 1983) and even make decisions (Andersen 2004). A growing number of DC studies have explored the renewal of capabilities and resources in the digital platform organisation. They tend to focus on discussing characteristics of capabilities (Mikalef, Boura, Lekakos and Krogstie 2019; Siaw and Sarpong 2021; Helfat and Raubitschek 2018; Haim Faridian and Neubaum 2021). Such as critical factors (leadership, network and inter-organisational ties) affecting DCs' effectiveness (Sunder and Marathe 2018; Haim Faridian and Neubaum 2021) and unique firm-level processes (value co-creation, platform development and lifecycle) (Giudici, Reinmoeller and Ravasi 2018; Teece 2017; Shi, Li and Chumnumpan 2020). However, they lack explanations of the detailed actions and agencies within the capabilities and routines.

Middle managers play a crucial role in terms of strategic implementation and formation. The middle management team is responsible for putting organisational strategy into practice as one of the employees who serve as *"important interfaces between otherwise disconnected actors and, for example, top and operating-level managers"* (Wooldridge, Schmid, Floyd 2008, p1191). They must make sense of the organisational strategy to lower-level employees (Beatty and Lee 1992; Huy 2002), decide how strategies are put into practice (Wooldridge and Floyd 1994), mobilise resources (Bartlett and Ghoshal 1993), and champion new ideas to top levels

(Dutton, Ashford and O'Neill 1997). Middle managers are at the core of strategy enactment and are essential for an organisation to create new capabilities (Currie and Procter 2005; Dutton, Ashford and O'Neil 1997; Dutton, Ashford, O'Neil and Lawrence 2001). Simply put, on the one hand, middle managers are the interface that connects the top management with the lower-level employees and market information. On the other hand, they are crucial in collecting, nurturing and transferring knowledge (Wooldridge and Floyd 1994). It has been pointed out that middle managers often influence the emotions and behaviours of lower-level employees, which could encourage frequent and healthy interactions among lower-level employees. Studies found that middle managers function to build up shared understandings, develop working motivation and negotiate to solve conflicts among employees (Balogun and Johnson 2004; Beatty and Lee 1992; Rainey and Watson 1996). They ought to be capable of mentally preparing lower-level employees for harmonious collaborations and effective interactions. Also, middle managers can affect the implementation of organisational policy and form teams to cope with certain issues (Kodama 2005; Rainey and Watson 1996), which means they can influence or even manage cooperation among employees. It is convincing that middle managers play an essential role in managing the interaction among members. Due to middle managers' significant role in implementing organisational strategy and fostering positive interactions and creativity among lower-level employees, they have the potential to enhance operational efficiency and facilitate the continuous renewal of organisational routines.

Echoing the middle manager's perspectives, scholars argued that the implementation is not simply a mechanical process. There could be a considerable difference between intentions and actions (Wooldridge, Schmid and Floyd 2008; Wooldridge and Floyd 1994). In many cases, middle managers must deliberately revise the strategic decision depending on the situation they encounter (Ford 1999) to achieve certain desired results. Therefore, by putting routines in place, the middle managers are practising their understanding of the organisational strategy and the current situation rather than coping with top managers' instructions. Therefore, the

intentional efforts of middle managers impact the formation of dynamic capability. Moreover, compared to upper-level managers, middle managers expose more directly to market information, such as new business opportunities and threats. They also get better access to a wide range of ideas when communicating with customers, suppliers and technologies, so they can nurture the ideas and pass them to the top levels (Wooldridge and Floyd 1994). The new skills and knowledge provided by the middle managers would facilitate the formation of new routines and strategic reactions to the market (Zott 2003) and, thus, result in continuous new resource configuration and product innovation.

5.4.4.2 Viewing the dynamic capability from the middle manager perspective

Some arguments over multi-level analysis: It has been argued that the assumptions on which the dynamic capability framework only reflects a part of a more complex process (Salvato and Vassolo 2017). Salvato and Vassolo (2017) point out that dynamic capability is considered the result of collective efforts, which include top-level management and micro-level implementation by individuals. The routine of resource reconfiguration should include multiple levels of changes which function together to react to environmental dynamism. Therefore, a coherent explanation of dynamic capability should contain the analysis of different levels of resource dynamism (Drnevich and Kriauciunas 2011; Helfat and Winter 2011; Schilke 2014; Salvato and Vassolo 2017). the absence of lower-level views tends to obscure a coherent understanding of dynamic capability (Salvato and Vassolo 2017). That is to say, instead of focusing on personal skills or organisational-level routine, the middle-management perspective provides us with a meso-angle to view the collective effort contributed by lower-level employees to the routine dynamism. It has been pointed out that by focusing on either the micro-level or macro-level analysis, the extent studies leave the discussion of the dynamism developed together by the organisational members in a blank space (Salvato and Vassolo 2017; Salvato and Rerup 2011). The interaction and cooperation among employees could be the source of a more sustainable dynamism because employees tend to identify issues and generate new ideas when interacting. However, dynamic capability literature

mainly considers the development of routines and resource base from a top management perspective (Rindova and Kotha 2001; Adner and Helfat 2003; Helfat and Peteraf 2015; Teece 2007; Salvato and Vassolo 2017). Nevertheless, I have limited studies to explain how these collective efforts are managed and how they contribute to the improvement of routine (Salvato and Vassolo 2017).

The middle management perspective merits my attention for certain specific reasons.

Firstly, as explained above, middle managers play important roles in forming and implementing the organisational strategy. It is essential to highlight that the middle management team might function independently of the top management team (Salvato and Vassolo 2017). On the one hand, Salvato and Vassolo (2017) suggest that top management decisions might not directly connect to the actual enactments. In fact, they almost connect this idea with human nature, such as habit (or learned behaviour), emotion (or affect), and cognition (or deliberation). They infer that the enactment of strategy might not directly connect to top management decisions, and implementation activities by lower-level employees might, to a certain extent, function independently and autonomously. They give the example of Apple, which failed to connect the enactment activities to the leadership of Steve Jobs and thus hampered the growth of the company. In this case, members other than the top management team might not directly connect with the organisation's strategy. In other words, they might not implement the top-level strategy exactly as top managers expect. Therefore, I suggest that middle managers could, to a certain level, function independently of the top management team. On the other hand, Andersen (2004) suggests that in a decentralised scenario, middle managers can take new initiatives without asking for permission from top managers. Meanwhile, the context of my dissertation—the open digital platform organisation and its ecosystem—adopts a decentralised design. Therefore, while the top managers develop the routine for actions, middle managers play a crucial role in routine implementation and formation. They are the interface that connects the top management with the lower-level employees and market information. Secondly, they are crucial in collecting, nurturing and transferring knowledge (Wooldridge and Floyd 1994). Ford (1999)

pointed out that middle managers do not serve as direct channels for strategic decisions. Middle managers can interpret strategic decisions based on their knowledge and experiences (Balogun and Johnson 2004) and develop the schema for actions according to the reality they face (Floyd and Wooldridge 1994). It is important to point out that middle managers get better access to external information than top managers (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). Especially when a platform company involves various external parties, it is more difficult for top managers to view the competition for a picture of the environment. At the same time, middle managers are the ones who interact with external actors and respond to threats and opportunities from the environment (Baron 1995). Hence, the middle managers' skills and creativities are essential for building the dynamism of the platform company, which depreciates the centralised decision-making role of top managers. Many studies also recognise the influence of middle-level managers that they function to improve the quality of decisions (Wooldridge and Floyd 1990), jointly formulate strategies with the top managers (Burgelman 1983) and even make strategic decisions in highly decentralised organisations (Andersen 2004). This reflects the viewpoint of Feldman and Pentland (2003) that the implementation of routine could be affected by actions, people and location in time and space; Emirbayer and Mische (1998) also pointed out that the actors who practice the routine could be the inventors of new possibilities for thoughts and actions. Therefore, apart from the top managers, the middle management team can also affect resource dynamism by taking innovative actions (Salvato and Vassolo 2017; Nelson and Winter 1982). Their judgments on the knowledge and actions help to shape the overall organisational strategy (Jelinek and Schoonhoven 1990; Bower 1982; Noda and Bower 1996), and thus, renew the routines. However, the dynamic capability theories mainly view the development and renewal of the managerial routine from the top-management leading perspective (Rindova and Kotha 2001; Adner and Helfat 2003; Helfat and Peteraf 2015; Teece 2007; Salvato and Vassolo 2017), and failed to include the upward impacts of middle managers. In other words, studies pay significant attention to the decision-making job of top managers, and they generally

neglect middle managers' independent functions of transforming strategic decisions into practices creatively (Rindova and Kotha 2001; Adner and Helfat 2003; Helfat and Peteraf 2015; Teece 2007; Salvato and Vassolo 2017). Simply treating the organisational routine as decision heuristics given by the top managers could lead to neglecting employees' creativity and autonomy on a lower level (Salvato and Vassolo 2017; Nelson and Winter 1982; Adler and Obstfeld 2007). This might hamper the thorough understanding of creating reliable and systematic processes for resource base dynamisation (Zollo and Winter 2002). Hence, to better explain the dynamic routine, it is necessary to shift away from the unilateral view and explore how middle managers play their roles and cooperate with top managers to improve the managerial routine and renew the resource base. However, extant DC studies largely emphasise top executives' "heroic" role and top-level motivations and decisions (Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). Therefore, the theoretical simplification needs to be compensated by middle managers' perspective, as MMs expose directly to local issues and making decisions to solve real-time issues (Natarajan, Mahmood and Mitchell 2019). MMs' routines provide a valuable angle to unfold how lower-level activities compensate for top-level strategy through flexible enactment and deployment. Nevertheless, it is largely missing in the DC studies (Ambrosini and Altintas 2019; Teece 2016; Kuratko, Ireland, Covin and Hornsby 2005), which hamper a comprehensive understanding of the "dynamic" of routines and dynamic capabilities.

5.4.4.3 Using the middle manager perspective to study dynamic capability in the context of a digital platform organisation

The middle management perspective provides a fruitful angle to explore the mechanism of a platform company. The extant dynamic capability literature mainly considers the development of routines and resource base from a top management perspective (Rindova and Kotha 2001; Adner and Helfat 2003; Helfat and Peteraf 2015; Teece 2007; Salvato and Vassolo 2017). It has little concern about the middle manager's role in implementing the strategy, which might hamper a thorough

understanding of creating reliable and systematic processes for resource base dynamisation (Zollo and Winter 2002). However, platform companies are often associated with an ecosystem, connecting with a range of geographically dispersed and diverse networks of users (Gruber, MacMillan, and Thompson 2008; Zittrain 2008). Some large platform companies might have a significant number of product lines and subunits, meaning the middle managers could have a distant relationship with the upper-level management team. This might heighten the communication difficulty, and in many cases, the middle managers need to implement the routine without top managers. According to Natarajan, Mahmood, and Mitchell (2019), top managers naturally have limited information about activities conducted at lower levels of the organisation. In an open digital platform organisation where external parties are not fully controlled, and the generative technology enables a wide range of unfiltered resource applications, it becomes more challenging for top managers to obtain a detailed picture of the local situation. As a result, they inevitably rely on middle managers to collect information, address local issues, and deliver strategic messages. Moreover, as the open structure distributes central authority, middle managers sometimes need to take initiative in the absence of top managers (Andersen 2004). Therefore, studying digital platform organisations from the perspective of middle managers is crucial for a deeper understanding of their unique mechanisms.

Middle managers' perspective provides a fruitful angle to study the dynamic capability in the digital platform context for certain reasons. First, since the digital platform organisation is fuelled by generative technology and based on an opening business model (Cennamo and Santaló 2019), it allows a variety range of autonomous complementors to adopt the shared resources and make "unfiltered contributions" to the platform (Zittrain 2008). While the digital platform enjoys "free innovation" from broad contributors, it suffers from a reduction in stability (Tilson et al. 2010; Yoo, Boland, Lyytinen and Majchrzak 2012). It is because complementors potentially produce unintended usage of the technology (Zittrain 2008; Cennamo and Santaló 2019), and diffused innovation responsibilities and resource ownerships

potentially make different contributors represent their count of issues (Cennamo and Santaló 2019; Zittrain 2008). As a result, it seems highly difficult for a digital platform to cope with the volatile environment through practising path-dependent routines which represent a repetitive (Schreyögg and Kliesch-Eberl 2007) and abstract system (Salvato 2009; Salvato and Vassolo 2017) for solving general issues (Obstfeld 2012). However, current dynamic capability studies focus on firm-level routines (e.g. Teece, Pisano and Shuen 1997; Zollo and Winter 2002; Winter 2003), which largely rules out the internal changes and alteration mechanisms of a routine carried on by autonomous individuals (Salvato and Vassolo 2017). Such rigidity limits DC's capacity to continuously create changes (Leonard-Barton 1992; Danneels 2010). Thus, it would eventually lead the organisational routine in the digital platform organisation toward erosion (Tripsas and Gavetti 2000; Vergne and Durand 2011). Therefore, we need a practical perspective to unpack the firm-level routine. Middle manager's routines and actions specifically reflect the enactment and deployment of organisational routines, as they are responsible for making decisions on how to interpret and practise the strategy according to the local issue they encounter (Wenzel, Danner-Schröder, and Spee 2020; Parmigiani, and Howard-Grenville 2011; Felin, Foss, Heimeriks, and Madsen 2012). Their actions provide a micro-foundation perspective of the organisational routine, which shows the complex and flexible lower-level process of deploying and shaping routines to solve a whole spectrum of emerging and contextualised issues (Dutton, Ashford and O'Neill 1997; Burgelman 1991). Hence, improving the current understanding of dynamic capability in the digital platform organisation through a micro-foundations approach.

Second, the digital platform organisation is often related to an ecosystem where a focal firm relinquishes full control over the external parties and seeks value co-creation with them (Adner and Kapoor 2010; Kapoor 2018). The shifting leadership of a platform cause significant information asymmetry between the top-management team and local conditions, which means that top managers are no longer sufficient to solve all of the issues incurred by different stakeholders (Noda and Collis 2001; Guth and MacMillan 1986; Wooldridge et al. 2008). However, extant DC studies

primarily emphasise the "heroic" role of top executives and directly connect the top-level decisions to the design of organisational routine and the result of internal activities (Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). This could be a risky assumption for a digital platform, and studies have been arguing that this type of organisation should rely less on top manager decisions, and organisations need to incorporate DC in a decentralised architecture to become more responsive to technologies and customers (Teece 2007; Ciborra et al. 2001). In this case, middle managers become more important than the higher-level management team, who expose directly to the local issues and make decisions to solve real-time issues (Natarajan, Mahmood and Mitchell 2019). Besides being the mediator between the top-level team and frontline individuals (Wooldridge, Schmidt, and Floyd 2008), middle managers' routines provide a good angle to view how complex operational processes constitute organisational routines. It shows how lower-level activities compensate for top-level strategies through flexible enactment and deployment. Therefore, the middle-management routines facilitate my understanding of the micro-foundation of dynamic capability. Nevertheless, it is largely missing in DC studies (Ambrosini and Altintas 2019; Teece 2016; Kuratko, Ireland, Covin and Hornsby 2005), which hamper a comprehensive understanding of the "dynamic" of routines and dynamic capabilities.

5.4.5 Marching toward a Managerial System View

As I elaborated in the previous section, the managerial process that maintains the resource dynamism in an open digital platform organisation cannot be solely considered the top manager's decision-making process. Also, it is risky to directly connect the top managerial decision to the organisation's performance because the collective activities at the other levels could be complex, intentional, location-specific, and affected by enactors' cognition. I also propose using the middle manager's perspective as the lens to observe strategic enactment and routine dynamism at multiple levels (e.g., top managers, middle managers, and lower-level employees). This idea partially echoes the concept of the managerial system proposed by Bititci,

Ackermann, Ates, Davies, Garengo, Gibb, MacBryde, Mackay, Maguire, Meer, Shafti, Bourne, and Firat (2011, p871) that "*managerial processes and their constituent activities were observed to exist not in isolation but as part of a complex and interconnected managerial system within organisations.*" According to the suggestion, the managerial process of an organisation cannot be simply considered as one type of process, such as the decision-making process or the enactment process. Instead, the management activities of an organisation should be considered as a series of interacting activities shared across multiple processes, forming a highly interconnected system. The study suggests that various managerial processes need to be interconnected by shared managerial activities. They provide the example of the "performance scoreboard", where an operational director positions the scoreboard to show the performance and regularly meets up with the other managers in front of it to share information, discuss their decisions, and plan their next moves. Such an example shows how managerial processes have an impact on other managers and their activities, and the business performance outcomes tend to be based on complex interactions and connections among different individuals and activities. Additionally, Bititci et al. (2011) also suggest that managers need to frequently deal with uncertainty and complexity. This situation gives rise to a state of uncertainty regarding the cause-and-effect relationship between managerial actions and their performance outcomes. Consequently, it becomes challenging to identify opportunities where a single managerial activity can lead to multiple desired outcomes.

Studies have proposed that dynamic capabilities largely embed in the managerial process (Teece 2007; Augier and Teece 2009), and the interconnectedness of the managerial process can partly impact the dynamic capability and organisational performance (Bititci et al. 2011). They maintain that with managerial processes that are more mature and interconnected, the dynamic capability can render better outcomes and higher-level performance. However, the topic of dynamic capability is due to be further unfolded. Studies have been calling for further explorations on the interconnection of different activities and individuals within the organisation to obtain

a better understanding of dynamic capability and how it retains dynamism (Bititci et al. 2011; Salvato and Vassolo 2017; Felin, Foss, Heimeriks, and Madsen 2012).

The managerial system view facilitates my study of the dynamism of managerial routines in an open digital platform organisation for several reasons. First, as elaborated previously, platform organisations that relinquish control and utilise generative technology often face unfiltered complementary contributions and need to interact with a large number of autonomous external parties (Zittrain 2008; Cennamo and Santaló 2019). Therefore, it is risky to depend solely on the managerial decisions of top managers, as they may have information asymmetry and find it difficult to see the entire picture of what happens in diverse local situations (Noda and Collis 2001; Guth and MacMillan 1986; Wooldridge et al. 2008). The managerial system view offers a substantial theoretical guideline to explore how managerial processes are interconnected and how managers integrate diverse activities to create routine and resource dynamism in a digital platform organisation rather than simply focusing on top-level decisions. Second, since platform organisations face a turbulent market and incomplete organisational design (Garud, Jain, and Tuertscher 2008), managers need to constantly deal with uncertainty and causal ambiguity between their activities and performance outcomes. It is risky to rely solely on a single group of individuals' strategic vision or a single type of managerial activity to develop continuous dynamism (Ciborra et al. 2001). The managerial system view provides a theoretical stance to study the activities that react to market changes as a complex system that involves multiple processes and different agencies. Thus, the managerial system view is coherent with my previous arguments and provides a useful theoretical guideline for me to aggregate my argument into a logical flow and help me answer the research question.

In my second case study, I will analyse the managerial system within the open digital platform organisation by observing it from the perspective of middle managers. As crucial mediators between the top management team and the community at other levels within the organisation, middle managers provide a convenient and efficient perspective to observe the interactions among different processes and

organisational members. This enables my research to answer the question of how managerial routines maintain dynamism and continue to reconfigure the resource base to react to environmental changes.

6.0 The theoretical framework

The previous sections have reviewed the literature on ecosystem, dynamic capability and platform organisation. I define the platform organisations from three perspectives: the *shifting platform leadership*, the *externalised value proposition* and the *dynamic evolution process*. I define the platform organisation as the type of organisation that maintains an interdependent relationship with the external parties who are loosely organised and evolve alongside an on-going process by obtaining external contributions. I also define three research gaps revolving around the key features: 1) the demand-side economy 2) the incompleteness of the organisational design, and 3) the ecosystem-level dynamism by comparing the platform organisation literature to the dynamic capability theory. By selecting and defining the key concept of my research, I will link these concepts by developing a theoretical framework in this section. With my theoretical framework, I will be able to show my resource theoretical base, research gap and objective more vividly.

6.1 Setting up a specific context of the platform ecosystem— the foundation of my theoretical articulation

I use three perspectives to define the platform organisation, thus, settling a specific context for my discussion (see my definition of platform organisations reproduced in Figure 1). I discuss *loose leadership*, *externalised value creation* and the *emergent evolutionary process* of a platform organisation. The extant platform literature has already covered the discussion of each perspective. According to my literature review, these three perspectives stand for independent viewpoints but are also mutually included. I choose to organise the three perspectives together and form a new comprehensive perspective which provides a fruitful angle to explore the

platform organisation. For example, the loose leadership combined with the externalised value proposition result in a flexible organisational resource base. The resource reconfiguration process of each actor on the platform is less controlled and predictable. The platform organisation reconfigure their resources under highly different principles. Such as developing a highly attractive resource base, maintaining a close relationship with external parties, providing resources and common grounds, maintaining frequent interactions with the demand side and building a concomitant organisational structure. The resource reconfiguration process of a platform organisation needs to be largely externalised. The organisation must seek a mutually beneficial interaction between the platform and the users instead of internalising or controlling them. Many extant works of literature have stated the mutually beneficial relationship between the focal firm and complementors. The complementor can increase value by joining a flourishing ecosystem (Ceccagnoli, Forman, Huang, and Wu 2012); the focal firm, in turn, benefit from the increasing amount of complementors (Dattée, Alexy and Autio 2018; Boudreau 2010). The specific relationship is often established by resource sharing (Jacobides, Cennamo and Gawer 2018; Altman and Tushman 2017; Adner 2017), especially in the platform ecosystem where the focal firm shares its core resource with peripheral complementors. The development of these external partners would, in turn, enlarges the product portfolio (Gawer 2014). In addition, when I mention the externalised value proposition and the dynamic evolutionary process, I emphasise that the platform organisation have an back-and-forth process of interacting with the external parties back and forth. Since the external parties contribute innovation, products and services to the platform, they also adaptively react to the market change and, thus, change the overall platform business. Also, studies point out that the platform business evolves with fast speed and a less designed plan. Therefore, *the resource reconfiguration process of a platform organisation* significantly depends on the information and innovations provided by the external parties rather than the profound insights of the platform leader or top managers. The biggest challenge for platform organisations is to reconfigure the resource base depending on the insights obtained

from external parties. A platform organisation need to develop distinct principles of resource reconfiguration with an intense focus on the development of external parties and bring the dynamism inside and outside of the organisation into a harmonious picture. Furthermore, by putting the loose leadership and the dynamic evolution process together, I find that one of the most critical tasks for a platform leader is to co-work with the external parties and gradually unfold the process of resource reconfiguration. The authority is more distributed, and every organisation member is responsible for improving the platform and seeking a better solution. The platform leader no longer controls or designs the resource dynamism but guides the overall ecosystem toward a strategic direction. Therefore, the platform development process is an on-going evolution that involves both platform leaders and platform users.

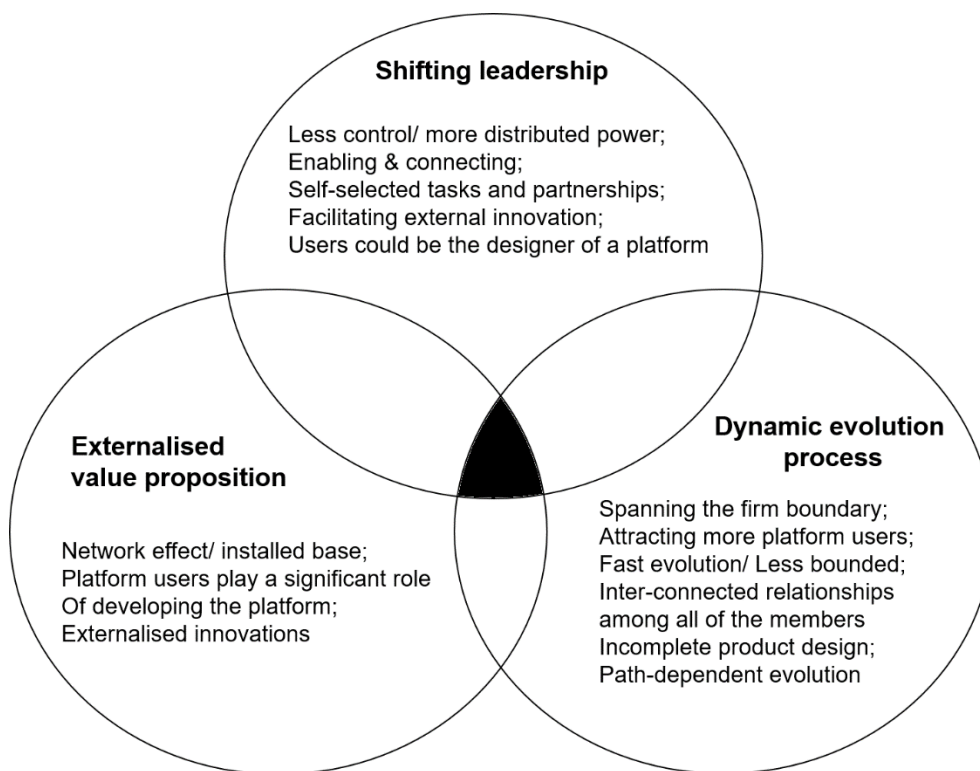


Figure 1 The concept of a digital platform ecosystem (the research context)

By observing the overlapped parts of these three perspectives, I find that the reconfiguration process of a platform organisation involves 1) the significant

uncertainty that comes from every member on the platform 2) innovations that are mainly derived from the development of external parties and 3) the on-going evolution process which equally involves both of the leader and the demand-side. The unique characteristics of the platform resource base cause significant complexity and uncertainty of platform resource reconfiguration, which provide a fruitful angle for future exploration. Moreover, an open platform organisation could fail because they do not adopt a more flexible and ecosystem-level vision of the platform strategy.

6.2 The development of dynamic capability in the context of the platform ecosystem

Depending on my definition of the platform organisation, I find that the dynamic capability is a suitable theoretical lens to explore the issue because, first, the dynamic capability literature studies represent a small but recognisable theme of platform organisation studies. It considers the platform organisation as a synthesis that consists of multiple resources and capabilities, which are rapidly recombined and reoriented by the organisation to adapt to the fast-changing environment. The basic logic of dynamic capability theory echoes my definition, which maintains that the platform organisation consists of multiple internal and external resources. I endeavour to explore how platform organisations rapidly recombine and reconfigure their resources to gain competitive advantage and continuously evolve. Second, both platform organisation literature and dynamic capability theory adopt an evolutionary view that the organisation must constantly integrate and reconfigure its resources to adapt to the fast-changing environment and obtain competitive advantages. Third, the discussion of platform organisation and dynamic capability applies to a fast-changing environment (reproduced in Figure 2).

The basic assumption of the dynamic capability is the organisational capability, also called the "higher-level capability/routine" (Winter 2003), to integrate, build or reconfigure internal and external resources to react to the changing environment

(Teece, Pisano and Shuen 1997). The resource-related nature of dynamic capability theories appears suitable for discussing the resource-sharing process in the platform company. Accordingly, Dynamic Capability is the opposite of Ordinary Capability (Teece 2014), which is more basic and static and is concerned with surviving and earning revenues. Instead, the dynamic capability is "the rate of change" of capabilities. In other words, it enables the capabilities to iterate continuously to achieve competitive advantage (Collis 1994). Meanwhile, some of the extant literature argues that dynamic capability per se is a "situated phenomenon", which means a company needs to constantly review and upgrade the dynamic capability to maintain its competitive advantage (Ambrosini and Bowman 2009). Echoing this assumption, some of the dynamic capability studies posit that the resource allocation and distribution inside the organisation could be "situated" (Galunic and Eisenhardt 2001; Verona and Ravasi 2003). The research of Galunic and Eisenhardt (2001) reveals that an organisation exerts more potential capabilities of its multiple divisions by constantly re-assigning resources and missions to different divisions. Verona and Ravasi (2003) posit that allocating resources flexibly among different projects can stimulate group co-ordinations among employees from different departments and make better use of their skills, thus, achieving a better outcome of product innovation. Nevertheless, these researches are based on the context of internal organisation, and the focal firm has full control over the resource distribution and product innovation processes. In the context of a Platform Company, the focal firm mainly works with the complementors from outside the company, and the amount of product innovation projects could be much more significant compared to the amount of innovation conducted inside the company. It is difficult for the platform company to set up resource-sharing plans depending on every situation. I compare the platform organisation literature with the dynamic capability theories and summarise theoretical gaps between these two works (see the comparison reproduced in Table 1). I find that the dynamic capability theory fails to fully explain the mechanism of platform organisation because studies related to dynamic capability often miss the

discussion on the resource reconfiguration in the demand-side economy, the incomplete evolution path and the ecosystem-level dynamism.

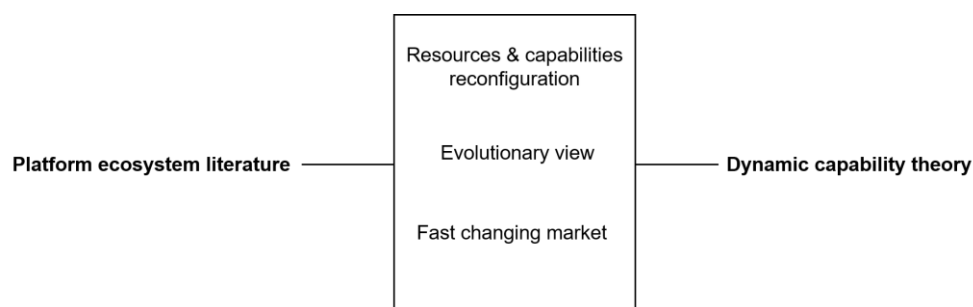


Figure 2 Dynamic capability is a suitable theoretical lens to explore the platform organisation.

Theoretical gaps	Platform organisation literature	Dynamic capability theory
The demand-side economy	Network effect/ installed base	Inter-organisation network (suppliers & producers)
	Multilateral relationship	Bilateral relationship
	Less-control	Centralised control
	Value co-creation	Value created & captured by the organisation
The incompleteness of organisational design	Self-interested external parties	Platform centric external parties
	Scaling up fast	Scaling up in a regular speed
	Less bounded evolution path	Stable evolution path
	Path-dependent evolution process	Experience-dependent evolution process
	Persistent resource reconfiguration	Snap-shot of resource reconfiguration
The ecosystem-level dynamism	Interdependent relationship with external parties	Controlling external parties
	Non-zero-sum game	zero-sum game
	Fertilising the growth of external parties	Fertilising the internal growth
	Members interconnected with each other	Members isolate from each other

Table 1 Theoretical gaps between platform organisation and dynamic capability literature

These missing discussions hamper my understanding of the platform resource reconfiguration. My research explores the resource reconfiguration process that develops dynamic capabilities in the platform organisation. Thus far, the missing discussions of 1) the resource reconfiguration in the demand-side economy 2) the

incomplete evolution path, and 3) the ecosystem-level dynamism hamper the explanation of resource reconfiguration in the platform organisation (reproduced in Figure 3). I adopt these gaps as perspectives to explore the platform resource reconfiguration process and thus contribute to both platform organisation literature and the dynamic capability theory.

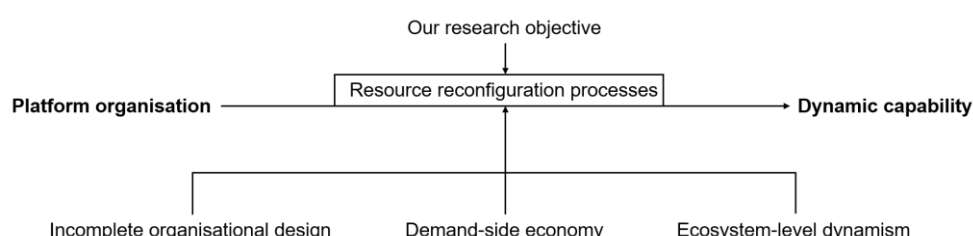


Figure 3 Reproduction of the research objective

6.3 The interactive process of seeking new resource mixes

As previously defined, my main objective is to explore the resource reconfiguration process of a platform organisation to develop dynamic capabilities. To explore this process, I take a closer view and observe how a set of resource mix at stage A is renewed or improved and becomes the new set of resource mixes at stage B. Simply put, I wonder how resource mixes change from one state to another. The reconfiguration process between different stages heavily involves the efforts of the platform and the platform users. As I previously mentioned, the platform organisation significantly externalise the value creation process, such as innovation, product and services development, and platform users are intensely involved with the platform design and improvement. Platform organisations usually benefit from the direct or indirect network effect. The value to the platform users depends on the amount and quality of the other users on the same platform (Eisenmann, Parker and Van Alstyne 2011; Evans 2003). The platform increases its value by engaging more users, enabling more transactions among different businesses and facilitating complementary innovations. In other words, the value of a platform rises from the connections and interactions with different external users (Kwak, Kim and Park 2018;

Boudreau 2012). The external actors can potentially conduct innovation and provide complements to the platform (Gawer and Cusumano 2002). Studies indicate that the dynamic capability may not reside exclusively within the organisation. Instead, it could be co-created relationally with the external parties (Giudici, Reinmoeller and Ravasi 2018). As Teece (2018) also emphasised in a recent publication, in the context of the digital era and platform organisations, complementarities tend to play a much more critical role than they used to be, and organisations need to focus on leveraging enabling technologies and inspire more downstream usages. In the meantime, platform users are not fully controlled by the platform leader. Therefore, the collaboration process between the platform and platform users tends to be interactive in which the platform leader co-works with the platform users and seeks new resource mixes (see Figure 4).

Nevertheless, I have pointed out that the extant dynamic capability literature does not fully explain the process of reconfiguration because the platform organisation establishes upon the demand-side economy, and the evolution path of the platform organisation is less bounded and at an ecosystem level. Therefore, while I try to explain how the platform interacts with platform users and reconfigure the resource base, I take these three theoretical gaps as my perspectives to further explore the mechanism (see Figure 4).

Figure 4 represents my research objective. In brief, the model illustrates that I want to study the interactive process between the platform and its users, aiming to understand how this interactive process leads to the reconfiguration of the resource base from stage A to stage B, thus facilitating the development and maintenance of resource base dynamism. Additionally, during the (interactive) resource reconfiguration process, the platform organisation needs to address three important issues: navigating the demand-side economy, maintaining ecosystem-level dynamism, and managing incomplete organisational design. These three issues, identified in the literature review section, highlight theoretical gaps between dynamic capability theory and its application in the context of open digital platform organisations. The demand-side economy requires the platform leader to

incorporate the user side and diverse external parties into the value-creation process, while ecosystem-level dynamism necessitates adopting a relational view of organisational strategy and resource base reconfiguration rather than a top-management view. Lastly, the incomplete organisational design calls for further explanation within dynamic capability theory regarding the ongoing renewal of the resource base, which is based on generative technology and loose leadership. By addressing the research question presented in this figure, we potentially gain a better understanding of dynamic capability theory and the unique mechanism of open digital platforms and their ecosystems.

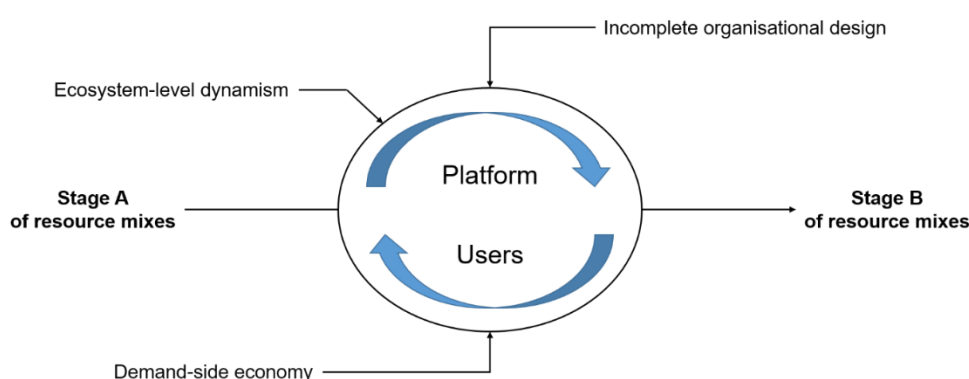


Figure 4 The interactive process of seeking new resource mixes 1

6.4 Routine activities inside the digital platform organisation.

Studies have suggested that adopting a new strategy would change internal processes (Hanelt, Bohnsack, Marz, and Antunes 2021; Li and Chan 2019). Therefore, I also decided to tap into the internal organisational routine to form a comprehensive picture of the platform ecosystem. I posit that the current rigidity of the dynamic capability theory in the context of the platform ecosystem also exists on the micro-foundation level. With the ecosystem's rapid evolution, the internal routine needs to become highly dynamic to support the fast change. I need to further unfold the dynamism of the digital platform organisation on a micro-foundation level to gain a deeper understanding of the ecosystem dynamism.

Departing from the angle of routines, I highlight that while the dynamic capability (DC) theory is essentially established to sustain competitive advantages, it has been criticised for lacking explanations for fuelling continuous changes, especially in the fast-changing environment (Salvato and Vassolo 2017). Thus far, a majority of studies embed the DC in the organisational routines as firm-level "rules". They insist on generating dynamism through repetitive reconfiguration activities and the systematic remodel of extant routines (Obstfeld 2012), which is suggested to be naturally path-dependent (Teece 2007; Eisenhardt and Martin 2000). Meanwhile, studies largely attribute the formation and modification of routines to the strategic change decided by the top-tier individuals (Pandza and Thorpe 2009; Winter 2003; Biesenthal, Gudergan and Ambrosini 2019; Helfat et al. 2007). Hence, I have a few explanations of the internal activities conducted by different agencies that create changes and alterations within routines (Salvato and Vassolo 2017). Given the current definition of routines, studies argue that it might apply better to a more stable environment (Eisenhardt and Martin 2000). Meanwhile, studies also argue that the knowledge generated through previous experiences of a single group of members seems short in explanations of the routine dynamism in a fast-changing environment where routines need to be modified reactively to solve rapidly emerging issues (Tripsas and Gavetti 2000; Vergne and Durand 2011; Miller, Pentland and Choi 2012). Such a limitation is salient in the context of digital platform organisation (DPO), which often endows the nature of constant morphing and generativity, especially in China. The blueprint of a DPO might not present a clear future and relies on incremental changes and iterations (Li 2021). Hence, the organisational routine for DPO needs to change continuously and reactively to cope with the uncertainty (Helfat and Raubitschek 2018) and highly fluctuating environment (Zeng and Mackay 2018; Helfat and Raubitschek 2000; Teece 2018). Therefore, the extant DC theory is insufficient to explain the unique mechanism of DPO, and I urgently need to further unpack the dynamism of routines to achieve more understanding.

Many studies have highlighted that the routine has both ostensive and performative aspects. The enactment is as essential as having a top-down framework (Biesenthal,

Gudergan and Ambrosini 2019). Collective efforts provided by employees who deeply engage in the problem-solving and strategy enactment process show a holistic picture of the alteration and contextualisation of routines. They provide an understanding of the formation of routine idiosyncrasy (Murthy and Madhok 2021; Salvato and Vassolo 2017; Felin, Foss, Heimeriks, and Madsen 2012). Thus far, a growing amount of DC studies have explored the process (Narayanan, Colwell and Douglas 2009), implementation (Li, Fu, and Ma 2021) and agencies (Pandza and Thorpe 2009) of routines. To a certain level, they acknowledged mindful, sophisticated and collective activities conducted by employees on different levels. These activities are essential in optimising and renewing the routine to adapt to quickly shifting local conditions (e.g. Mowbray, Wilkinson and Tse 2022; Li, Fu, and Ma 2021; Herhausen, Morgan, Brozović, and Volberda 2021). Nevertheless, limited researches have in-depth investigations of the routine dynamism of digital platform organisations through a processual perspective.

I still emphasise the ultimate research purpose of understanding how a set of resource mixes at stage A is renewed and becomes the new set of resource mixes at stage B (a better version of resource mixes that potentially creates more value than that of the previous stage). I pursue this goal by studying the process within the platform organisation (reproduced in Figure 5).

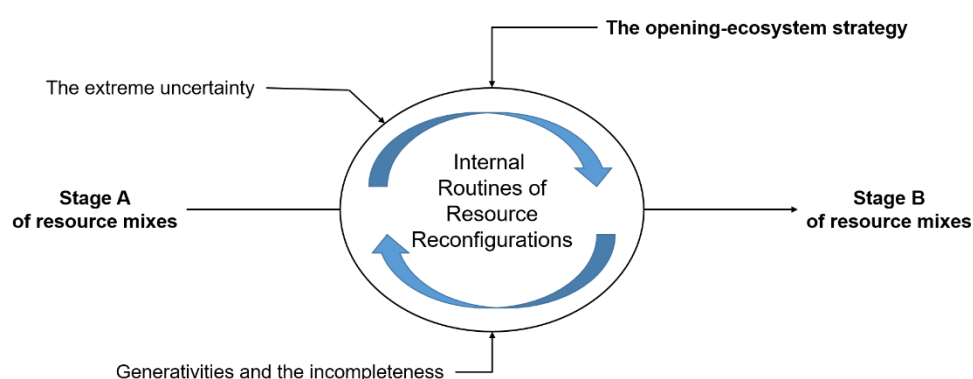


Figure 5 The interactive process of seeking new resource mixes 2

Chapter 3 The research methodology

1.0 Introduction

My research aims to delve into a comprehensive discussion of the business strategy involved in establishing a business ecosystem. I pursue understanding how a platform organisation builds up its ecosystem by reconfiguring its resource in a way that is different from the traditional ones. I am curious about how organisational resource bases are reconfigured to react to the uncertainty from the ecosystem model. I focus on unfolding the detailed process to obtain a holistic view of the question. The aim is to develop a thoroughly elaborated storyline and reveal the constantly evolving process and its unique mechanism. My research question and aim require us to have detailed interactions with multiple dimensions of an organisation and develop comprehensive interpretations of actors, actions, relations and context, and thus, develop the processual result that shows *how* to achieve the desired result and *how* organisations evolve constantly. Moreover, the processual perspective tends to see things from a more dynamic angle; it insists that the world is continuously changing. Therefore, I cannot simply see strategic patterns as fixed results (Klarner and Raisch 2013); instead, the organisation is a reification of a dynamic process (Tsoukas and Chia 2002) which would be reshaped continuously. Such a perspective requires us to interact continuously with the phenomenon and reform my understanding of the subject as my research progresses.

I believe that a clearly defined and suitable paradigm and research design would facilitate us to have smooth research practises and also establish logical and legit connections among research questions, methods, findings and contributions. Therefore, considering the research question and goal, I adopt the paradigm of constructivism and the case study method while using qualitative data and then trying to generate qualitative results. In the following section, I will justify the philosophical position and discuss the overall research paradigm, ontology, epistemology, methodology and axiology.

2.0 The paradigm of my research

Every research is underpinned by a philosophical assumption and position, which give us a solid foundation for my research and facilitate us to make sense of my discussions. By adopting a specific research paradigm, the researchers would have a guideline which helps to see the nature of reality (Ontology), what can be considered valid knowledge (Epistemology) and how to know what I know (Methodology). Therefore, to conduct research and generate qualified results, I ought to be able to clarify the question of what paradigm I follow and why I consider ourselves to be in this position. In the meantime, I should also be aware of the drawbacks of my chosen paradigm and be ready to deal with the potential issues. To be more prepared for future research activities, this section aims to claim my research paradigm and justify the philosophical position. Meanwhile, I discuss the disadvantages of choosing the position and provide several solutions.

To conduct the research, I adopt the paradigm of constructionism. Scholars have not concluded which paradigm is most suitable for ecosystem studies. However, using the illustration of digital cross-industry innovations, Phillips and Ritala (2019) point out that system-level research involves considerable actors and processes of evolution, so that the qualitative study could be a highly suitable research method for ecosystem studies (Yin 2014). Especially the detailed elaboration of the context and road mapping of the evolutionary processes of the ecosystem. These approaches incur results of historical findings, conceptualisation and knowledge generation (e.g. Enkel and Gassmann 2010; Stieglitz 2003). These reflect that ecosystem studies require researchers to interact deeply with the phenomenon and interpret the complex internal mechanisms of change and evolution. More importantly, given the objective of my research, which endeavours to deeply unfold the process of resource reconfigurations in an ecosystem and road map the evolution of a platform ecosystem, I consider my research paradigm is more close to the left side of the diagram in Figure (Morgan and Smircich 1980). As I aim to have

more understanding of how the ecosystem develops in a particular context and I would like to constantly interact with different subjects and evolve my understanding of the ecosystem, I consider ourselves constructivist.

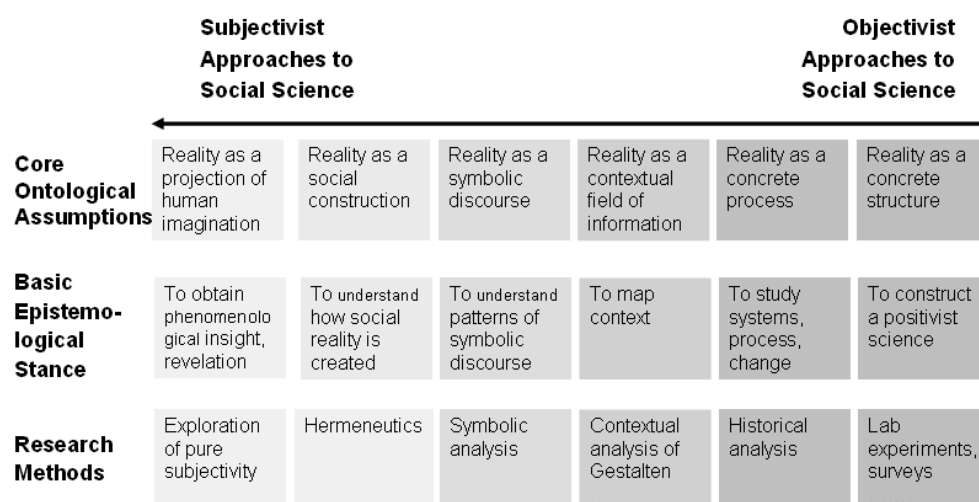


Figure 6 Source: Adapted from Morgan and Smircich (1980)

Constructionism emphasises that social phenomenon is built up in the social context where social members interact, communicate, and create their subjective realities. According to Easterby-Smith, Thorpe and Jackson (2015), social constructionism focuses on how people make sense of the world (e.g. Shotter 1993; Watzlawick 1984) and how social reality is constructed by researchers rather than decided by the concrete external world. This paradigm values people's experiences and believes that people's actions are caused by different personal understandings of the situation (Easterby-Smith, Thorpe and Jackson 2015). Therefore, the researchers are related to what is observed (Creswell 2014), and knowledge comes from subjective evidence (Collis and Hussy 2014).

2.1 Ontology

Ontology is the discussion of reality's nature (Easterby-Smith, Thorpe and Jackson 2015). Different scholars tend to categorise ontology in different ways. Collis and Hussey (2014) directly separate the ontology into positivism and interpretivism, while

Easterby-Smith, Thorpe and Jackson (2015) categorise it into four sections: realism, internal realism, relativism and nominalism, according to the philosophical position and level of rigour. I consider my ontology at one of the endpoints of the ontology spectrum, which is constructionism. This ontology considers reality multiplied, and researchers can interpret it from their own perspective. My research focuses on the process for a platform organisation to develop dynamic capability, a social phenomenon constructed by individuals or the collection of different individuals to react to the rapidly changing external environment.

The ontology of constructivism suits my research for the following reasons: 1) since my research is in an ecosystem, I need to pay more attention to actors and their autonomy, identity, diversity and unique activities. Therefore, I do not need a simple outcome of certain factors. Instead, I need holistic explanations of the actors, agencies, context, relations and interactions which lead the organisation from motivations to results. 2) The process of resource reconfiguration varies depending on individuals' experience, knowledge and personal choice. Thus, I emphasise the subjectivity and complexity of the organisational process "rather than narrow meanings in a few categories or ideas" (Creswell 2014). 3) Furthermore, actors in the ecosystem constantly interact and, through which, develop shared understandings so they can be involved in the process and spend their efforts developing and evolving the process and achieving certain common value propositions of a system, thus, socially constructing the ecosystem. Therefore, I look at the question from a more subjective view and highlight organisation members' understandings of the context and how they endow meanings to their actions and decisions (Benton and Craib 2011). 4) Additionally, as I believe in the subjectivity and complexity of the social construction process of an ecosystem, I acknowledge that the explanations of theories and phenomena depend on researchers' perspectives and interpretations, and different researchers could have various explanations of reality. For example, in terms of the dynamic capability theory, I believe that different researchers interpret reality depending on their research purpose and experience, like the ongoing debate between Teece et al. (1997) and

Eisenhardt and Martin (2000). These definitions might exist parallelly, and the truth can be multiple. How organisations approach dynamic capability could be highly different depending on their context, tangible and intangible resources and individual experiences. Hence, my main task is to explain how meanings of certain realities are generated by restructuring assumptions and beliefs rather than identifying how researchers gain an understanding of their social context (Benton and Craib 2011).

I seek a complex and in-depth understanding of the social reality and attempt to develop a personal view of the situation (Creswell 2014). Additionally, my research also, to a certain level, relates to interpretivism. Interpretivism is interrelated with constructionism (Simpson, Berger and Luckmann 1967). The interpretivist explains the social phenomenon based on observing social actions and interpreting the meanings attached to the actions by the social members. Like the constructivist, the interpretivist is also rooted in social construction and various explanations of reality (Chowdhury 2014; Walsham 1995). Interpretivism maintains that reality is socially constructed by actors, depending on their understanding of motives for actions and their reality (Parkin 2002). It is highly difficult to separate constructionism and interpretivism completely. Thus, certain strategic studies decide to put them in the same category under Nominalist and Hermeneutics (Rabetino, Kohtamäki and Federico 2020). Other studies proffer that interpretivism roots in the analysis of social actions and the reality shaped by the actions (Parkin 2002), which is highly similar to constructivism. However, it is important to clarify that my understanding of reality and research is not the same as such an extreme viewpoint. Instead, my system-level analysis relies more on the back-and-forth interactions with individuals and teams within the context. I am not the interpreters that are entirely responsible for shaping reality. Therefore, interpretivism partly suits my qualitative research that explores platform organisation's evolution process, which is the social phenomenon constructed by organisation members based on their understanding of the organisational strategy and their experience and knowledge.

However, it is worth mentioning that other philosophical positions would criticise the nature of constructionism. Since I intend to construct the cases depending on my

understanding of reality, I would inevitably agree that there is more than one reality because different people would have different interpretations. It would be difficult to perfectly bridge the empirical evidence with the theoretical statement (Lieberson 1992). This makes my explanation hard to be examined by other researchers. For example, it is difficult to justify the correctness of how I organise the data and the meanings I attach to it. Because the organisation is a complex social phenomenon with multiple aspects of meaning (Astley and Van de Ven 1983; Fabian 2000), people detect different layers of meanings from the same situation (Creswell 2014). However, my research incur analytical generalisability, the primary objective of which, is not to generate outcomes that are representative of a broader population (Thomas, 2011). Instead, my research enrich and modify the extant theories with its context-specific results and sophisticated interpretations (Thomas, 2011). To avoid biases, one solution to tackle the issues is to work with other researchers. For example, in terms of the case study, I could invite another researcher to construct the case parallelly with us and compare my results to find the common issues and refine my case (e.g. Rindova and Kotha 2001). In this way, I would acquire more than one opinion of how to view and present the reality, thus, having a more comprehensive way of building up the case, which is the foundation of the following research activities. In later sections of research design and methodology, I will develop more detailed theoretical arguments and solutions to avoid biases as much as I can and enable the analytical generalisability. I will ensure to further secure my research's legitimacy, validity and reliability.

2.2 Epistemology

Epistemology focuses on the discussion of "the nature of knowledge" (Easterby-Smith, Thorpe and Jackson 2015), including the questions of what can be considered valid knowledge and how to acquire this knowledge. It investigates the relationship between researchers and the researched objects (Collis and Hussey 2014). The researches related to constructionism usually base on a relatively

general question so researchers can create meanings upon certain objectives (Creswell 2014). According to Collis and Hussey (2014), constructivists seek to minimise the distance between researchers and the situation studied by researchers. Such a viewpoint echoes Smith's (1983, p10-p11) argument that "*in quantitative research, facts act to constrain my beliefs; while in interpretivism (constructionist) research beliefs determine what should count as facts*". Besides, to further answer the question of what constitutes knowledge and how to generate knowledge, I need to clarify the main approaches in management studies to analyse the social phenomenon, which is the general knowledge and contextual knowledge approach (Aram and Salipante 2003). General knowledge refers to the measurable and quantifiable patterns of the social phenomenon. This approach generates knowledge which can be applied in a universal range, because it is highly generalisable, replicable and predictable. At the same time, the contextual knowledge approach generates knowledge which depends on the research's interpretation and the research context (Aram and Salipante 2003). Studies have pointed out that the general knowledge matches the quantitative research methods, which often relate to techniques such as equations and modelling. Meanwhile, the contextual knowledge approach suits the qualitative research method relies on the context, and the result tends to be rich in explanation and description (Thompson, Kiefer and York 2011). Thus, the contextual knowledge approach does not focus on the generalisability of knowledge. Instead, it is developed by constructing subjective narratives and generating thick descriptions to deeply explain the social phenomenon built up by the social actors (Tsoukas 1994).

I adopt the epistemology of constructionism and the contextual knowledge approach because I believe my interpretations can affect how people view social reality. Thus, my mission is to gather facts and generate context-specific meanings depending on my experiences (Easterby-Smith, Thorpe and Jackson 2015). My research aims to explore the resource reconfiguration processes that develop dynamic capabilities in the platform organisation. I aim to answer the question and generate a thesis and theoretical framework to tackle the question. Since I follow the constructionism

paradigm, I will collect and organise qualitative data of companies from the different data sources and attach meanings to it; after that, I will seek to bridge the data with theories. Since my focus is resource reconfiguration during ecosystem management and evolution processes, I choose the resource-related literature, which is dynamic capability theory, as the base of my argument. While analysing, I try to use this literature to explain the phenomenon of the chosen cases and identify which parts of the case can be explained by the theories and which parts cannot be fully explained. For example, while the dynamic capability theories have been focusing on interpreting organisational resource usage, it has not been able to tackle the issue of the evolution of resource configuration on the ecosystem level. To fill the gap, I will combine the evidence and the extant framework and then use the ecosystem as the complement literature to explain from a different perspective. Ideally, the gap would give a new angle to view resource management on the system level. The freshly generated theory would aid the explanation of the under-explored phenomenon and theoretical framework; I can enrich the insights of dynamic capability.

This specific way of generating theory and exploring the phenomenon has a drawback. That is, the interpretation largely depends on my logic. Although I would follow the basic principles of the extant frameworks, the linkages between the concrete evidence and the theoretical conceptualisation are built up by my interpretations. I do not have numerical data to test or visualise the relations between the phenomenon and theories. For example, there might be limited testable data to support that certain types of resource management are related to dynamic capability (even when the management is successful because outstanding performance does not specifically require dynamic capability) (Zott 2003). Meanwhile, my logic is always arguable (from the perspective of other researchers). It would lead to questioning my thesis and theoretical framework; therefore, it would be more difficult for me to secure validity and reliability compared to the research that adopts the opposite philosophical positions (Collis and Hussey 2014).

The available solution to the issues above upon generating theories is to consult the existing literature fully. In this way, I would be able to be aware of the previous analysis and discussion of the cases (Lee and Lee 2019), the relations between different phenomena and theoretical concepts, and also, the link between different extant theories. Also, I will conduct an iterative analysis by constant review and comparing the theories and the case to "assess how well or poorly it fits with case data" (Eisenhardt 1989). By checking back and forth between the data and the framework, I would obtain a deeper understanding of the case and the chosen literature, thus building up a more rigid link among them.

2.3 Axiology

The axiology assumptions consider the researchers' values during knowledge generation (Collis and Hussey 2014; Ponterotto 2005). It discusses how one thinks of the world affects one acts in research and study processes (Kasim, Alexander and Hudson 2005). This means that the axiology should be asymmetrical with ontology and epistemology (Khalifa 2010). The axiology assumption of constructionism highlights that the researchers' values cannot be separated from the research processes. Instead, the researchers should recognise and describe their values rather than deny them (Ponterotto 2005). Therefore, the findings of the specific type of research are biased, and value-laden (Collis and Hussey 2014) and the interpretation of the phenomenon that is under investigation is affected by the researchers' experiences and the specific context of the research (Khalifa 2010; Kasim, Alexander and Hudson 2005). Following the assumption of constructionism, I believe that I have value in the research process, and my interpretations can affect how people view the specific phenomenon (the business ecosystem). My understanding of the phenomenon deeply roots in the interactions and interpersonal connections with actors in the ecosystem. I need to try to facilitate my subjects to deeply unfold their experiences and knowledge of the context they live in and the process they conduct (Liaw 2002). In addition, I am obligated to choose the

appropriate method from a range of alternatives to fulfil my research purpose and understand my research questions (Yin 2003). Therefore, denying my value as a researcher in the research process is irrational, and I need to continue to recognise my value during my research. For example, there are several different strands of ecosystem research. Accordingly, it could be generally divided into three streams which are the "business ecosystem", "innovation ecosystem", and "platform ecosystem" (Jacobides, Cennamo and Gawer 2018); I tend to have more focus on the platform ecosystem. My focus is decided by my reading experience and exposure to some instances such as Tencent, Alibaba and Amazon (who are successful at implementing ecosystem strategy); I eventually find ourselves particularly inspired by the platform ecosystem. Additionally, my theoretical arguments are also inspired by the gap that I sense while I compare different theoretical arguments and how they failed to explain the phenomenon of my interests. To fill the gap and make contributions, I need to design the research suitable for visualising and amplifying my arguments and shape it into systematic interpretations that can be recognised and comprehended by my peers and readers. Through a series of research activities guided by ontology, epistemology and axiology, I find a more comprehensive explanation of the business model and mechanism for a successful platform ecosystem.

However, it is essential to acknowledge the fact that although I have certain specific emphasis and research assumptions, I do not necessarily need to consider the other studies who different to us as being wrong (Antlová, Chudý, Buchtová and KucEROVÁ 2015). Since my value is recognised in the research, and the result of my discussion can guide the way people view the specific topic, I cannot simply "take sides" and only discuss the outcomes that favour the theoretical conceptualisation that is desirable to us (Collis and Hussey 2014). Therefore, while I am analysing the data, I must consider and present the whole picture of the case and try to think of it from different perspectives. To establish my research, I do not have to deny the theories from other perspectives or even from the opposite ones (but I can choose to argue

with them); the important thing is to highlight the ethic and my values in the research and present a comprehensive discussion to the audiences.

2.4 Methodology

2.4.1 Research design

2.4.1.1 The case study

General definitions. The case study is a widely adopted qualitative research method which covers research from many different academic areas, such as management, education and psychology (Eisenhardt and Graebner 2007; Mills, Wiebe and Durepos 2010). Some influential management studies adopt the case study method. The case study is one of the approaches to gathering data (Lincoln and Guba 1985). A case study can consist of multiple elements such as the organisation, members of the organisation, projects, culture and behaviours; the researcher would interact with these entities in a case and interpret the processes, changes and interplays within the bundle of evidence. Studies also pointed out that the case study must conduct in a clearly defined context where the element of the case co-exist and interact with each other (Quinlan 2011). In the context settled by the researcher, the researcher maintains a close relationship with the case and conducts an in-depth observation to generate context-specific, detailed and holistic explanations and theories impossible to develop by quantitative research (Mills, Wiebe and Durepos 2010).

Context and Boundaries. The case study is an inductive inquiry into a social phenomenon in a specific real-life setting (Yin 2014). By identifying the specific context of the case study, I expect to have a clear boundary for my discussion, and I will be able to specify the data that I need to collect from a wide range of sources. The boundary of my case study is to analyse the interactions among actors within the selected platform ecosystem and the focal firm's activities of orchestrating and renewing the resource base, reacting to the environmental changes and generating value. Such a setting means that my research would involve the investigation of a

whole spectrum of actors since one of the basic definitions of a platform ecosystem is the incorporation of diversity. Specifically, in my case, I define the actors in the platform ecosystem as complementors, the platform, managers within the organisation and lower-level employees within the organisation. As a result of the actors' locations (internal organisation, external organisation, macro-level, micro-level), I would develop multiple studies in different themes to investigate these actors' interactions and activities for developing the ecosystem. As pointed out by studies, the case study aims to understand the interaction between the subject and its context. The specified real-life setting also helps to distinguish the case studies from similar research in the same academic area (Yin 2014). Thus, a clear context definition sets a strong foundation for the following research activities. In my study, I define the context for the platform organisation as a hyper-competitive environment where information technology is highly advanced, so a platform organisation's competencies are easier to imitate. Also, I highlight the characteristic of the platform organisation, including the loose leadership, externalised value proposition and dynamic evolution process, which cause significant uncertainty. This specific context amplifies the difficulty of resource reconfiguration and the importance of interactions between the platform and platform users. The context provides a strong motivation for my research and helps to form original research questions. Moreover, since Dubois and Gadde (2002) have posited that the case study is the most suitable method to explore the interaction and the dynamism between the case and the context, the case study is the best approach for my research which heavily rely on the context.

Theoretical boundary. Also, the case study highly relies on the theoretical background and research objective. By building a comprehensive theoretical base through reviewing and connecting literature, facts and elements in the case will be better connected. Therefore, my story is not simply a bundle of data; the establishment of my case is guided by a rich set of literature and rigorous logic. Using the dynamic capability theory as the fundamental theoretical base to discuss issues in the context of the platform ecosystem, I essentially believe in the ongoing evolution

of the resource base and the flexible leverage of resources for reacting to a fast-changing environment. Rather than owning specific resources through contractual agreement or Merge and Acquisition; and profiting through the logic of transaction cost theory. As such, when I investigated the case, I paid significant attention to the remix and reconfiguration of resources during the interactions among different actors and how these new resource mixes advance the organisation in the competition. The clarified theoretical lens gave us a highly focused theme during the investigation. It helped us to form an argument that applies to the extant theorise and tightly connects the research goals, findings and contributions. Also, apart from studying actors' relationship to the organisation and top-tier entrepreneurs, I spent great efforts to unfold connections among different actors thoroughly. The carefully chosen theoretical stance and the precise usage of the underlying assumption of theories offer us a stable base to conduct research high in complexity while keeping a focused logic and sharp contributions.

2.4.1.2 Reviewing case studies of the platform organisation

To further discuss the application of the case study to my topic, I pick five articles (under the topics of platform ecosystem and dynamic capability) that adopt the case study methodology. Table 2 shows the general literature information of each article, and Table 3 further breaks down the research method into elements, namely research context, database, limitations and the issue of rigorousness. As shown by table 2, all of the chosen case studies focus on the question of "how". This echoes Yin's (2003) suggestions that the proposition of the research question determines and guides the research design, and the case study is suitable for answering the question of "how" and "why".

Table 3 further breaks down the research design of those papers. As previously highlighted, context is one of the crucial elements of the case study in that it reflects the idiosyncrasy feature of a case, helps to articulate the research question and affects the result of interpretation (Aram and Salipante 2003; Stake 2005). All chosen studies set their research in a hypercompetitive environment where the core element

is "change". In the digital platform industry, organisations face a competitive market environment fuelled by industry convergence and interdependency (Sawhney and Mohanbir 1998), low entry barriers (Porter 2001), imitable capabilities and resources (Shapiro and Varian 1998), and empowered customers owing to low switching costs and more substitute services (Porter 2001). The low information cost and advanced cloud technology permit organisations to develop in a non-linear manner over time and space (Nambisan 2016). The kind of environment that is full of new competitors, new technologies, and unpredictability could pose challenges for organisations to survive and grow. In terms of platform ecosystem studies, the platform can be considered as a particular context where the value and advantages of companies highly depend on engagement with the externals. A well-defined context makes the research questions unique and specific, the fast-changing environment indicates the urgency of developing a dynamic platform strategy, and the distinct characteristic of the platform company force the research to look for novel resource management.

In terms of the database, apart from the quantitative study (using the data set provided by professional data companies), all qualitative studies use textual data from multiple sources. Two qualitative studies use both interview and archive data (publicly available). Since the interview data provide more information and perspectives on the situation (Denzin and Lincoln 2018; Stake 2005), it tends to be widely used in case studies. Also, using both primary and secondary data facilitate the triangulation of the data set and the cross-checking. On the other hand, the ones that merely use secondary data are generally criticised for the lack of variety and validity (Rindova and Kotha 2001; McIntyre and Srinivasan 2017).

The most highlighted limitation of qualitative studies is the lack of generalisability of the research outcome because the study is set in a particular context (Tsoukas 1994; Aram and Salipante 2003). According to Stake (2005), the case study can be intrinsic because it focuses on understanding the particular case, and its purpose is not to generate theory. Studies argue that case studies should provide in-depth narratives of certain individuals, which lead to nuance and a deep understanding of a particular phenomenon (Tsoukas 1994; Yin 2003). Therefore, the limitation of generalisability

is embedded in the nature of case studies. On the other hand, some of the studies argued that the case might have certain utility beyond itself (George and Bennett 2004; Byrne and Ragin 2009), and a few studies offer solutions to higher the generalisability of the single case study. For example, Barzelay (1993) provides a four-step methodology: observation, thick description, narrative reasoning and evaluation. Overall, the high generalisability is not the ultimate goal of case studies, but they could still contribute to the overall development of theories (Stake 2005). Researchers need to be conscious of this shortcoming while conducting the research.

As for the rigorousness, qualitative studies tend to express more concern about this issue. The most used solution is employing multiple case studies and a rich database. However, it is worth mentioning that studies do not have to conduct multiple case studies to guarantee rigorousness. According to Stake (1995), the case study is not a "sampling study", and it does not study a case to understand other cases. As long as the case study generates in-depth outcomes and presents them to the readers through a carefully articulated storyline that effectively passes the knowledge, it is worth the reading.

Published Journals	Research method	Research question	Cause—Effect
Kapoor, R. and Agarwal, S. (2017) Organization Science	Quantitative multiple case study	How may the structural and evolutionary features of the ecosystem shape the extent to which participating complementor firms can sustain their superior performance?	The ecosystem-level interdependence between the platform and complementors — the performance of complementors shaped by ecosystem structure and evolution
Dattee, B., Alexy, O. and Autio, E. (2018) Academy of Management Journal	Inductive multiple case study	How do prospective ecosystem stakeholders commit resources toward a nascent ecosystem creation effort?	The generative technology innovation cause uncertainty in platform development — dynamic & process-oriented platform governance
Wareham, J., Fox, B. and Giner, J. L. C. (2014) Organization Science	Inductive single case study grounded theory approach	How are the main tensions in technology ecosystems addressed in technology ecosystem governance?	The stability-evolvability tension in the platform ecosystem — the dynamic design of platform governance
West, J. (2003) Research Policy	Inductive case study and analysis of secondary data	How much is open enough to attract enough buyers while retaining adequate returns?	The appropriability-adoption tension occurs in the open source system — hybrid platform strategy
Rindova, V. P. and Kotha, S. (2001) Academy of Management Journal	Inductive case study and analysis of secondary data grounded theory approach	How do firms achieve dynamic fit with the environment?	Hypercompetitive environments require new strategies to sustain competitive advantage — dynamic capability of continuously morphing

Table 2 General information about articles

Case Studies	Context	Database	Limitations	Rigorousness
Kapoor, R. and Agarwal, S. (2017)	1. Hyper competitive smartphone software industry 2. Time setting: 01/2012-01/2014	1. Data set of top-ranking applications on Apple and Google's platform 2. Supplementary data	1. Single context, not generalisable 2. certain results are less robust than others 3. Measurement is subject to certain boundary conditions	Using supplement data from websites and LinkedIn
Dattee, B., Alexy, O. and Autio, E. (2018)	1. Environment of radical technology and market uncertainty 2. Recent and ongoing time setting	Interview and archive data based on two cases	Case selection is biased toward large firms (single context); limited generalisability.	1. Literal-replication multiple cases (2) designs 2. Rich database and cross-checking 3. Holding workshops
Wareham, J., Fox, B. and Giner, J. L. C. (2014)	Enterprise resource planning (ERP) software industry	1. Interview and archive data based on a single case. 2. Workshop presentation	Do not explicitly address ecosystem evolution.	1. Rich database and cross-checking 2. First order & second-order coding 3. Constantly compare data and theories
West, J. (2003)	1. Time setting 1995–2002 2. Competitive market	Secondary data based on three cases	1. Qualitative case analyses and conceptual theorising only 2. Single context, not generalisable (only suits the successful cases)	1. Detailed mapping of the development path of the cases 2. Multiple cases (3) designs 3. Rich database
Rindova, V. P. and Kotha, S. (2001)	1. Hypercompetitive environments 2. The emergence of Internet search engines 3. Time setting: 1994–1999	Secondary archive data based on two cases	1. Single context; limited generalisability 2. Only using secondary data	1. Comparative evidence (successful case vs unsuccessful case) 2. E-mail exchanges with one of the founders of Yahoo! 3. Multiple data sources & triangulation

Table 3 The further breakdown of the research method

2.4.1.3 The single case study

Why use a single case study? The research questions determined how such a phenomenon would be approached and the number of cases. My research objective is to explore the resource reconfiguration process of a platform organisation to develop dynamic capabilities and answer the question of "how". The research question shows that I need to interpret the interplay and dynamism within a platform organisation and try to present the process for the organisation, managers and employees to remix the resource base in such a specific context. I need to acknowledge the different identities and qualities of target actors, study their interactions, and explain how these interactions contribute to the evolution of an ecosystem. My research objective indicates conducting an in-depth inductive study of the phenomenon and collecting rich data sets to develop narrative analysis and provide nuance and descriptive results. It is essential to highlight that both single-case and multiple-case studies suit my study because I focus on generating a deep and rich explanation of the phenomenon instead of looking for generalisability. However, I decide to use a single case study because a single case study allows us to focus on an extreme sample and conduct a historical and process study to observe the changes and interplay within the phenomenon. This type of case study is named an intensive case study in that the researchers focus on the case per se and pursue holistic description and interpretation (Mills, Wiebe and Durepos 2010). For example, a single case setting allows us to interact deeply with actors on different levels, such as complementors, the focal firm, top managers, middle managers and frontline employees. I can comprehensively investigate their actions and motivations and understand how their interactions contribute to the evolution of the ecosystem.

Researchers have pointed out that it is relatively common for a case study to employ more than one type of data-collecting approach, and the type of data varies as the gathering method differentiates (Mills, Wiebe and Durepos 2010). In my research, I adopt both primary and secondary data; I collect secondary data from public resources such as company press releases, reports, newspaper articles, journal articles, books and strategic analysis from magazines and websites. While

consulting the existing records and documents, I chronologically organise the companies' achievements and critical events to build up historical cases. Additionally, I gather original data by conducting interviews with the management team and other individuals involved in the study using a semi-structured interview approach. Typically, this method involves a combination of closed-ended questions (around 6-7 in number) and open-ended questions (around 3-4 in number). Then, I will cross-check between different types of data or the same kind of data from actors on different levels to achieve data triangulation and let the data sets mutually verify, confirm and enrich each other.

2.4.1.4 Empirical settings

The new project developments have an important role in organisational capability development (Bresman 2013; Kim and Pennings 2009; Knott, Posen and Wu 2009). My study unfolds the micro-foundations of new project development through the in-depth investigation of middle managers' routines within the highly successful digital platform Tencent. It stands for an instructive case for my research because it first establishes a hyper-competitive market while reacting to the market trend successfully and remaining at the top of the industry. In 1998 when the internet started to be known and used in China, Tencent launched an online instant message software called QQ and initially entered the digital business with its "online social" concept. During 2000-2004, Tencent continued to develop many products and services such as telephone message services, QQ group chat, QQ show, QQ games and QQ portal net. Many of these projects have become extremely well-known for the generation who started using the internet daily. From 2005-2009, Tencent quickly reacted to the fast-growing number of internet users by developing products and services, collaborating with other internet companies and restructuring the organisation quickly. Starting from 2010, when internet products and services sprung up quickly, Tencent decided to open its platforms and share its capabilities with the externals, which aimed to obtain even more capabilities from other internet players. From 2011-2014 when Apple Ipad and smartphone became popular and the mobile internet gradually penetrated peoples' life, Tencent reacted quickly and launched the

smartphone application—Wechat and quickly dominated the mobile social business. In the following six years, Tencent continues to open its platforms and develop more capabilities, such as Tencent Cloud and AI technologies, which tightly follow the market trend. The point is that Tencent successfully adapted to market changes every time despite how fast the external environment shifted. It illustrates an exceptional case of a digital platform that quickly develops new capabilities and precisely fulfils the market demands.

Secondly, Tencent fits closely with the type of digital platform I depicted in the theoretical part with its hybrid character and broadly established ecosystem. It is important to highlight that the representativeness of a sample is not the single crucial criterion of the legitimacy of a sample selection. Instead, the researcher should clearly define the sample's core dimensions, which link the sample to the extant theories and how the specific quality exemplifies the analytical object (Thomas 2010). The study points out that: *"The move from situation to processing is accomplished differently in different reflexive methods, but it always relies on existing theory"* (Burawoy 2009). Therefore, I must directly link the qualities of Tencent to my theoretical set-up of the digital platform organisation before I continue the investigation. First, Tencent is a product-oriented platform that focuses on leveraging its *generative technologies* and providing customers with a wide range of digital products. Starting in 2010, Tencent officially adopted the "opening strategy" and claimed that the value appropriation for external partnerships would reach 20 billion. Said one of the top executives Kaifu Lee:

"The opening platform, bulk of users, active data flow...all of which, will provide the developers with more convenient and faster entrepreneurial approaches, and let developers experience the horizon and power of standing on the shoulders of giants...Here is the platform for developers to find values and keep forging ahead." ("Tencent 2012 opening platform white paper book")

Second, while Tencent continues to explore its generative business models, it also emphasises connecting businesses from different industries and attracting more partnerships and users from a spectrum of business areas. By leveraging its capabilities on the internet, Tencent connects *multi-sided* actors and cultivates interdependent relationships among platform users to capture more value from a complex business ecosystem. As the CEO Huateng Ma said:

“Many of my products including Wechat and QQ are actually functioning as connecting machines, (connecting) people to people, devices to devices, services to services, people to devices, people to service, all of which should be connected smartly. I build the bottom, the logic on top of this should be operated by the traditional industry per se...Tencent could become an internet connecting-machine, connecting business partners on one side, and the bulk of customers on the other side, and together, build a healthy and active internet ecosystem, connecting everything.” (“Tencent 2014 opening platform white paper book”)

Third, Tencent is one of the pioneers among large and successful digital platforms in China, who adopt the concept of “opening platform” and “ecosystem”. After the famous “3Q War” (the business battle with Kingsoft) in 2011, Tencent started to realise that it is not rational to try to “do everything by itself” (mentioned by many interviewees). Therefore, it quickly opened and shared its resource base and sought approaches to value co-creation. Said one of the professionals in the Tencent-Wechat-opening-platform department:

“Alibaba and Alipay have consulted my business model (the opening platform business model). WeChat is different from Alibaba with its model of opening and collaboration. I have users, I have the data flow and data of social relation chain, and I can

collaborate with different businesses. I do not have to do business by ourselves. By using my tools, I can energise other businesses. They develop and provide services through my platform. I might charge for a small amount of service-charge, and have multi-sided value co-creation with my partners and customers...Alipay has actually consulted my business model...they are surprised by the income of Wechat Pay...the Wechat Pay actually has more market share than Alipay.”

Thus far, the ecosystem surrounding Tencent’s digital platforms is widespread and gradually penetrating different industries, such as the financial, e-commerce, and entertainment industries. A comparison of Tencent’s financial indicators with five other outstanding digital platform companies over the last five years is produced in Table 4 down below. It shows that Tencent has been outplaying its competitors for years, as it continues to have high revenue, a stable incremental ratio and highly profitable projects.

In sum, studying the managerial routine to develop new projects within Tencent would potentially generate fruitful insights into dynamic capability in the digital platform context.

Firm	2016			2017			2018			2019			2020		
	Revenue		ROI (%)	Revenue		ROI (%)	Revenue		ROI (%)	Revenue		ROI (%)	Revenue		ROI (%)
	(million\$)	Increase (%)		(million\$)	Increase (%)		(million\$)	Increase (%)		(million\$)	Increase (%)		(million\$)	Increase (%)	
Tencent	23,564	41	73	34,542	56	45	49,850	32	40	56,218	21	49	68,080	28	73
Alibaba Group	15,686	33	125	22,994	56	63	39,898	58	103	56,152	51	57	71,985	35	119
NetEase, Inc.	5,498	67	34	8,315	42	25	9,767	24	16	4,532	15	15	5,974	24	13
Baidu, Inc.	10,161	6	6	13,034	20	5	14,876	21	7	15,429	5	-0.9	16,410	-0.3	7
Weibo Corporation	655	37	23	1,150	75	26	1,718	49	28	1,767	2	28	1,689	-4	8
Sohu.com Limited	1,650	15	-13	1,861	13	-10	1,883	1	-2	1,845	2	0.6	750	-60	8

Table 4 Key finance indicators of Tencent and the other 5 top Chinese digital platform organisations

2.4.2 Research Method

2.4.2.1 Data collection

In terms of data collection, I follow the three-stage process framework adopted by Plakoyiannaki, Tzokas, Dimitratos and Saren (2007), which systematically separates the data collection process into stages of "*Drifting, Designing and Probing*" (which is a modified version of Bonoma's (1985) framework). The process is reproduced in Figure 7.

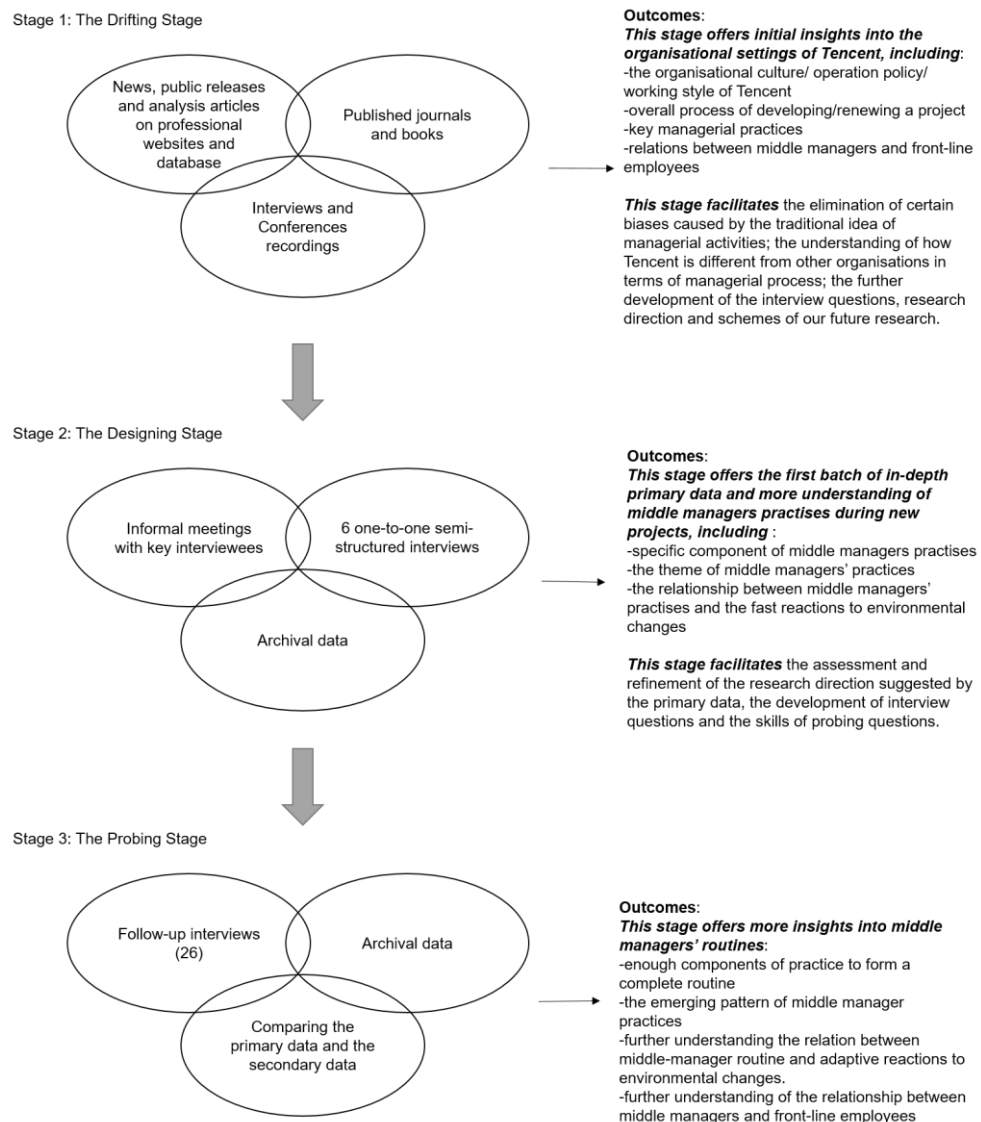


Figure 7 The three-stage data collection process

2.4.2.1.1 Secondary data

At the beginning of the process, which is the *drifting stage*, the main objective of this stage is to have an overall understanding of the *concept*, *locale* and *jargon* of the phenomenon as it occurs in the field (Plakoyiannaki, Tzokas, Dimitratos and Saren 2007; Bonoma 1985). I aimed to have a priori notion of Tencent's organisation setting and the critical component of middle managers' practices (Bonoma 1985). My data collection is heavily based on a diverse range of secondary data, including news, public releases, and analytical articles on the professional website and database (sources shown in Appendix 1). They provided a general picture of Tencent's organisational management culture, operational policy, working style, and the general process of new project development. The description of historical events at different stages in Case 1 is largely based on secondary data and supported by interview data. To build the storyline of Case 1, I searched through a significant amount of secondary data, including six books: "The Tencent Method—the product philosophy of a \$150 billion company" (2014), "Tencent Biography" (2017), "How Tencent works" (2016), "Tencent Industrial Forest: entrepreneurial password in the ERA of AI" (2018), "Hua Teng Ma's TENGXUN story" (2016), and "Commercial product manager—Product management thinking taught by Tencent" (2019). I also read plenty of published journals and dissertations in both Chinese and English, which provide insights into key historical events. I continuously went back to read these published works to seek support and inspiration for my case. For example, I have scanned through "Tencent Biography" (2017) at least three times in order to gain a better understanding of how Tencent became the industry leader. Furthermore, the storyline was backed up by my interview data.

Additionally, as Tencent is highly well-known in China and has a significant amount of data publicly available online, I adopt the approach of *Boolean* search and quickly narrow down the keyword and keyword combination (Habersang, Küberling-Jost, Reihlen and Seckler 2018): "internal management", "project management", "product manager", "internal organisation management", "product management", "product manager", "talent management" and "internal organisational ecosystem". I also

include case data from published reports, journals and books, which are the primary source for my direct quotation and case citation. Last but not least, I also search for videos and records of interviews targeting middle managers and employees, which focus on project operation, daily managerial activities, team management and frontline employee management. The source of secondary data is presented in Appendix 1. The interview records provide us with initial notions of specific practices by middle managers, thus, allowing us to have a more specific understanding of middle manager routines and how they interact with internal and external changes.

In the first stage, I accumulate over 180 pages of notes. I continuously collect, review, and analysis the secondary data until I can develop relatively comprehensive drafts, tables and figures to depict a storyline of the middle manager's critical practices and the overall process of developing new projects within Tencent. I would like to note that drafts, tables and figures developed in this stage are not displayed in the paper because they are considered notes and do not directly appear in the content. The overall understanding of the context and process within Tencent allows us to eliminate certain biases caused by the traditional idea of managerial activities (Piore 1979), thus, facilitating a certain understanding of how Tencent is different from other organisations in terms of managerial process. Thus, I can further develop the interview questions, directions, and schemes of my future research (van Maanen,1982).

2.4.2.1.2 Primary Data

During the *Design* stage, I collected primary data and further assessed and refined the research direction suggested by the preliminary data. I selected middle managers from different business groups (Tencent has six main business groups plus other businesses that are not categorised yet, each business group functions as an independent company) and a range of different functions. The "selective" activities in my research involve defining the middle management position at Tencent. Subsequently, I will search within my network of interpersonal relationships to identify friends and family members who work at Tencent and have access to middle managers. To define the middle management position at Tencent, I began by

seeking theoretical support in the literature. I discovered that Wooldridge, Schmid, and Floyd (2008) provided a definition that resonated with my research goals. According to them, middle managers "serve as important interfaces between otherwise disconnected actors, such as top and operating-level managers" (p. 1191). This definition offers clear and straightforward guidance for identifying middle managers at Tencent. Based on this definition and my objective of analysing organisational routines at the meso-level, I decided to focus on individuals who hold managerial positions and can directly connect with front-line professionals, while also having access to the strategic level and participating in strategic activities. I also considered the interviewees' tenure at Tencent. Priority was given to those with longer experience, as they would likely have a deeper understanding of the organisation. Furthermore, to ensure data triangulation and support robust arguments and theorisation (Denzin, 1989). I made efforts to engage employees from various cross-functional departments, including the technology, product, and data analysis departments. As a result, my interviewees represent members from six different Business Groups (BG) of Tencent, including QQ Music as an independent business group. With these criteria in mind, I began asking around and informing people of my selection criteria to identify suitable candidates for interviews. This process allowed me to selectively choose interviewees who fit the desired profile. Furthermore, I had the opportunity to interact with two higher-level managers (a director and a senior director in the department) who played a significant role in facilitating my data collection process. They actively encouraged the middle managers (team leaders) within their respective departments to participate in my interviews. Thanks to their support and endorsement, the middle managers displayed a greater willingness to share detailed stories and insights. This collaborative effort resulted in the collection of a substantial amount of high-quality data, which greatly contributed to the success of my research. I also selected interviewees from the frontline individuals to have a more holistic view. The source of primary data is presented in Appendix 2 at the end. I generated a more in-depth

understanding of the managerial practices during the new project development process.

During the primary data collection, I started with informal meetings with six key interviewees by inviting them for coffee or dinner. These interviewees are at the middle manager level and responsible for one or a couple of teams and multiple successfully established projects. Before the informal meetings, I initiated contact with the first informant on WeChat on 14-05-2020. It is important to note that Tencent operates within a closed organisational culture, and its employees typically decline interview requests from external parties. While I did not keep track of the exact number of interviewees who refused to participate, I estimate that it was approximately ten individuals. My friend, family members, and I made extensive use of our interpersonal network to identify potential interviewees. We shared information widely but encountered rejections at various stages, including initial contact, informal meetings, and snowballing. Although I did not inquire about the precise number of individuals who declined, all of my contacts informed me that it was challenging to persuade individuals to agree. Based on these circumstances, I would estimate that we approached at least 20 people and ultimately gathered data from 6 interviewees. This person happens to be a close friend of my father, marking the initial contact with the interviewee.

To convince managers at Tencent to participate in my interviews, I follow a specific approach. First, I send them the abstract of my research and the questionnaire, providing key information about the study. This initial communication allows them to review the questions and realise that there are no specific inquiries requiring access to confidential data such as customer information, product designs, or key strategies. In addition, I assure them of the ethical considerations involved by sharing the approved ethical form from my school. This demonstrates that interviewees in this research are protected by my school and that I am obligated to maintain confidentiality and not cause any personal or professional issues for them. However, the most effective way to persuade them is by seeking approval from their higher-level managers. By approaching these managers and obtaining their support, I

enhance the credibility and legitimacy of the research. It is important to note that I do not offer any incentives or rewards in return for their participation. Instead, I maintain regular communication and provide updates on the progress of my research. My primary goal is to foster friendly relationships and establish rapport with the interviewees.

The informal meetings occurred in early November 2020. There were two separate informal meetings, one with six middle managers and another with a senior director from a department. Both meetings were organised as dinner parties, providing a relaxed and informal setting conducive to conversation and information exchange. These meetings typically lasted for approximately 2-3 hours each. During the informal meetings, I focused on getting background information such as the organisational culture, organisational strategies, department settings, their managing style, potential bias and, more importantly, the boundary of the interview (questions that they are not allowed to answer). The informal meeting facilitates us gaining trust from my interviewees and sets the base for smooth interviews; it also facilitates the further refinement of my interview questions to guarantee the efficiency of interviews.

Then, I conducted one-to-one semi-structured interviews with the six middle managers. Each interview lasted for 70-90 minutes, which were tape-recorded and transcribed. The first semi-structured interview with one of the six middle managers occurred on 16th November 2020, and the final interview is scheduled for 3rd December 2020. All of the interviews were conducted in Mandarin Chinese and have not been fully translated. I coded the interviews directly in Chinese, translating only those portions that were necessary for inclusion in the dissertation. The initial six interviews were conducted face-to-face, while a total of fifteen interviews were conducted online. Among these, thirteen were offline face-to-face interviews, and two were conducted via email.

The interviews followed the general theme and direction settled by 12 pre-designed questions (listed in appendix 3), aiming to explore the main research question of

"how do middle managers' routines support the dynamic capability in a digital platform organisation?" The interview focused on the processes of developing a new project in recent history and middle managers' roles and actions within those processes. The project selection was not imposed by researchers but rather by interviewees (Tranfield, Duberley, Smith, Musson, and Stokes 2000). The researcher would indicate the middle managers to introduce some of their successfully developed projects, from which they gain in-depth and valuable experience. The conversation would often start with the question, *"Do you have any experience of developing a successful project, from 0 to 1?"* Then the interviewees were encouraged to elaborate on the 1) initiation of the project 2) sequential steps for developing a new project, 3) the challenges they encountered, 4) people they communicate with, 5) resource they use, more importantly, 6) the specific actions they took to accomplish each stage. The interviewer did not restrict or control the conversation. Interviewees were encouraged to give as much information about their "story" as possible (Chell 1998). However, the interviewer tried to direct the conversation to "what did they do" and "how did they do it". This stage offers insights into the key components of middle managerial practises, the underlying logic of middle managers' actions and the relationship between middle managers' actions and fast reaction to environmental changes. Thus, I can further modify the research question and refine my research direction with new insights.

In the *probing* stage, I conducted 24 follow-up interviews by leveraging the snowballing technique. I selected and contacted interviewees who were mostly friends of friends or friends of previous interviewees, utilising the snowballing method. The initial contact was usually made through WeChat, where I discussed the interview arrangement with them. Out of the snowballing interviews, six of the interviewees were directly introduced by the higher-level manager, and I met them on the day of the interview. The first follow-up interview occurred on 04/12/2020, and the final one took place on 08/01/2021. During this session, the first contact was made on 30th November 2020. Unfortunately, I did not maintain an exact record of the number of interviewees who declined to participate, but I estimate the figure to

be approximately 20. To identify potential interviewees, I extensively utilised personal networks, including acquaintances and relatives. I estimate that we approached at least 40 individuals and eventually gathered data from 24 interviewees. Each subsequent interview typically lasted for around 60-90 minutes, and all of them were conducted in Mandarin Chinese. The interviews were tape-recorded and transcribed afterwards. However, they have not been fully translated. I coded the interviews directly in Chinese, translating only the relevant portions that needed to be quoted in the dissertation. I stored the data on a personal computer and protected it with a password for security purposes.

I selected interviewees by following the guidelines provided by Huber and Power (1985) to enhance the accuracy of retrospective reports. To address potential biases in managers' retrospective reports, I followed the guidelines provided by Huber and Power (1985). They offer a framework to mitigate biases that may arise due to personal motivations, cognitive limitations, lack of crucial information, and biased questioning. To counteract these biases, I incorporated individuals from various positions within the organisation, including different departments, managerial levels, frontline employees, experienced professionals, and new employees. By involving diverse perspectives, I aimed to gather a comprehensive understanding of the formation and renewal of organisational strategy and the occurrence of creative activities during routine renewal. Specifically, in model 18 (figure), I relied on data provided by three managers who collaborated on a project. This allowed me to capture multiple perspectives on the development of a successful project. The convergence and enrichment of their storylines without any contradictions or paradoxes indicate limited biases. This approach strengthens the credibility and reliability of the data collected, providing a more robust understanding of the phenomenon under investigation.

The majority of the questions remained consistent throughout the interviews, with no significant changes in their order or structure. However, I did make some adjustments to the wording of certain questions over time. As I familiarised myself with the organisational culture and became more acquainted with the terminology

and phrases related to projects and managerial activities, I adapted my questions to align with their "organisational language." This allowed me to ask questions and convey ideas more effectively, facilitating better understanding and engagement from the interviewees. Furthermore, as I gained more experience conducting interviews, I began to recognise which questions had the potential to elicit more detailed and insightful responses, as well as which questions resonated well with the interviewees. This awareness helped me refine and prioritise certain questions that were more favoured and likely to generate richer data. For example, my experience shows that the question 'Do you have any experience of developing a successful project from 0 to 1?' can prompt middle managers to provide more information. Each middle manager at Tencent must have developed some successful projects. These projects are like their 'babies' that they build up from scratch. A project could start as a simple idea, and middle managers must orchestrate resources and solve various problems to develop it and eventually make it a profitable project. They tend to refer to it as a project 'from 0 to 1.' After the project is officially adopted, they further develop it, and they call that process 'from 1 to 100.' In this case, middle managers are often highly proud of their projects and enthusiastically share stories. Moreover, these stories reflect the managerial routine and relevant agencies involved in developing a new capability. Therefore, I would focus more on those questions and encourage them to elaborate on their answers.

I collected 800 pages of transcriptions in total. Meanwhile, I reviewed the archival data and compared it with the primary data. I started to see the echoing parts between the two data sets and developed a better understanding of middle manager routines. This understanding, in turn, guided my question-probing in the interview and information extraction of the secondary data. This stage functions as an extension and refinement of the previous stage, insights of which facilitate us to further deepen and refine my understanding of the underlying logic of middle managers' practices. I also accumulated significant components to form a comprehensive view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.

Moreover, the interview ratio of 6-24 was not strictly planned. After developing a certain understanding of middle manager routines based on secondary data, I aimed to obtain primary data to gain further insights and refine my interview questions. Fortunately, I had the opportunity to invite six exceptional middle managers to a dinner party and obtain their permission to conduct interviews. This process unfolded naturally. However, the timing and impact of the first six interviews align with the requirements defined by Plakoyiannaki, Tzokas, Dimitratos, and Saren (2007) in the designing stage. The initial batch of primary data significantly enhanced my understanding of middle manager routines, which were previously based on secondary data. It also enabled me to fine-tune my research direction and interview questions, thereby facilitating subsequent data collection. The snowballing technique was used after these six interviews. We started asking around again and tried to have these interviewees introduce more managers for interviews. Additionally, the refined questions significantly facilitated the subsequent interviews, enabling me to understand the logic and ask the right questions.

2.4.2.2 Data analysis

2.4.2.2.1 The process study

I conducted a qualitative analysis to generate theoretical insights from my single case study. By profoundly exploring a specific case, my single case study is expected to generate intimate familiarity with the case's detailed mechanisms, patterns and interplays and create new insights and perspectives or enrich the extant theory.

Aiming for a deep understanding of a particular social phenomenon, I used my single case studies to produce thick descriptions. I immersed ourselves in my case to seek the patterns or unique characteristics of the case before the insights were established. I adopted the analytic procedures Yin (1994) provided: 1) comparing the data collected from the case to the extant literature; 2) looking for conflicts between data sets and building up causal or interactive linkage among elements

within the phenomenon. The analysis could be focused or structured in that the formation of data sets follows a reduction strategy that researchers need to pick the most relevant data that matches the central discussion clearly defined in the literature review. In this way, the result would have a clear boundary which refers to the specific explanation of a focused subject in a clearly defined context.

One of the specific analytical approaches is process tracing, typically useful when the patterned interaction among elements and actors within a case is unclear (Mills, Wiebe and Durepos 2010). As a result, theoretical work tends to be enriched by observing the interplay within the case and generating narrative results of the interplay. To conduct the process tracing, the researcher needs to thoroughly review the extant theories and literature to understand the incumbent discussion of the interplay in the research context. Then, researchers will reveal the undermined interactions by "poking through" the case (Mills, Wiebe and Durepos 2010; Langley, Smallman and Tsoukas 2013). I adopted the approach of process tracing because I believe that the interactions between the platform and platform users make up a crucial part of the platform organisation literature. Depending on my literature review of the unique character and mechanisms of platform organisation, I find that the platform organisation distinguish from traditional organisations with its unique way of interacting with its users. My literature review shows that the loose leadership and the largely externalised value proposition bring high uncertainty. The current literature does not fully explain how platforms reconfigure the resource base while interacting with external parties. Therefore, I adopt the process study to observe the interactions between platforms and platform users and focus on the element of resource. I aim to find how platform organisation interacts with platform users and how resources are renewed during the process.

It is essential to mention that the ontology of the process approach views an organisation as consisting of multiple continuously changing qualities, though some qualities might change at different speeds (Langley, Smallman and Tsoukas 2013). The other ontology at the opposite end of the spectrum considers that reality is made up of stable materials and that the substance of things will stay the same as time

passes. Even though the quality (e.g. space and time) of substance might change, nature stays the same. Whereas, in the ontology of process studies, reality consists of processes instead of substance. Process researchers argue that stable substances fail to construct reality because they are inevitably changing, as they claim that "Process is fundamental: The river is not an object but an ever-changing flow; the sun is not a thing, but a flaming fire. Everything in nature is a matter of process, of activity, of change" (Rescher 1996). Therefore, I highlight the importance of "time" in my study and use historical data to build the case. The element of time is largely left out in the management studies, which means my process conceptuality would potentially contribute to the part of the literature that non-historical studies cannot cover. My process study covers discussions of the continuous interplay within an ecosystem. I study the process of resource reconfigurations and answer the question of "what to do", "what point in time", and "in what context" (Sandberg and Tsoukas 2011). Thus, providing a comprehensive picture of how to develop dynamic capabilities in a platform organisation.

2.4.2.2.2 The process model

I develop process models to illustrate the managerial routines of middle managers within Tencent. I decide to use the process model because my research question is about "*how*" (Langley, Smallman, Tsoukas, and Van de Ven 2013; Langley, Smallman, Tsoukas, and Van de Ven 2009; Mohr 1982). I endeavour to deeply unpack the complex practices underlying the idiosyncrasy of routines and capabilities. The process study is naturally at the practice level that focuses on using the knowledge of *know-how* to explain how constructs such as context, actions and participants interplay and eventually lead to the desirable result (e.g. Monin, Noorderhaven, Vaara, and Kroon 2013; Langley and Tsoukas 2010; Bresman 2013). Studies of process insist that they suggest "*know-what*" knowledge has almost no value of guidance in terms of enactments, and it could bring about very different enlightenment when I study the process of achieving the know-what (Langley and Tsoukas 2010). Such a consideration echoes the theoretical objective of my study. For example, I argue that the idiosyncratic routine as an abstract system is

insufficient to explain the source of the idiosyncrasy. Thus, I try to deeply unpack the internal mechanism that gives rise to the idiosyncrasy by investigating actions and agencies engaged in the routine.

2.4.2.2.3 The coding technique

I adopt the approach of coding to analyse my qualitative data as the coding approach is recognised as a systematic and rigorous way of generating theories, concepts and relationships from data (Mills, Durepos, and Wiebe 2010; Strauss and Corbin 1998).

Opening coding. I conducted the first batch of analysis by following the guidance of "Opening coding" (Mills, Durepos, and Wiebe 2010; Strauss and Corbin 1998). In this stage, I tried to identify "actions" that appeared in the conversation and put them into categories. A category contains similar actions and closely relates to middle managers, project development or reactions to changes, which are essential qualities for my study (Mills, Durepos, and Wiebe 2010). By roughly putting actions into categories, I identified certain critical actions during the process of project development (Rindova and Kotha 2001), such as "*matching employees to projects*", "*setting KPI/OKR*", and "*regular meetings*". I also found that middle managers' actions are highly associated with frontline employees' actions and results. When describing the process of project development, most middle managers use "*I*" rather than "*we*". There are only a few times that they would use "*I*", and that information usually relates to their personal experiences and understandings. This unique managerial language, to a certain extent, reflects the "*soft*", "*collaborative*", and "*flexible*" managerial style spanning among most of the middle managers interviewed by us, which reflects a unique aspect and theme for my analysis (Rindova and Kotha 2001).

Axial coding. To further develop clear concepts and themes in the "Axial Coding" stage, I disaggregated, re-grouped and connected certain categories to better understand the processes and actions (Mills, Durepos, and Wiebe 2010). I found that managerial practices are significantly connected with and affected by frontline employees' actions and organisational strategy. Therefore, I re-grouped certain

categories of actions by judging whether they are on the *frontline individual*, *middle manager*, or *organisational levels*. I must understand what kinds of actions match to which level; I also compared actions on different levels and analysed how they connect. I also found that several particular categories could be described by other categories. Thus, I merged some categories under one important category, which gave certain actions such as "*boundary setting*" and "*matching*" more meanings and dimensions and further facilitated the development of the process model (Strauss and Corbin 1998). In this stage, I further specified meanings of important categories and developed connections among different categories (Strauss and Corbin 1998; Mills, Durepos, and Wiebe 2010). I further understood the mechanism of my target case and which part potentially made it different from a traditional concept (Mills, Durepos, and Wiebe 2010), which facilitated the future analysis.

Selective coding. In the "Selective Coding" stage, I further connected concepts and categories generated in the previous stage. I again grouped and re-grouped the actions to generate categories useful for conceptualisation. I developed comprehensive routines for frontline individuals and middle managers by using the actions categorised into the frontline individual and middle manager levels. I found that the frontline employees establish a tight connection with the middle manager during the project development process by constantly providing *feedback*. I also found that a few actions of middle managers show the mandatory management style. Instead, the key concept of "*directing*" and "*facilitating*" tend to dominate the managerial theme. I developed project development processes on the individual and middle-manager levels. Also, I combined the two different routines into an organic and complex reaction process. Eventually, I related the combination of these routines to the nimble reactions of internal and external changes. I developed a storyline in this stage, facilitating us to get to the theorisation stage.

However, I want to highlight that selective coding is not an automatic result of the previous coding and that the final categories and relationships do not simply appear through the previous categories. The previous stages are inspiring but not significant to develop a comprehensive story and theory. I had to go back to the raw data, re-

analysed them, and extract useful information to develop my core concept. Such an analytical process reflects the debate between Barney Glaser (1992) and Anselm Strauss (1987). As the opposite to Anselm Strauss (the adopted approach in my research), Glaser (1992) posits that the result of selective coding is an almost automatic outcome of previous stages of data analysis. Data coding should be a self-selecting process, and the selective coding stage is for articulating concepts into theoretical terms. Conversely, my analysis process reflects that data analysis outcomes do not automatically appear from the categories built up in the opening and axial coding stage. It is mainly because the project development process at Tencent is highly complex and results in many fragmented categories in the first and second stages. I must go back to the raw data in the selective coding stage, review the whole coding process, and extract new information, and these three analytical stages work in a non-linear approach. Therefore, regarding the methodology, I also posit that Anselm Strauss's coding technic is more suitable for highly complex processes.

2.4.3 Validity, reliability and the analytic generalisability

I have taken a series of measures to enhance my research's validity, reliability and generalisability. In order to strengthen the validity and reliability, I first adopt a comparative analysis approach (Dyer and Nobeoka 2000). While analysing and developing categories, I constantly compared the new batch of data to the previously collected data and continued to go back and forth between data and theory. I repeated the process until theoretical saturation, and no new categories appeared (Glaser and Strauss 1967). Second, I need to have data triangulation and integrate a wide variety of data to support my argument and theorisation (Denzin 1989). My primary data collection process involves employees from cross-functions (e.g. technology department, product department, data analysis department). Also, my interviewees cover members from 6 different Business Groups (BG) of Tencent (including QQ Music as an independent business group). It is worth mentioning that,

confirmed by one of the frontline professionals of the gaming department, Tencent adopts a "*city-state system*" type of organisational structure. This means that every business group is relatively independent, and their operational style and culture could be highly different. Therefore, having cross-BG interviewees further facilitates us in confirming and comparing my data and avoiding bias from a limited perspective (Yin 2003). I also involve interviewees from different hierarchical levels (higher-level managers, middle managers and frontline employees) to avoid bias from single-level employees and facilitate more elaborated explanations (Jick 1979). Third, I use the triangulation method to investigate the managerial routine from a different perspective. I include secondary data such as annual reports, newspapers, interview records, books and journals and the primary data. By using different methods and letting different types of data cross-check/-confirm with each other (Rindova and Kotha 2001), I could migrate the bias of a single data type and enhance the validity and reliability of my result. Forth, as the research proceeds, the theory articulation process, data collection process, data analysis process and writing process are supervised by highly experienced co-authors. To migrate the potential bias of a single researcher, I make sure my research continues to gain opposition from different researchers so the research would be developed more comprehensively.

In terms of generalisability, conventional views hold doubts about the value and generalisability of single-case studies (e.g. Campbell and Stanley 1966; Abercrombie, Hill and Turner 1984); they maintain that a single-case study simply cannot produce reliable outcomes about a broader class. Nonetheless, later, Flyvbjerg (2006) argues that these views are "not true", and the in-depth study could provide context-specific knowledge, which is just as legitimate as the knowledge that shows concert rules (Flyvbjerg 2001).

However, I maintain that my single-case study possesses a certain level of generalisability. First, in terms of the case's selection, the typicality and representativeness make the case significant. To make the case representative and be able to replicate in a similar situation, I need to choose the key case of a phenomenon, so the "outlinerness" gives the case the capacity to exemplify the

analytical object of the inquiry (Lijphart 1971; Thomas 2011). Yin (2014) also defines these case-selecting activities as "purposeful sampling", and he posits that the extreme case or an unusual case can be studied to reveal certain under-explained matters and their relationship. Thus, an exceptional case is vital for the representativeness of the case result. It gives a case the power to manifest the under-explored theory and, thus, offers a certain level of generalisability. In terms of my single case, I select one of the most famous platform organisations in the world—Tencent. As one of its experienced employees states: "After the 3Q war, Tencent started to realise that it cannot do everything by itself, so it developed this opening-platform strategy...although Alibaba is also doing it now, it starts with imitating Tencent's strategy." Therefore, although Tencent might not be the first platform to adopt the opening platform strategy, it is one of the most successful platforms and sets up examples for other successful platforms to follow. In this case, I indeed choose a special case in China, and it can facilitate us to explore some of the under-explained matters and their relationship.

Secondly, the representativeness of a case is not the sole crucial criterion for the legitimacy of case selection. Instead, the researcher should clearly define the core dimension of the case that links it to existing theories and explain how the specific qualities exemplify the analytical object (Thomas, 2010). In other words, representativeness alone does not guarantee the capacity to elaborate new theories. As one study points out, *"the move from situation to process is accomplished differently in different reflexive methods, but it is always reliant on existing theory"* (Burawoy, 2009, p. 41). The case must establish connections with existing theories, demonstrating how theories apply to the case and how the case fills a theoretical gap. As Eisenhardt (1991) suggests, the development of constructs and their relationship reflected in a story is equally important as telling a good story (Ridder, 2017). In the case of Tencent, I selected it because its characteristics closely align with the existing literature on open platforms, providing a clear framework for applying extant theories to the case. Additionally, Tencent's successful construction of a platform ecosystem offers an opportunity to explore the process of platform

development and ecosystem formation. Through in-depth reading and interviews, I obtained a rich dataset and achieved data triangulation. I then aggregated the data into social processes (Ridder, 2017) and identified a detailed journey for Tencent in developing its ecosystem. Consequently, I discovered a series of capabilities that Tencent possesses to foster ecosystem development, making a legitimate contribution to platform and dynamic capability theories. Furthermore, my results have a higher chance of shedding light on other platform-ecosystem-related phenomena.

Third, the single case provides thick and historical descriptions to readers and elaborates new theories in detail that other types of methodology cannot provide. By reading the rich outcome, readers are allowed to learn from the case and draw their conclusion based on their experiences, thus making a generalisation by themselves ("naturalistic generalisation") (Stake 1995; Ridder 2017). The single case study allows the subject to be studied deeply at several points in time (Ridder 2017). Therefore, its capacity to generate context-related knowledge could be higher than the multiple-case study, which needs to study several cases simultaneously (Dyer and Wilkins 1991). Therefore, the single case study can explore certain inaccessible inquiries and make its unique and legitimate contributions. My historical study of Tencent reveals the capability to develop an ecosystem at different points in time, and I also managed to reflect common patterns among these different phases. I provide a rich set of stories for readers to have a holistic view of the journey of developing a platform ecosystem. With my findings, readers can develop their understanding of the dynamic capability to grow an ecosystem and develop some generalisation base on their experiences. I also provide a detailed elaboration upon the missing part of dynamic capability, which the other research designs cannot provide.

Most importantly, my research is subject to the analytic generalisability. Analytical generalisation is the opposite of statistical generalisation which tends to generate insights from a population of data or instances. Instead, analytical generalisation requires the comparison of empirical results with a tentative theory (Yin 2009). In

other words, my single case study and analytical generalisation stance emphasise theoretical propositions rather than population or universe. The primary approach is to generalise the insights from the case by using tentative theories to enable a more general perspective on my case findings (Kvale 1996, p233), and the case findings can, in turn, enrich and broaden the application of the tentative theory (Ridder, 2017).

Analytical generalizability requires establishing connections between empirical results and theory and enabling the modification and extension of the theory (Yin, 2014). We need to use a case to support conceptualisation (Firestone, 1993) and generate concepts from particularities. My case of Tencent displays tight connections with my theoretical framework encompassing dynamic capability theory, platform literature, and ecosystem literature. Attributes of Tencent, such as the open platform, loose leadership, incomplete organisational design, and interdependence with external parties, reflect key issues and objectives raised by previous studies. Therefore, Tencent is more than just a sample; it is a set of typical and unique instances for a specific analytical framework (Delmar, 2010; Thomas, 2011). Thus, Tencent serves as an adequate case to enrich or modify these tentative theories.

Additionally, in qualitative research, analysis and interpretation are highly important to enable analytical generalizability (Polit and Beck, 2010). My empirical outcomes need to facilitate a sophisticated understanding of the mechanisms and rationales behind particular events, processes, and configurations (Thomas 2010, 2011). As Thorne et al. (2009) argued, "When articulated in a manner that is authentic and credible to the reader, (findings) can reflect valid descriptions of sufficient richness and depth that their products warrant a degree of generalizability in relation to a field of understanding" (p1385). My research on Tencent, especially the findings and discussion sections, contains in-depth stories and context-specific samples. My case utilises substantial details to reveal constructs and relationships in the phenomenon and their interaction processes. I employ historical storylines and process tracing techniques to illustrate how conditions shift from one state to another. As instructed by Yin (2014, p143), I "compare an empirically based pattern – that is, one based on the findings from case study – with a predicted one made before you collected your

data (...)." By comparing propositions and examining extensive case material, new elements or relationships can emerge, contributing to the development of a tentative theory. Therefore, my single case study provides enrichment and modifications to theories.

As outlined by Ridder (2017), to enable generalizability, empirical research needs to "demonstrate the lacks and gaps of the tentative theory; to specify how and why the tentative theory is aimed to be extended and/or modified... and to evaluate new elements, relationships, and mechanisms related to the previous theory." My single case research on Tencent demonstrates sufficient functions to enrich the existing dynamic capability theory at an ecosystem level and provides a further understanding of ecosystem orchestration and platform manager leadership. My results enhance the usefulness of these theories (Corley and Gioia, 2011). To a certain extent, my study achieves broad constructions and conceptualisations by utilising particularities. In this case, it is analytically generalisable.

Chapter 4 Case Studies

0.0 An overview of Tencent's underlying resource reconfiguration logic.

Before I start to unpack my case studies and discussions, I would like to present an overview of how Tencent reconfigured its resources and the overall process of the resource flow. This section aims to provide some basic knowledge of Tencent to prepare readers for a better understanding of the case study section. Through this brief section, we can understand the main actors and activities involved in the value creation process and a general picture of Tencent's dynamic feedback loop (which will be deeply unpacked in cases 1 and 2).

During the research, I found that Tencent opens its platforms in a repeat pattern where it starts by allowing complementors to access the infrastructure, customer base and some other essential resources. Then, it gradually provides more and more resources and services depending on complementary needs for product development. Eventually, complementors from different business areas would use Tencent's services and resources to develop products under their specific industrial logic.

During the opening processes, Tencent creates good services and effectively delivers resources and services to match complementors' needs. According to my evidence, Tencent's platform resource will go through a 3-layer resource sharing system until it finally reaches complementors; and this system restructures and re-shapes resources into the version that meets the complementary needs and facilitates complementary innovations. I will explain each layer in detail in the following sections:

The first layer—A stable Infrastructure

The first layer of this system is a stable infrastructure, which is the base of the other two layers and all of the platform's activities. A stable infrastructure ensures smooth transactions and resource-sharing processes and guarantees a virtual system

capable of catering for most complementary products. Hence, it is generally considered the key element of the data-attracting ability of a platform (Wu 2016).

The second layer—Service Design and Categorisation Under Product-Oriented Logic

Based on the stable infrastructure, the second layer of the system is the service designing and systemising mechanism under the product-oriented logic. By sensing the needs of the complementors to develop products, Tencent develops and categorises its services into four sequenced categories: services for *making* the product, services for *promoting* the product, services for *maintaining* the product and services to retain customers (see Figure 8). The product-oriented logic helps Tencent create services that satisfy needs in every stage of the product development process. With its resources penetrating the complementary innovation process, it improves the outcomes and deepens the connection with the external partners. For example, Tencent first opened up the Myapp.com application platform by allowing application developers to promote their products on the platform and access some essential resources. Then, Tencent gradually created services and tools depending on its database, algorithms, technologies and infrastructures, and more importantly, complementors' needs. Tencent's services cover most of the product development stages. In the product-making stage, Myapp.com provides programming tools to accelerate the process from designing to making an application. Then, at the promoting stage, Myapp.com offers big data advertisement services to promote applications to target customers. Finally, yet importantly, in the retaining stage, Myapp.com provides bug-fixing services that ensure the quality of applications during their upgrades (to reduce customer loss).

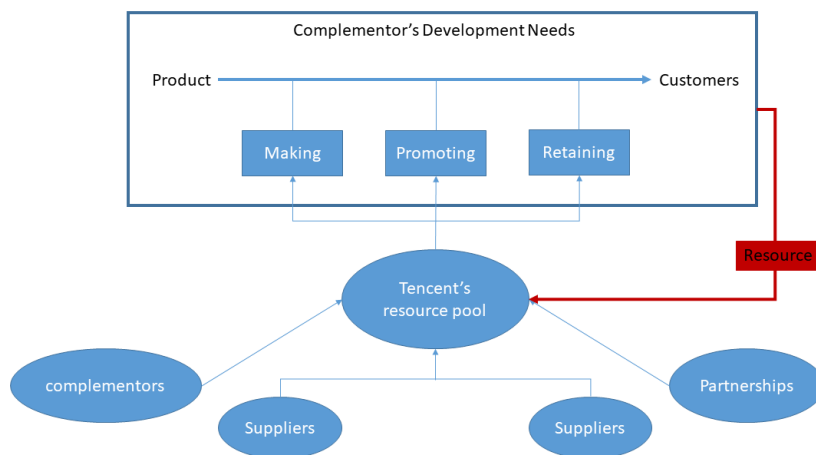


Figure 8 Tencent's underlying resource reconfiguration logic

The Third Layer—an Effective Interacting System

With services being created, they go through the system's third layer, which matches services and resources to different complementors; I call this layer an effective interacting system. In the third layer, Tencent establishes a self-applying system that sets up service-applying links on its websites to let external partners apply for services, tools and resources they need to develop their products. Also, Tencent would actively match up complementors from different industries, allowing them to complement each other with their skills and capabilities. For example, Tencent matches complementors from the finance area to game developers because a good paying system is key to a profitable game. Moreover, Tencent also encourages direct communication among complementors by helping them build communities. For example, Tencent often hosts start-up networking events to encourage innovators to meet each other and exchange ideas. Seemingly, when resources finally get through all of the layers of the system, it should be with the matching complementors in the form desired by them.

As resources are finally in complementors' hands, they can create products using their industry logic. Additionally, after a product is successfully developed, it could

be put into Tencent's resource pool and become a service or business support for other complementors by going through the resource-sharing system (see the whole process in Figure 9).

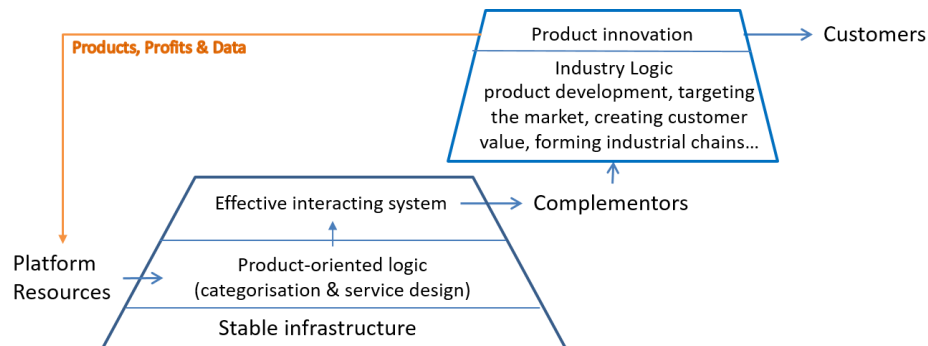


Figure 9 The basic process from resource sharing to product development

Case study 1: Dialectic tuning: Reconceptualising dynamic capabilities for the scale-up process of platform-based entrepreneurial firms

1.0 Introduction

The platform company illustrates a novel way to orchestrate a variety of peripheral contributions made by external partners (Zittrain 2008; Adner 2017; Jacobides, Cennamo and Gawer 2018). Literature has generally shown that the value proposition of a platform company is highly externalised, which brings about both dynamism and uncertainty. I am interested in the evolutionary process of this unique type of organisation, whereas literature insights on this topic are limited. As the platform company faces a hypercompetitive environment and a market with limited resources (Davidsson 2004), it needs to constantly reconfigure and integrate its resource base to gain advantages and grow into an ecosystem. Hence, I adopt the dynamic capability theory as the lens to discuss my question. However, the unique form of organisation requires us to rethink the concept of dynamic capability. It is because, first, the platform company benefits from the network effect and generative technologies. Its value highly depends on the engagement with the externals (Katz

and Shapiro 1985), while the dynamic capability theory inwardly focuses on the managerial process (Eisenhardt and Martin 2000). Second, the platform company is often linked with the concept of the ecosystem, where the organisational form evolves from time to time and lacks a fixed managerial plan (Arndt and Pierce 2018), while the dynamic capability theory tends to emphasise the structured and static managerial process (Teece 2007). Therefore, I ask the question of how platform companies reconfigure the resource base to drive their growth.

To answer the question, I investigate the growing path of Tencent through an inductive qualitative case study. Tencent merits my attention because it is one of the most successful platform companies in China, and I consider it the typical case to illustrate the resource reconfiguration mechanism. I collect secondary data from multiple sources and map a timeline of the sequential key events. Then, I build a process model to find the managerial pattern in different growing stages.

I make two contributions through this research. First, I reconceptualise the dynamic capability theory in the platform company context. I find that a platform company's managerial process is highly interactive, and its resource base is co-constructed with platform users. New resources are generated during the process of interaction and exchange; new configurations are formed based on the issues that emerge from the communication with externals. Departing from the predominant dynamic capability views, the resource reconfiguration process in a platform context is not managerial-led but determined by bilateral interactions between the focal firm and the external partners. Second, since the dynamic capability theory is essentially about managing resources, I also contribute to adding new perspectives to view resource management. Unlike the traditional resource-based view, which stresses the possession and control of VRIN (Valuable, Rare, Imperfectly Imitable and Non-Substitutable) resources, platform companies need to share the resource base. Resources get reformed during the interaction, becoming versatile and generating more value. In short, by bringing the dynamic capability theory into the platform company context, I obtain a deeper understanding of the platform's growth and

renew insights into organisational resource management. Hence, I enrich dynamic capability and platform organisation literature.

2.0 Case Findings

2.1 Stage 1. Creating the critical mass of network effect and setting up the base of an ecosystem

2.1.1 Attracting (1999-2001)

Attracting refers to Tencent's capability to interact with customers, understand their preferences, and create products that fulfil customers' expectations. Since Tencent's business gene is a social communication software provider, Tencent is passionate about interacting with its customers. The capability to understand customers and improve products makes Tencent's products highly attractive. It attracts an increasing number of customers, even though it might not be the first mover in the market. Such a capability facilitates Tencent to build an interdependent relationship with its customers and establish a strong foundation for creating network effects and building up the ecosystem.

The original product of Tencent—QQ (formerly named the OICQ), was introduced in 1999. QQ allows internet users to chat with other users in a digital chat room on their personal computers (PC). Coming from a software engineering background, the founder of Tencent—Pony Ma, puts great emphasis on user experience and is perceived as the “Chief Customer Experience Officer” at Tencent. One informant explained, *“He used QQ on a daily basis, pondering over the typography, the hue, and even the auditory feedback it produces during user engagement. He encouraged us to interact with users regularly, attentively listen to their feedback, and contemplate improved methods for enhancing the user experience. This habit has become ingrained in me, and I continue to follow it diligently each day.”* (Team leader and professional technology developer, Tencent Corporate Development Group) With an emphasis on user experience and fast problem-fixing speed, QQ quickly gained popularity and surpassed other Instant Messaging (IM) products in

the market. As they recalled later, the reason for QQ to surpass the competitors in the market is because of two reasons: 1) competitors' misunderstanding of the value of social communication software; 2) the constant micro-innovation of QQ. For example, QQ developers managed to read the information from the market and found that customers prefer their List of Friends to be saved online instead of on the computer, so they will not lose their list of online friends when they change to new hardware. Reacting to the demand from the market, QQ moved the online list of friends onto the background server. As a result, users can check their list of online friends when they log on to QQ. Another successful improvement was that designers reduced the size of the software. They quickly found that the internet foundation in China was much weaker than that in the US—the birthplace of social communication software. To customise QQ for Chinese users and facilitate QQ to run on a Chinese computer smoothly, the engineers of QQ shrank it from 5MB to about 220K. In the following year, the developers of QQ continuously added more features (e.g. online portray, QQ emoji, sound effects) to it, many of which became the trademark of QQ, and it became enormously well-known in the market. As a result, QQ attracted 1 million users just by the ninth month after the launch and accumulated over one hundred million registered users from 2000 to 2001.

Although QQ quickly accumulated a large customer base, Tencent struggled to monetise its platform. The first opportunity appeared when mobile phones started to popularise in China in 2000. Around the same time, the Chinese Mobile Communication Company (CMCC) began introducing the “Monternet” project in many cities. By working closely with CMCC, Tencent developed a mobile QQ service that allows users to send QQ messages through mobile phones and only charges small fees. The cooperation had been highly successful. By the second month of 2001, the mobile QQ service had channelled 3000 million messages, and the number of online users of QQ reached up to 1 million. This cooperation helped QQ get through the crisis and continued to attract more customers. Through collaborating with the mobile communication company, frequently improving the QQ application and creating better customer experiences, Tencent attracted many

customers and generated significant data flow. The large customer base and data flow gradually formed a strong foundation for the development of future businesses of Tencent.

2.1.2 Mining (2002-2004)

Mining refers to Tencent's capability of having insights into customer data. In this stage, Tencent mainly focused on building an effective feedback loop with customers to continuously generate more understanding and use the insight to develop products. This capability was developed when Tencent needed to monetise the customer data further and obtain the capital to survive in the market. While QQ quickly got an increasing amount of data flow, Tencent struggled to develop a product that could turn customer data into cash flow. Meanwhile, investors still had a limited understanding of the value of data, so Tencent gained minimal support from external parties. Hence, Tencent developed the mining capability to create services and products based on customer data and attract customers to consume its products by paying affordable fees.

After experimenting with the data and monitoring users' feedback, Tencent introduced multiple value-adding services such as the QQ show, Qzone and QQ music. The idea behind the "value-adding services" is that they serve as accessories of QQ and aim to improve the customer-online-social experience. In the early time, Chinese customers were not used to paying for online services and products. In fact, in 2001, Tencent tried to charge a minimal amount of money for signing up for QQ IDs, and customers were strongly dissatisfied with the policy. The reputation of the company was severely damaged. Since then, Tencent quickly gave up on directly charging for products and services. Instead, it developed value-adding services to improve the QQ-using experience. Customers can choose to use QQ for free, or they can choose to pay a small number of fees to enjoy privileges, such as sending music to their friends or having diverse options of QQ profile pictures. One informant recalled, *"Generating revenue proved to be a significant challenge, despite my partnership with CMCC. As our customer base rapidly expanded, it placed a*

considerable strain on my costly server infrastructure. We consistently brainstormed fresh concepts, conducted market experiments, closely monitored data feedback, and sought to comprehend user interactions. Subsequently, I implemented further adjustments and reevaluated the data."(Team leader and professional technology developer, Tencent Corporate Development Group). Mining customer data provided clear insights for Tencent to launch many other products. For example, the "Support Product Exchange Centre", where customers were able to leave feedback and engage in further discussions on product features, was visited daily by product managers and software engineers. Then, depending on the feedback, managers and engineers could develop tailored solutions to tackle the problems and improve user experience. One informant explained, *"There isn't a great deal of hierarchical communication, but rather a greater focus on engaging with external parties through data or alternative communication channels. My main objective is to enhance the user experience, and I rely on data and customer input as my primary sources of guidance."*(Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group). As a result, Tencent was able to have a much more holistic understanding of its users (purchasing, socialising/relation chain, browsing) and develop better products. Following the data-driven logic, the QQ value-adding services and QQ IM tool were constantly being improved under the guidance of customer feedback. Tencent quickly modified the interface and functions of these products according to customer reactions, and thus, its products were able to surpass the competitors in the market.

The mining capability facilitated Tencent to develop a better understanding of customers. It helped Tencent to develop a creative business model to attract more data and cash flow.

2.1.3 Diversifying (2005-2010)

Diversifying refers to the capability of adding an even more significant number of features and additional products to drive network effects. Whilst the diversifying capability works not just as a capability to enlarge the product portfolio and attract

data and cash flow. It can also link a diverse range of products into a complex structure, and these recombined products and services provide a wide range of online experiences to customers. Furthermore, since the products are interconnected, when one product gains customer data, the other product would also benefit from the versatility of the data, which is called the network effect. For example, Tencent launched an internet content platform, auction platform, anti-virus software product, audio-video software, QQ mail and QQ group-buying platform during 2004-2010. The diversified online services are combined through Tencent's portal net, which is called the "portal net + IM platform" strategy. In 2005, Tencent launched the "one-stop" online service which aims to integrate all of its services on its portal net website to satisfy people's multiple life demands such as news, communication, entertainment and e-commerce. To channel more data onto the website, Tencent attached the link of the website to QQ—its most used product. When people use QQ, the pop-up window appears occasionally, and they can click on the website if they are interested in the content. Later, as the website became popular, it helped attract more customers to use QQ and all other services exposed through the portal net. In the bigger picture, customers using QQ, the portal net website or other services would have the chance to get to know more about Tencent's available services because they are connected through the "one-stop" website. Thus, customer data flow could be channelled and used more efficiently to create more value. Tencent had successfully structured and connected its products to increase profitability. This strategy helped to exert the value of customer data intensely and facilitated Tencent to create a lock-in effect to retain its customers.

The diversifying capability is the advanced version of both attracting and mining capabilities. It not only allowed Tencent to actively interact with customers and develop a large number of products and services, but it also allowed Tencent to create a network effect among its products. In other words, when one product gained data flow, the other products connected to it would also benefit. Hence, the diversifying capability heightens the overall profitability of the platform. With this capability, Tencent created and structured its products, exerted the versatility of

customer data, developed a strong feedback loop with customers and built a firm foundation for the ecosystem.

To sum up the stage, from 1998 to 2010, Tencent showed strong capabilities in attracting customers, mining the value of customer data and diversifying the product portfolio. These capabilities allowed it to interact deeply with customers and understand their preferences, needs and expectations. In this stage, Tencent created a unique business model and a range of popular services. It also accumulated a significant number of customers involved with the online social community established by Tencent. Tencent, in this stage, created a feedback system (reproduced in Figure 10) between itself and its customers, which established a strong base for Tencent to construct its ecosystem.

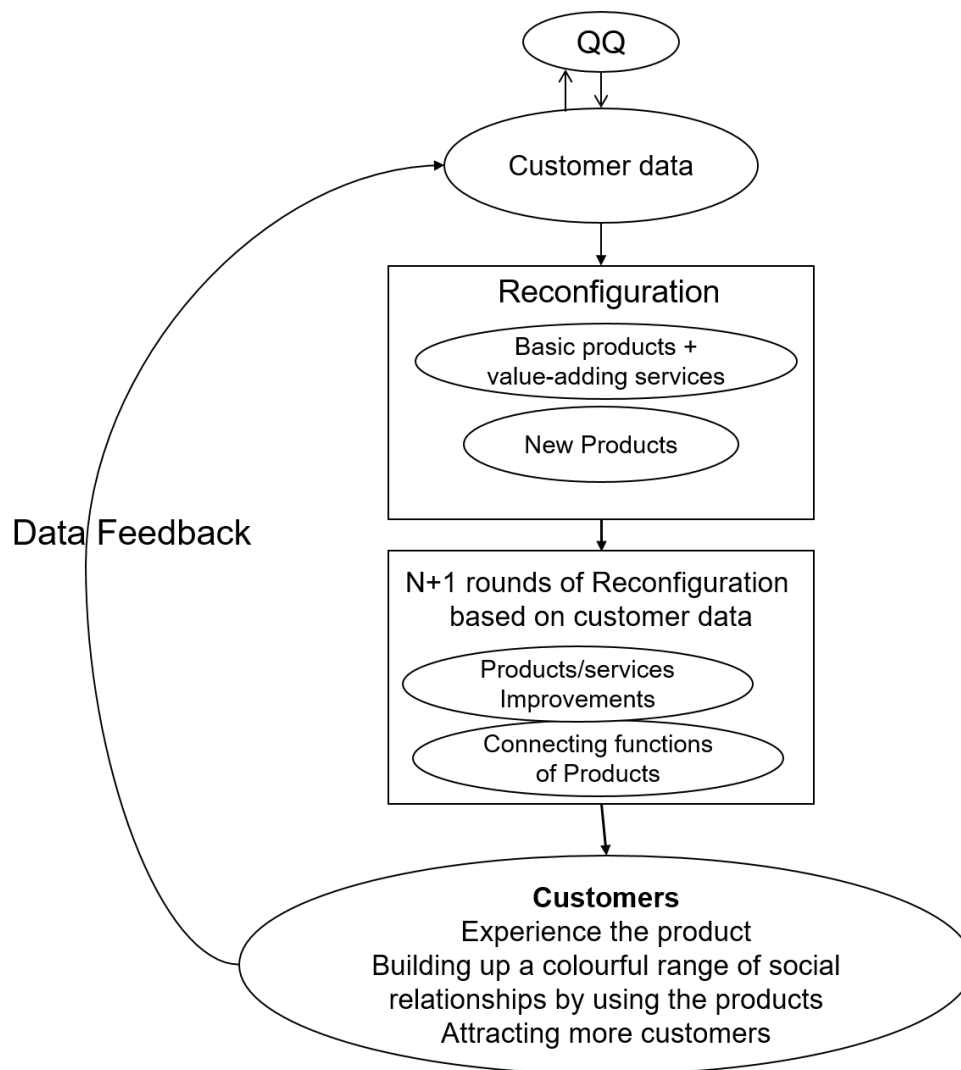


Figure 10 The Feedback Loop in Stage 1

2.2 Stage 2: Opening the platform and developing the ecosystem

2.2.1 Accessing (2011-2014)

2011 was the year when smartphones gradually started to become another essential internet tool. Quickly reacting to the change, Tencent developed another IM application called “WeChat” and continued attracting many customers. Another strategically significant thing is that Tencent decided to open its platforms to third parties, which means it started to share its customer base, customer data, technologies/algorithms and platform infrastructures with the public. The shared resources attracted many third-party developers to use the platforms; in turn,

Tencent was also allowed to access more algorithms, data, customers and a bigger product portfolio provided by external parties. In other words, Tencent could create more value by attracting more external resources and bundling the resources into more competencies.

Before 2010, Tencent had been highly cautious about opening the platform despite the platform competitor—Facebook had opened its platform and database and saw a huge benefit from it. The turnaround appeared after the "3Q war", which awakened Tencent to the significance of building a harmonious relationship with external actors. Tencent officially claimed its opening to third parties in 2011 and started to share its database with no conditions. It is worth highlighting that in this specific time, Tencent had accumulated a considerable amount of customers, databases and algorithms while building up stable platform infrastructures.

Accessing refers to the capability to open up the platform and attract many complementors. Such a capability facilitated Tencent to co-create value with the first batch of complementors who chose to enter the platform. Tencent developed this capability when it eventually gave up on doing everything by itself and decided to collaborate with the other players in the competitive landscape by sharing a part of its database and capital.

With its aggressive expanding strategy, Tencent was perceived as the “national copycat” and constantly criticised for its lack of innovation, copying others' business models and lack of ethical behaviour. In 2011, Tencent started a three-month “Tencent diagnosis” event inviting employees, external experts, competitors and academics from universities to review Tencent's development trajectory and discuss the next opportunity.

I had never expected Tencent to hold such an event. If it is the case of Microsoft, I think its typical reaction is to find a thousand ways to defend itself and prove it is right...(However) The Tencent diagnosing event was like a myriad of cannons attacking it simultaneously. I saw many people criticised Tencent

only for self-satisfaction. They acted like noble judges, condescending to the defendant who would not defend himself. Said the director of the Chinese information technology and network economy office—Qiping Jiang (Tencent biography 2018 p266)

In 2012, Tencent decided to open its platforms to third parties, which means it started to share its customer base, customer data, technologies/algorithms and platform infrastructures. The shared resource attracted many third-party developers to use the platforms; in turn, Tencent was also allowed to access more algorithms, data, customers and a bigger product portfolio. In other words, Tencent was able to create more value by attracting more external resources and bundling the resource into more capabilities.

The number of third-party developers quickly reached 1 billion, and by 2014, Tencent opened its application platform "Myapp.com" to offer more services to third-party users. Myapp.com is an application store for the Android system where third parties are allowed to launch and promote their products while customers can download apps from it. The opening application platform has shown high attraction for third-party developers and customers. On the one hand, the stable platform infrastructure, multiple combinations of platform services, and a large number of services and tools provided by different platforms (e.g. finance platform, gaming platform, QQ platform and search engine) made it the first choice of many small application developers. On the other hand, third-party developers kept enriching Tencent's product portfolio and helped to serve customers better. As a result, by July 2014, Myapp.com had accumulated 7600 million times of downloading. Apart from Myapp.com, Tencent has also opened more platforms such as WeChat, QQ, games, start-ups and artificial technology; each platform provides a series of services and fulfils different business needs, attracting increasing business partners.

The accessing capability allows Tencent to build an opening ecosystem based on the foundation it set up in the previous stage. While this capability shows certain new

functions, such as opening the platform, attracting a large number of complementors, co-creating value with external parties and evolving the platform, this capability inherits the core logic of the previous capabilities. As shown in the example, Tencent still put users' interests at the centre of its activities. Tencent develops its platform to serve the platform users (customers and complementors). It focuses on satisfying its users and supporting their business activities. Hence, the accessing capability still shows the unique quality of previous capabilities, but in a more sophisticated way.

2.2.2 Fertilising (2014-2016)

Opening and sharing the platform is neither a slogan nor a simple concept. Opening the platform is often a gesture, but I would rather consider it a capability. Sharing is not goodwill; it is more of a construction of a feasible system through which you can open and share. Said Pony Ma. (Tencent biography 2018, p269)

Fertilising refers to the capability of supporting and connecting external complementors by sharing platform resources. By opening its platform, Tencent allowed customers to access its resources and offered solutions to help them grow, thus, fertilising the external business partners and helping them become profitable; in turn, Tencent could benefit from the growth of these partnerships. In other words, Tencent managed to grow with its partners and built up an organic business ecosystem to gain competitive advantages.

After Tencent's first success in opening the platform and attracting complementors, the top-management team needed to figure out how to build a strong value co-creation relationship with external parties so the platform could continue to scale up. By opening its platform, Tencent allowed business customers to access its resources and offered solutions to help businesses grow. Thus, it fertilised external business partners and helped them to become profitable. In other words, Tencent managed to grow with its partners and built an organic business ecosystem to gain competitive advantages.

*According to Zhiping Liu (president of Tencent), the first capability of the opening is Tencent's **capital**. He insisted that it was impossible for Tencent to set foot in every product in internet businesses, especially in the field of content. The only feasible way to involve in these businesses was through investing capital. Through investing capital in different businesses and form alignments, Tencent could achieve the goal of opening the platform and unleashing the value of its platform resources...The second capability was the **data flow**. Tencent unconditionally shared its internal resources, such as API, social components, promoting tools, and QQ login. These resources were originally for private use. (Tencent biography 2018, p271)*

One of the critical points of the platform is to help external partners to skip unnecessary learning processes. The third-party developers come with their core capabilities, such as designs of games or programmes. Then, Tencent provides them with the contingency capability needed to develop their core capabilities, such as promotion and tools/systems to run the game. Thus, helping third-party partners skip some of the developing processes. This way, external partners can grow quickly, and Tencent can profit from their growth. The external partners do not have to spend time and money developing essential managerial capabilities. Instead, they can focus on developing their core competence. The establishment of a digital platform aims to make the most of the core capabilities of external partners.

Therefore, Tencent gradually added more services to the platform since its opening. Firstly, Tencent offered multiple promotion services. For example, Tencent developed a "platform data exchange" program that assessed the external partners' data-attracting ability and supported them with the matching data flow. Tencent also offered an "exclusive launch" service, where developers could launch their product on Tencent's platform and immediately access a large customer base. Moreover, before the launching event, Tencent would offer a series of pre-launching activities

or campaigns to secure the data flow on the launching day. Secondly, Tencent offered a series of data-retaining services, which helped to retain customers after the products survived and grew. For example, the platform offered the "gift pack" service, which helped design and promote certain applications' discounts to the "Gift Pack Zone" on the website. Thus, it facilitated retaining customers and attracting more data flow to the Apps. Besides, Tencent served third parties with a stable platform infrastructure and supporting tools. One of the tools was the "smart updating system", which helped customers to upgrade the application to a new version smoothly and reduced customer loss during the upgrading process. Thirdly, in the case of those outstanding partners such as 58.com and JD.com (big digital platform companies in China), Tencent would offer customised services from promoting to retaining and even value-adding services.

By 2015—the fourth year of opening the platform, Tencent's digital businesses had covered an extensive range of fields such as games, advertisement, entertainment (ebooks, films, anime, television shows), finance (banking, payment service), education, and social media. Tencent has been accumulating enormous partnerships and product portfolios while refining and enriching the services it provides to the public. The vast database channelled from QQ/WeChat and complementors allowed Tencent to obtain more customer information and target a more precise customer group when promoting products. In addition, data coming from external sources also improves Tencent's algorithm and problem-solving capabilities. Hence, Tencent could offer multiple tools and services to help application developers to develop products at lower costs. Finally, yet importantly, by continuing to expand the scale of opening, the multiple platforms strategy has become more mature. Different platforms such as QQ game, WeChat, payment platforms, Qzone and social media platforms have accumulated a significant amount of customer data so that they could offer more comprehensive services to business partners. Besides, Tencent used the database to build a protection system that secures customer data and intellectual properties and reduces potential damages.

The strategy worked well to help the externals to grow and lengthen their product lifecycle and enrich the capability of Tencent per se. As the very famous motto of Tencent portrays, "Tencent gives half of its life to the partners." It connects its fortune with the profitability of external parties. Thus, by helping them to grow faster and better, Tencent would benefit from it. This capability allows Tencent to maintain a healthy ecosystem with strong network effects and the "1+1>2" effect.

2.2.3 Morphing (2016-2017)

Morphing refers to the process of continuous business model innovations at the platform and ecosystem levels.

Through utilising and learning from complementary products, technologies and customer data provided by external partners, Tencent was able to take advantage of the existing network and embrace the mobile internet by introducing a new mobile message app—WeChat. WeChat is the smartphone version of QQ; it inherits the core function of QQ, which is online socialising. However, it is specifically designed for smartphone users. Following multiple rounds of improvement depending on customer feedback and adding features such as "Friend-shake" and "WeChat Moments", WeChat was quickly welcomed by smartphone users. As a result, it attracted 1 hundred million concurrent online users 433 days after launching. In 2014, Tencent opened up the WeChat platform. Tencent opened up a series of entrances, such as the "WeChat Official Account" and "Mini Program", for external partners to use the resource on WeChat. Tencent lets external businesses use its robust database of customer social relation chains on WeChat. By using a series of aforementioned opening strategies, such as providing capital, customer data and programming tools, WeChat has now become another robust platform of Tencent, where complementors can create content, promote products and communicate with customers. Taking the place of QQ, WeChat is undoubtedly one of the most popular platforms in China. Reporting a series of successes of the opening strategy, Tencent strived to expand its business range and ecosystem further. For one thing, it continuously added more services to the existing platforms to improve the supporting

system that targets external parties. For example, it constantly added more tools and solutions (e.g. promoting plans and technical supports) to the application platform (i.e. Myapp.com) and customer-targeting services to the advertisement platform. For another thing, Tencent gradually opened more types of platforms by following the market trend. For instance, Tencent opened up the WeChat platform in around 2014. WeChat is the IM product created to react to the trend of using mobile phones. Soon after the maturity of this product, Tencent opened up a series of entrances, such as the “WeChat Official Account” and “Mini Program”, for the external partners to use the resource on WeChat. Using a series of aforementioned opening strategies, WeChat has now become another strong platform for Tencent, which helps Tencent achieve a leading position in the mobile software industry.

A very vivid example given by one of the interviewees is the case of the **WeChat Ride Code** which completely changed the travelling system in China and thrived during the Covid-19 pandemic:

I build interfaces for the platform, focusing on "within-city travel" like buses and underground. I create various capabilities to fulfill different usage scenarios, such as payment and real-time tracking. One of my creations is the "Ride Code," a digital QR code for public transportation. It enables payment without entering a password and improves the travel experience. I also collaborate with businesses in the transportation industry, including both Tencent and traditional industry teams. (9-year frontline professional and team leader in the Department of WeChat Opening Platform, Tencent WeChat Group)

The highly successful project significantly facilitates the operations of the public transportation industry, and people can benefit from the significant convenience by simply using their smartphones to pay for the ticket. Tencent continues to share its various resources and capabilities with external entities, rapidly expanding its businesses.

Additionally, Tencent created a strong cross-platform effect and further integrated its resources. For example, many tool developers also use Tencent's platform apart from the application developers. Tencent integrated resources from both sides and let them cooperate directly. For example, a sub-platform called "Blue Whale" allows developers to make programming tools using the platform resource. It also allows developers to sell their tools to application developers through the platform. By 2017, the "Blue Whale" platform owned more than 300 game development tools (which cover most of the popular tools in the market), most of which were developed by external developers. Thus, Tencent has a stronger technology base, allowing both sides to connect directly through the platform.

The morphing capability facilitates Tencent to transform from QQ centred to WeChat centred ecosystem. WeChat seized the opportunity brought about by the smartphone trend, giving Tencent the "ticket" to enter the competition of a new era. Meanwhile, the morphing capability also helps to innovate the business model. As the opening platform continues to grow, Tencent cannot provide every single support to external parties. It creates the cross-platform effect and lets the units that are relevant to each other communicate directly. It further integrates its resource base and continues to create value.

By constantly interacting with platform users (customers and complementors), Tencent continues to change its business model and develop better services and products. As shown in Figure 11, Tencent accessed external parties by providing a wide portfolio of platform support and service. The fertilising capability allows Tencent to continuously create and improve platform services based on the needs of complementors. With a large number of customers and complementors attracted by the platform, Tencent used the morphing capability to keep improving its business model and integrate its resources. Thus, it continued to enrich and improve its product portfolio. Furthermore, the feedback loop in this stage also becomes more complex. One of the feedback loops is the customer-platform loop which shows the relationship established in stage 1 that customer feedback helps Tencent to create and improve its products. Another feedback loop is the customer-complementor-

platform loop, which refers to the process in which customers give feedback to complementors after using their products. Then, after analysing the customer data, complementors deliver more feedback to the platform. Finally, the platform would improve its support system and help complementors to improve their businesses depending on their feedback.

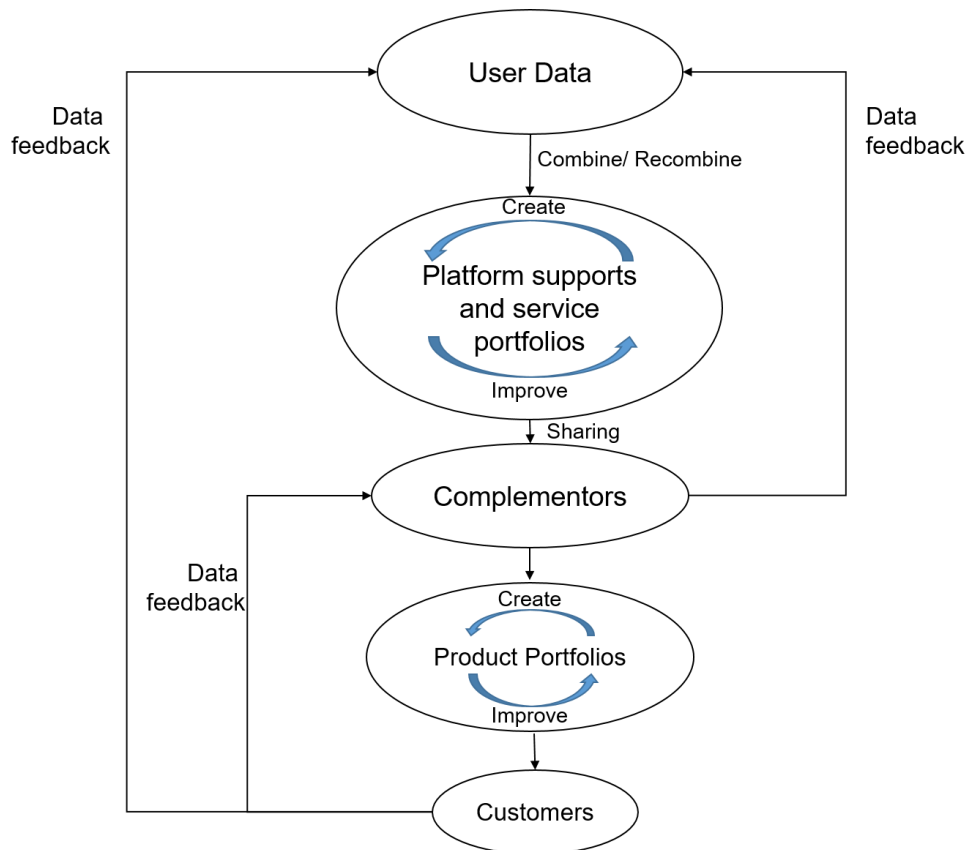


Figure 11 The Feedback Loop in Stage 2

2.3 Stage 3 Building a platform ecosystem to sustain the growth

2.3.1 Subdividing (or further accessing) (2017-2018)

As mentioned previously, before Tencent fully opened its platform, it held most of its business as self-developed and private-use; it had been running multiple products by itself for a while and realised that it was challenging to ace all areas. Starting in 2011, Tencent considered itself more of a platform operator rather than a product

provider. It began to gradually cut down its long product chains and let a wide range of outsiders who specialised in different areas enter its platform and develop products and services for customers. Then, with the success of opening up a series of platforms and constructing a healthy ecosystem, Tencent continued to attract more external partners to enlarge the business scale and grow the platform ecosystem. The subdividing capability refers to the capability for Tencent to collaborate with external players from different industries and seek to deepen the collaboration with each industry. At this stage, Tencent has already developed a mature ecosystem with many platform users and partnerships. Therefore, to continue to scale up, top managers needed to further explore and divide the market into more categories; so Tencent could have more collaborations and value co-creation opportunities. On the one hand, to encourage more entries, Tencent kept expanding its service portfolios. For example, it added financial support and launched a "10 billion" project to fund potential third-party developers. It also added more intelligent services that absorbed human intelligence from the top Chinese universities and built support teams to tutor third parties to develop products and businesses. Additionally, Tencent's platforms have a user-friendly application system where potential partners can easily apply for entry within a few minutes by following the direction on the website. On the other hand, Tencent continued to collaborate with more businesses from different industries to cover more areas, including online and offline businesses. In terms of online businesses, Tencent continued to enrich its partner portfolio. The partners were not only from different business areas but also played different roles, such as the developers, the operators or the tool developers. For example, the game business contains partners from the upper stream (content developers, technology developers); to the middle stream (programmers, picture beautifiers, launching activity designers, promoters) and the downstream (customer services, game-related product makers). In terms of offline businesses, Tencent has entered areas such as medicine and health care, college and university education, government management, dining and restaurant. It opened the platforms to traditional businesses and helped them exceed the digitalisation

process so they could operate more efficiently. For example, Tencent offers cloud technologies to help universities build a digital sharing system where students can register and upload their assignments and lecturers can share the slides, making the university more efficient. In the medical industry, Tencent offers digital services to build an online system where people can register and buy medicine through their smartphones.

The subdividing capability shows Tencent's passion for collaborating with complementors from as many industries as possible. To continue to scale the ecosystem, Tencent must seek to access to more external parties. This capability set the foundation for further development.

2.3.2 Cross-networking (2018-)

Cross-networking refers to the process of connecting heterogeneous resources to drive knowledge flows. Many businesses held by Tencent do not run in isolation. Instead, they are closely connecting and co-developing. Especially after 2016, when Tencent's cloud technology became more mature, it could do more complex algorithms involving a vast amount of data from different areas. However, the more areas Tencent entered, the more it realised how less it could do. Managers started to see the importance of connecting businesses in the ecosystem and letting related parties find each other and support each other's businesses. Tencent gradually started to "mix and match" its businesses to develop better products and services and benefit more from network effects.

For example, Tencent has business partners from literally every business area, such as the clothing industry, chain restaurants, the fast food industry and the cosmetic industry, all of which require different promoting services that target different customer groups. To solve the issue, Tencent encourages these businesses to connect directly with partners from the content industry (such as video, game and digital books application) through the advertisement platform. This platform uses its

extensive database, robust algorithms and stable infrastructure to facilitate cooperation between businesses and content providers.

Furthermore, the gaming business would require a robust payment system to develop a game and improve customer experiences fully. Therefore, Tencent connects third parties from the games area with its partners from financial areas to provide a smooth payment service. Meanwhile, Tencent could leverage the customer relation chain cultivated with its IM and social media businesses to promote the game. It means Tencent can promote a game by allowing customers to log in with their social media ID and share their gaming status on their social media pages. Also, the "IP" (Intellectual property) that has been successfully developed within a game could use the business from entertainment areas, and Tencent could produce film and TV shows based on the IP. Moreover, if the series of businesses become profitable, Tencent could also make game-related products and sell them through its e-commerce partners without building up a physical store. The point is that Tencent does not direct or lead the ecosystem; instead, it encourages direct interaction among the partners and lets them serve each other with their professional skills. As Pony Ma has been emphasising, the primary strategy of Tencent is "building a digital community". Tencent has been pursuing to be a good "connector" that connects businesses and services to extract value from the connections. In the digital ecosystem built up by Tencent, boundaries between different industries become blurry, and each actor in the system could reach out to good services provided by actors from other industries.

The cross-networking capability helps the ecosystem players of Tencent to grow even further. At this stage, what Tencent can accomplish becomes highly limited because complementors in the ecosystem are deeply subdivided, and they are doing a better job in their professional areas. Thus, Tencent decides to focus on "how to be a good platform" and connect different businesses in its ecosystem. The deeper these ecosystem players connect, the better Tencent's platforms function.

2.3.3 Self-organising (How AI supports self-organising) (2018-)

In the context of this research, I use the word—"self-organising" to describe the last stage of the forming process of the ecosystem. Self-organising means that the organisation is governed by a decentralised system. In other words, the organisation is running in a spontaneous order without the intervention of external force. In the case of Tencent, it has built up a relatively comprehensive system based on a diverse resource base, which allows external resources to enter and follow the system and result in considerable positive feedback.

During years of opening the platform and sharing resources, Tencent has improved its artificial intelligence (AI), cloud and big data technologies. More importantly, it has accumulated significant data about customers and businesses. The vast database and intelligent algorithm can immediately gain insights into the actors in the ecosystem to make simple judgments and respond to certain enquiries. Therefore, as long as the AI technology is appropriately programmed into the platform system, it facilitates effective information delivery and exchange. Hence, Tencent can operate its products and integrate business resources with less and less human effort.

As a matter of fact, it is difficult for Tencent to integrate its significant data and partnerships through human efforts, especially with a decentralised organising style. Meanwhile, AI technologies allow Tencent to continue to scale up its businesses. Many projects and platforms that involve a huge range of services, partnerships and businesses have adopted AI technology to cater for resource integrations. For example, platforms (QQ game, advertisement, WeChat) usually contain the functions of opening APIs, sharing technologies, designing solutions and matching services and partnerships. By now, AI technology can partly operate the functions with the power of big data and machine learning. Therefore the appliers can gain most of the help by using the self-applying system without accessing traditional customer services.

Another example to reflect self-organisation is the “Tencent WeStart” project. This project is developed to help start-up businesses grow and profit; it is separated into the kick-start stage, the entering stage, the developing stage and the rising stage. Each stage contains a series of services matching the needs of the specific business growth stage. For example, the first stage contains the services of finding small businesses a working space in a good location with an acceptable price. The second stage includes services of connecting start-ups to the business network; at the end, the outstanding ones would receive exclusive investments and training programs. Based on the developing process, Tencent provides essential technical support, financial services, online/offline business community support, platform infrastructure, database and human intelligence support to ensure positive feedback at the end of the process. The project involves the resources from many business sectors of Tencent, and each sector satisfies certain needs of the start-up businesses. *More importantly*, Tencent’s robust data system can make a quick and insightful judgement of the creditability and performance of a specific business and provide the support package they need. Thus, Tencent makes the most use of its resources to generate more resources and capabilities in the future. Additionally, the potential business starters can apply to join the project on the website and gain helps efficiently by following the guidance and process, and then spontaneously become a profitable part of Tencent.

In the third stage, Tencent already had a mature ecosystem and strived to develop it further. Tencent uses the subdividing capability to continue accessing more external parties and develop an enormously rich relational resource portfolio. Then, it endeavours to “mix and match” these businesses through cross-network effects and encourage different actors in the ecosystem to support each other. By analysing user data and using the AI system, Tencent can create and improve its resource portfolios and connect businesses more precisely. As reproduced in Figure 12, capabilities in this stage become even more complex, and it involves many components that need to improve and develop depending on the data feedback constantly. Apart from previously discussed feedback loops (the customer-platform

loop and the customer-complementor-platform loop), there is another loop: the complementor-relational-resource loop. It refers to the process of a platform using data feedback to connect businesses.

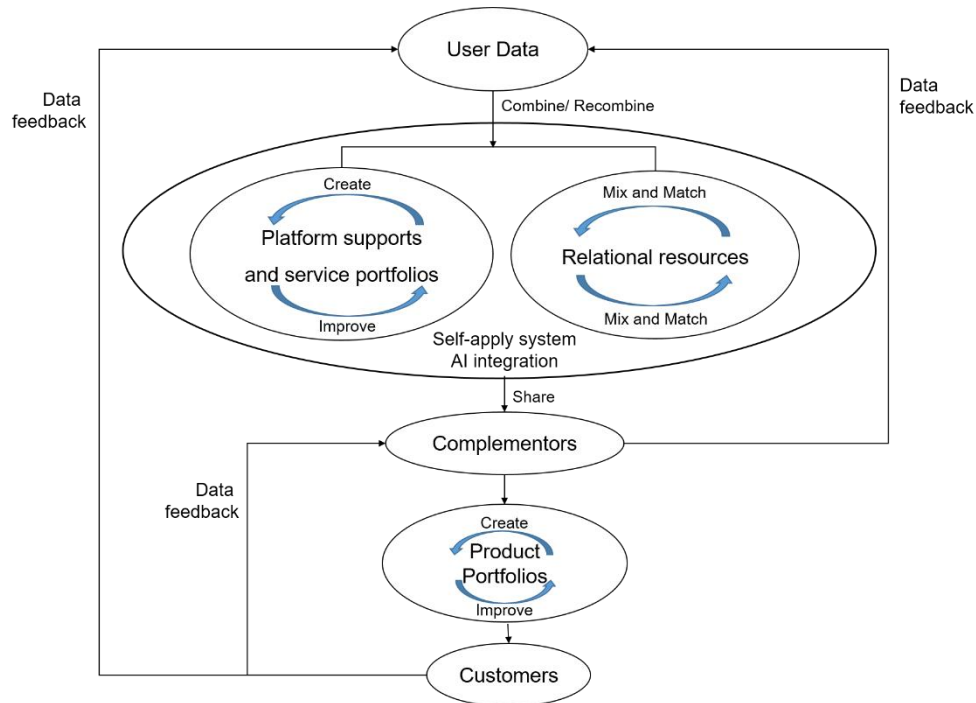


Figure 12 The Feedback Loop in Stage 3

Further elaboration and analysis: The existing body of research on resource management in the context of firm growth tends to adopt an introspective approach, attributing successful growth to the key resources and capabilities owned by an organisation (McKelvie and Wiklund 2010; DeSantola and Gulati 2017) and how these resources are coordinated within the firm. Departing from this literature, my observation of Tencent shows distinct approaches to reconfiguring resources that drive and sustain growth at the ecosystem level.

During the initial stage of platform development, the primary objective is to initiate a network effect and achieve critical mass through developing the platform portfolio. A platform organisation must leverage its limited resources to rapidly *attract* a critical mass of users by continuously *mining customer data* and *diversifying* its features and products. Assessing the effectiveness of *attracting capabilities* solely based on a snapshot from the initial stage would not reveal the true significance of eventual

changes. It is important to note that attracting is intentional and gradual in its effectiveness. Over time, a diverse set of ecosystem resources, connected through attracting capabilities, initiates and stimulates long-term network effects. Through a closer examination, I discovered that attracting possesses a dynamic attribute that allows for the repeated addition and connection of platform assets by discovering new and different ecosystem resources. This, in turn, provides diverse opportunities for creative resource reconfigurations. *Mining* is crucial as it enables the platform to learn from user-generated digital data and improve existing features while developing new ones. By harnessing the power of artificial intelligence, mining enhances the platform's ability to offer personalised and efficient services, ultimately improving the user experience (Gregory et al., 2020). Both *attracting* and *mining capabilities* facilitate the *diversifying capability*, which leads to the creation of new platform externalities that drive platform growth through indirect network effects and complementary goods (Danneels, 2008; McIntyre et al., 2021).

In the second stage of rapid growth, the resources accessed and capabilities manifested in the first stage become essential prerequisites for broadening the network scope and creating opportunities for novel resource reconfigurations. The customer base built during the initial stage stimulates further network effects, enabling the platform to access a wide range of complementor resources and capabilities by opening its Application Programming Interface (API). This action brings several positive outcomes. First, it expands the ecosystem's scope by inviting new external actors and resources through network effects. Second, it stimulates innovation and enhances network connectivity. *Accessing* more complementary resources allows Tencent to seize opportunities for novel innovations and sustain its competitive advantage (Sirmon et al., 2011). Third, a broader ecosystem improves data quantity and quality, enabling the platform to provide better user-centric design and tailored services. *Fertilizing* ecosystem resources is crucial because the value creation of a platform lies outside itself (Amit and Han, 2017). By nurturing these resources, the platform can deliver better complementary services to customers and enhance ecosystem performance, thereby fostering continued growth. Additionally,

in uncertain environments, *morphing* becomes vital as platform organisations need to constantly transform their product offerings, services, and organisational structures to compete in a rapidly evolving market (Adner and Helfat, 2003). The ability to effect continuous change and develop new capabilities is essential for driving growth.

By incorporating the new data, resources, capabilities, and organizational restructuring derived from the second stage, PBEFs can build *self-organized* ecosystems that enable them to continue scaling up. In the third stage, sustaining ecosystem growth relies heavily on three capabilities: *bio-diversification*, *cross-pollination*, and *self-organising*. *Bio-diversification* allows heterogeneous resources to form adaptive and interconnected networks, creating more opportunities for novel combinations. Cross-platform network effects further strengthen the lock-in effect, which is critical for ecosystem growth. This intertwined network connectivity provides the platform with ample data to strengthen its AI competency, enabling it to detect patterns, predict outcomes, and establish a self-organizing infrastructure for coordinating ecosystem-level resources.

3.0 Discussions and theoretical contributions

3.1 The interactive resource reconfiguration: reconceptualise dynamic capabilities to understand the evolution of a platform ecosystem

Most of the current dynamic capability literature tends to have discussions on a firm-level of resource reconfiguration, capability renewal and the internal mechanism of designing the system, routines and process (Teece, Pisano and Shuen 1997; Eisenhardt and Martin 2000). The firm and top managers are responsible for sensing, seizing and transforming the resource base. They are the most important agents of generating dynamic capability and evolving the organisation (Teece, Pisano and Shuen 1997; Teece 2007; Teece 2012). The majority of dynamic capability literature in entrepreneurship insists that the systematic remixing of the resource base is supposed to depend on the skills, knowledge and experience of top managers of the

firm, which developed in the past of problem-solving, routine designing and knowledge accumulation. Additionally, the research of Autio, George and Alexy (2011) also highlights the importance of managerial cognition for gaining competitive advantages; Zahra, Sapienza and Davidsson (2006) emphasise managers' crucial role in trial and error and improvisation.

On the other hand, this research reveals a different process for developing dynamic capabilities. Departing from the majority stance of the dynamic capability literature, which tends to insist on the "heroic" and dominant role of managers and the focal firms (Teece 2007; Teece 2012; Teece 2016; Eisenhardt and Martin 2000). My findings show that the value proposition of the digital platform organisation could be highly externalised rather than keeping resources controlled internally. The resource reconfiguration process in the platform ecosystem involves a large community. Members of the community are diverse, geographically dispersed and within a network that is consistently generating and attracting new participants through generative technologies. Issues and understandings of the market would gradually emerge during the back-and-forth interactions among the firm, complementors and customers, which would, in turn, guide the firm to take actions to reconfigure the resource base within the platform ecosystem. Thus, the ongoing and path-dependent interactions among different members could continuously fuel the dynamic capabilities development.

I provide multiple processual models to illustrate the constant growth of Tencent and the construction of its platform ecosystem. I separate the entire growth into three stages—1) setting up the foundation of the ecosystem 2) constructing the ecosystem and 3) continuing to develop the ecosystem. These models show complex and subtle patterns of resource reconfiguration and ecosystem development accomplished together by Tencent and its diverse ecosystem partnerships. By observing the underlying logic behind these models, I define the logic as “interactive resource reconfiguring” (also called “dialectic tuning”). I emphasise that dynamic capabilities in the context of digital platform organisation are no longer designed and created by the firm or top managers unilaterally in manager-led processes. Instead, the dynamic

capability is formed and re-formed during the dynamic interaction among the platform, complementors and customers. The dynamic capability would evolve as the conversation among different sides continues. The formation of new resource mixes is not architected by the platform but rather the product of the back-and-forth resource and information exchanges. Hence, my models show the special resource configurations of platform organisations co-created and co-developed by the firm and a diverse range of ecosystem parties. My logic of "dialectic tuning" exhibit the unique mechanism through which resources are constantly reshaped during interactions among multiple parties. Platform resources are in the state of continuous becoming rather than a carefully designed system or structure based on managers' profound understanding of the market and sophisticated intentions. The result leads us to view the highly complex connections and arrangements between a platform and its enormous amount of ecosystem partnerships, through which platform boundaries constantly shift. At the same time, new resources and capabilities are born, linked up, reformed and re-matched to evolve the ecosystem and better serve platform users. Again, I emphasise the importance of viewing the dynamic capability and resource management of the digital platform organisation ecosystem from a relational perspective and reveal the dynamism brought about by the interconnections between the platform and parties engaged in the ecosystem.

An increasing number of researchers are calling for more explorations of the unique mechanism for the platform organisation to leverage its resources and manoeuvre the challenges and opportunities (Helfat and Raubitschek 2018; Nambisan 2017; Nambisan, Siegel and Kenney 2018) by using the theoretical lens of dynamic capability (Zeng and Mackay 2018; Teece 2018; Helfat and Raubitschek 2018). Specifically, more and more scholars highlight the importance of investigating such an issue in the context of digital platform organisation (Amit and Han 2017; Nambisan, Siegel and Kenney 2018). This means that my research responds to the callings among strategic management academics (Chen, Donada and Perez 2017; Nambisan, Siegel and Kenney 2018; Parente, Geleilate and Rong 2018) by building

up those process models and illustrating the complex process of reconfiguring resources and developing dynamic capabilities.

3.2 Shifting from resource possession to resource sharing and versatility: the unique mechanism for grow a platform ecosystem

My research of the platform growth and the development of the platform ecosystem allows us to tap into the field of resource management literature, the discussions of which tend to be set under the dominant paradigm of the resource-based view that emphasises the possession and control of resources. The current theorisation still emphasises the valuable, rare, difficult to imitate and non-substituted (VRIN) framework (Barney 1991) and highlights the possession and identification of superior resources. Following the conceptualisation made by Penrose (1959), the resource-based view considers the nature of a firm as a bundle of resources so that the competitive advantage is generated by possessing heterogeneous resources (Barney 1991), which could also be understood as the view from an inside-out perspective. Rumelt (1984) and Wernerfelt (1984) further developed the view by proposing the "isolating mechanism", which secures the economic rents by creating a resource base that is difficult to imitate by competitors (Barney 1991; Rumelt 1991; Wernerfelt 1984). They focused on consolidating the possession and control over resources to lock them with the organisation for a longer time. The extant literature insists that owning an outstanding resource position enables the first-mover advantage of the firm in the market (Peteraf 1993) and allows the organisation to exploit unique growth opportunities (Alvarez and Busenitz 2001) and, thus, gain superiorities in the competition.

While I observe the complex process of firm growth, I realise that customer data is one of the most crucial resources exchanged around the ecosystem-related parties to drive the platform organisation's evolution. The database needs to be shared with different actors to actuate the development of understanding of the ecosystem and market, which would be put into action later. Platform owners would not try to control or isolate their database to achieve the resource-position barrier and eventually

obtain exclusive economic rent in the traditional sense (Wernerfelt 1984; Barney 1991; Rumelt 1991). Conversely, the platform database is considered a versatile resource orchestrated through sharing and exchanging among the platform, complementors and customers, which are further reformed and analysed to become more applicable to a diverse range of business usages. During the investigation, I whiteness the flow and recombination of the database and how data is applied to different actors for different kinds of use and development, which drive the platform's growth and carry on its evolution. One of my interviewees gave an example:

For example, I recently discovered certain valuable data points worth trying during data mining. Then, I would look at the specific data set, and I might decide to work with the other team to develop the business (based on the data). I will tell them what information I found in the process and determine whether it is what they already know. It could be a discovery if it differs from what they already have. If it is the same, it must be excavated again. (Team leader in the data analysis team of the commercial income department, Cloud and Smart Industries Group)

Example shows that data can be utilised by different actors in various ways, and a dataset could generate significant value when it is shared among different individuals. My research provides a unique perspective to view resources as not controlled by the focal firm and remain static. Instead, platform resources are dynamic and versatile, which means they could be put into multiple different usages and serve the growth of both the platform and the other ecosystem-related parties. The platform organisation could establish strong interdependence with its ecosystem partners by sharing resources and achieving co-developments and co-evolution.

Resource versatility and resource sharing make resource orchestrations in the context of the opening digital platform stand out from the traditional understanding of resource management and reconfigurations. Through studying approaches for Tencent to use dynamic capabilities to remix resources and drive the growth of the

platform ecosystem, I find that data inputs to the platform from the user side provide great facilitations to cognise the market and lead the resource orchestration. Meanwhile, sharing the database with the externals could enhance data communication, which leads to better configurations and cognitions. This discovery helps us address the arguments related to resource base theorisation, highlighting the sticky nature of resources and the externalisation of the resource value proposition (Priem, Butler, and Li 2013; Schmidt and Keil 2013). It is worth highlighting that a majority of researchers agree that the definitions of resource value and different source characteristics are very important to resource-related literature and understanding (Kraaijenbrink, Spender and Groen 2009; Leiblein 2011; Nason and Wiklund 2018; Schmidt and Keil 2013). Hence, I enrich this argument by studying the platform database and its unique characters (malleable, interactive, unconditionally shared) and ways of resource reconfiguration and orchestration. My conceptualisations of interactive resource reconfiguration, resource sharing and resource versatility highlight the emerging attention toward the demand-side perspective in strategic studies. Additionally, I respond to the callings to further unfold the theory of dynamic capability from an exogenous perspective (e.g., Priem, Butler, and Li 2013; Schmidt and Keil 2013).

3.3 Enriching the platform literature and understanding of complementarity

The outcome of this study enriches the extant platform literature, which discusses many different aspects, such as the growth of nascent platform (Schilling 2002; Clements and Ohashi 2005; Zhu and Iansiti 2012; Eisenmann 2006) and the design and governance of the platform organisation (e.g., Boudreau 2010; Baldwin and Clark 2006; Wareham et al. 2014). Extant studies largely recognise that the platform plays the role of a “hub” or a “broker” in the entire system (Teece 1986) and bares the responsibility of controlling and arranging complementarities and designing their entry and positions (Adner and Kapoor 2010). In other words, a platform is a dominator who designs the effective governance of the whole system; it lays down

rules of how its complementarities connect and function in the ecosystem (e.g., Huber, Kude and Dibbern 2017; Boudreau 2010).

Process models I build illustrate how a platform organisation orchestrates its resources and uses dynamic capabilities to construct and evolve its ecosystem while distributing the central power over ecosystem parties. Contrary to the traditional premise that considers platform leaders as the dominator of an ecosystem, my models show that a platform ecosystem is neither designed based on the leader's purpose nor entirely under the control of any focal actor. In fact, my interactive resource reconfiguration and resource versatility logic guide us to jump out of the box of "dominator-versus-follower" views and offers us a diversity of ways to think of how platform ecosystem resources are orchestrated and configured. Especially based on the research outcome of my study, I find two ways of managing platform resources highly convincing to us. The first approach is to use the data provided by platform users (complementors and customers) and the platform's data mining capability to guide the resource remixing. That is to say, the platform cannot have a full prediction of the plan for the future based on its experiences and profound vision because the next move is less predictable with so much central power being distributed to ecosystem parties. The platform would rather let the data feedback generated from platform users (after using products and services provided by the platform) guide its resource reconfiguration activities and form new capabilities. The process described by one of the managers at Tencent:

In the first stage of developing the Game Booster, I focus on user adoption to gauge interest in the capability. I analyse data such as the number of users, usage duration, frequency, and retention to assess its effectiveness. If users are actively trying and using the Booster, it indicates positive feedback. However, if users discontinue usage after a few attempts, it suggests the capability may not meet their needs, requiring optimisation. I also pay attention to the pricing aspect. If users abandon the purchase

process, I investigate alternative products they chose, such as free options. This helps me evaluate if the price of my product is perceived as high compared to free alternatives. I may also consider different pricing models, like monthly subscriptions, based on user preferences and willingness to pay. (Team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group)

The second way of orchestrating platform resources is to involve complementors in the process of co-transforming the resource base. As complementary assets are highly important resources for supporting the growth of the platform, the dynamic capability of a platform organisation is tightly intertwined and largely affected by the contributions made by ecosystem parties. Therefore, to evolve the platform organisation and maintain a healthy ecosystem, the organisation needs to navigate through the contributions from complementors and find a way to connect its resource base with ecosystem-level resources and facilitate the interdependence and co-development among resources from different sources in the ecosystem. In my case, the platform finds a way to benefit from the external parties while using its resources to support the further development of external parties. Tencent manages to deeply understand the needs of different complementors to evolve their self-interested yet platform-related business and provide multi-platform support to the externals to help them grow quicker and stronger. In the meantime, Tencent also forms a system to facilitate complementors to be mixed and matched, so their contributions can create more value through recombination. Tencent continues to improve its tools, services and system to tightly bundle different actors within the ecosystem and create an environment where complementors can grow together while benefiting the platform. Furthermore, Tencent also continues to evolve its platform based on feedback and contributions from complementors and continues to improve the ecosystem environment. As a result, my findings tell that platform capability development has an emergent and contingent nature, and it provides us with a fresh perspective to view platform development and resource orchestration. The platform is not

separated from the entire system; instead, it is a part that is deeply interconnected with other parts within the highly complex network (Parker and Van Alstyne 2018); a platform leader is obligated to figure out a way to co-evolve with the other parties. An increasing number of studies call for more understanding of the mechanism for digital platform organisations to manoeuvre and grow (Amit and Han 2017; Nambisan, et al. 2018). I respond to them by studying the resource reconfiguration of Tencent—the opening digital platform organisation.

3.4 The evolution of capabilities—the life cycle of the platform organisation's dynamic capability

Studies have suggested that dynamic capability shows a life cycle pattern as the organisation develops (Helfat and Peteraf 2003; Teece 2017). Dynamic capabilities show certain characteristics and patterns in different stages of firm development, such as founding, development and maturity (Helfat and Peteraf 2003). Nonetheless, these studies tend to have the underlying assumption that the management team dominates the evolutionary path of an organisation. In other words, executive teams decide which capability to develop based on the current endowment and which capability to create in the future.

My finding shows a different idea compared to extant research. The process model illustrates that ecosystem actors largely affect the evolution of dynamic capability in a platform organisation. The evolutionary journey of the platform ecosystem went through 3 stages, and each stage has its own set of dynamic capabilities. The first capability in each stage (attracting, accessing and subdividing capability) tends to focus on access to more external parties. These capabilities emphasise connections between the platform and the ecosystem player and function to build an initial collaborating relationship with them. Each stage's first capability is developed based on the resource and capability endowments of the current stage and what kind of connection could potentially facilitate the growth of an ecosystem. These capabilities are followed by capabilities (mining, fertilising and cross-networking capability) which focus on developing the partners that are freshly connected by the previous

capability. These capabilities help the external parties grow by mining their data, providing platform support and helping them connect to each other. To capture value from partnerships, the platform needs to understand the demands of platform users and reconfigure resources to help them develop. The last capability of each stage (diversifying, morphing and IA intelligent capability) is developed to integrate the ecosystem resources that are connected and cultivated by previous capabilities. As the previous capability already develops a strong resource base, the third capability functions to connect these resources by matching them and creating cross-platform effects to exert their value further. Each stage will not be completed and pass to the next stage without going through these three types of capability (reproduced in Figure 13).

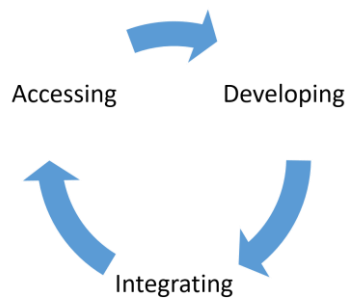


Figure 13 The life cycle of the platform organisation's dynamic capability

In addition, the dynamism of capability in each stage will rise to a certain level and hit a plateau. For example, suppose Tencent did not open its platform in the second stage and access to more ecosystem players. In that case, it might face the risk of lacking creativity and failing to develop more services and products. The extant dynamic capability might gradually become an obstacle for Tencent to develop further, and Tencent could face more and more critics from the market who accuse it of being a "copycat". The same logic applies to other stages. The platform needs

to constantly access, develop and integrate to create new resource dynamism to sustain the competitive advantage.

In terms of how I evaluate the dynamism and separate stages. I would like to highlight that it is true that even during the transition from one stage to another, Tencent continued to grow rapidly in terms of complexity and scope. For example, despite the strained relationships with other companies in the industry, Tencent's stock price broke through HK\$176.5 in January 2010, reaching a market capitalisation of HK\$250 billion. It surpassed Yahoo in one fell swoop and became the world's third-largest internet company after Google and Amazon (Tencent biography 2018, Chapter 13). Therefore, despite facing significant problems due to its strategy, Tencent continued to grow. Thus, I suggest that it may not be solely attributed to complexity or scope. I would like to supplement these two perspectives by introducing the perspective of "the emergence of the core rigid." As mentioned in the literature review, when a capability or routine lacks dynamism, it can eventually become a "core rigid" and hinder the organisation's growth (Leonard-Barton 1992; Danneels 2010). Particularly in the context of dynamic capabilities, which emphasise an evolutionary view and long-term growth, a capability and strategy would exhibit limitations when rigidity starts to appear. This indicates the need for improvement, renewal, and reconfiguration. Taking Tencent as an example, although it continued to experience rapid growth in 2010, it had already developed strained relationships with almost the entire industry due to its attempts to dominate the market and replicate other companies' innovations. I consider this the point at which the "core rigidity" emerged. In fact, the severe "3Q war" occurred later in 2010, significantly damaging Tencent's profitability and reputation. As a result, its dynamism was already compromised and unable to sustain long-term growth. Therefore, I consider 2010 as a stage for change and progression towards the next stage. This is my approach to evaluate the dynamism and separate stages.

My models reproduced in Figures 10-12 also show that the dynamic capability in the next stage is more sophisticated and higher in dynamism compared to the previous one. By comparing these three models, I realise that the number of dynamic

components which need to be developed and improved constantly based on the data feedback would rise every time the ecosystem develops to a more mature stage. As the ecosystem becomes more mature and involves more external parties, the dynamism of capability goes higher until it reaches a plateau, as previously mentioned. Then, the organisation would need to consider if it will further access to more external parties and continue to develop the resource dynamism or adopt the replication strategy and face the risk of lacking changes (reproduced in Figure 14).

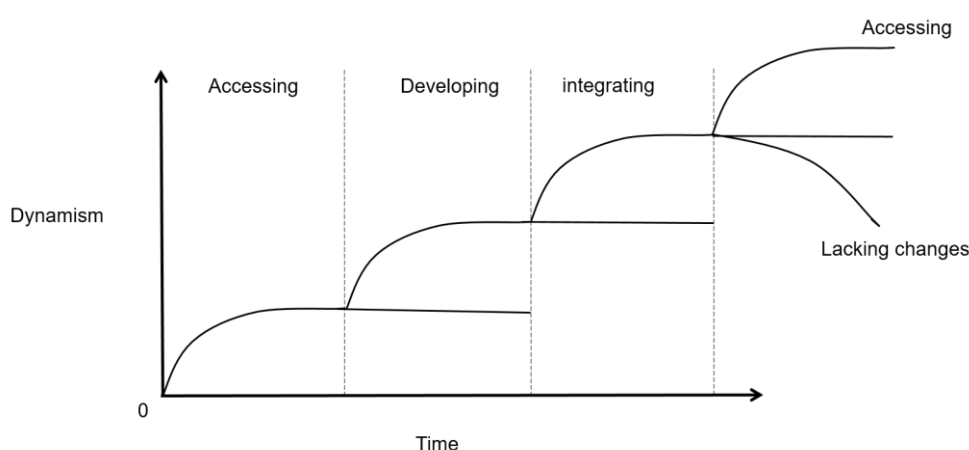


Figure 14 The life cycle of the platform organisation's dynamic capability 2

Using an in-depth historical case study of Tencent, I deeply unfold the process for a platform-based entrepreneurial firm to build its ecosystem by leveraging and sharing its resources and co-creating the ecosystem with external parties. After developing multiple models that reflect the unique pattern of "interactive resource reconfiguring", I reveal how Tencent evolved its platform resource base and sustained the ecosystem's growth. Hence, I submit the argument that dynamic capabilities are highly malleable and emergent, which would be shaped and reshaped during the interaction between the platform and its complementors. In other words, instead of being controlled and designed by the focal firm and the top-executive team, the platform ecosystem is co-created by the platform's internal and external members. The platform would continue to evolve and change while members connect and interact. Thus, I enrich the extant dynamic capability theory on an ecosystem level

and contribute to the platform ecosystem literature by producing detailed explanations and storylines.

3.5 Additional explanation of the research perspective of this case

I would like to emphasise that by proposing ecosystem-level dynamism, I did not mean to claim that the top team no longer controls anything. I believe it is risky to state anything that would significantly depreciate the role of top managers in organisational strategy. I would even like to highlight that top managers' decisions still lay down the core of the organisational strategy, even in the open digital platform ecosystem. What I want to emphasise in my dissertation is that under the issue of demand-side economy, loose(d) leadership, incomplete organisational design, and ecosystem-level dynamism, it is important for top managers to incorporate external autonomous actors and the resource base into the decision-making process. I have a greater focus on the interactive process rather than the one-sided decision-making process. It would be more precise to state that my research is using the outside-in perspective to enrich the inside-out perspective. Therefore, top managers still have control but partially lose control by incorporating external actors and letting them engage in the reconfiguration of the resource base through interaction.

Furthermore, my dissertation indeed has plenty of discussions regarding the orchestration of resources and capabilities from the platform ecosystem by the platform leader. However, I consider them to be slightly more than just resources and ordinary capabilities. I believe it goes beyond that. As I explained in the case, the platform leader, to a certain extent, needs to rely on the autonomous efforts of external parties. The platform organisation requires data feedback from ecosystem players after they conduct their innovation and bring it to the market. Additionally, the focal firm needs to constantly interact and share resources with external parties to stimulate more innovation and receive ongoing data feedback. Therefore, the platform also relies on the capabilities of external parties to continuously engage in product development and innovation. In this case, it goes beyond ordinary capabilities from the outside; it could be described as more complex or at a higher

level. Nonetheless, the most important point is the interaction, innovation, and continuous emergence of understanding throughout the process.

Case study 2: Reconceptualising the micro-foundations of dynamic capabilities in a digital platform organisation through investigating the managerial system.

1.0 Introduction

While the dynamic capability (DC) theory is essentially established to sustain competitive advantages, it has been criticised for lacking explanations for fuelling continuous changes, especially in the fast-changing environment (Salvato and Vassolo 2017). Thus far, a majority of studies embed the DC in the organisational routines as firm-level "rules" that generate dynamism through repetitive reconfiguration and systematic remodelling of extant routines (Obstfeld 2012), which is suggested to be naturally path-dependent (Teece 2007; Eisenhardt and Martin 2000). Meanwhile, studies largely attribute the formation and modification of routines to the strategic change decided by top-tier individuals (Pandza and Thorpe 2009; Winter 2003; Biesenthal, Gudergan and Ambrosini 2019; Helfat et al. 2007). We have a few explanations of internal activities conducted by different agencies that create changes and alterations within routines (Salvato and Vassolo 2017).

Several studies have acknowledged that the *path-dependent* nature of dynamic capabilities can hinder the development of new routines and strategies. They argue that routines are path-dependent in that they are shaped by asset position, path available and managerial experiences (Zollo and Winter 2002; Teece 2007; Miller, Pentland and Choi 2012). Such a definition gives high credit to the experience of an organisation. However, DC studies are pointing out that the environment represented by high-tech companies, information and software businesses tends to change rapidly (Teece 2007) and cause high-level uncertainty (Eisenhardt and Martin 2000; Garud, Jain and Tuertscher 2008). In such a context, studies have been expressing worries about that letting the memories of the past intrude on the rapidly

changing future (Schon 1983; Garud, Kumaraswamy and Karnøe 2010; Tripsas and Gavetti 2000; Vergne and Durand 2011; Miller, Pentland and Choi 2012). Routines can become "*trapped*" by relying heavily on the experiences and knowledge of a specific group (top managers), thus overlooking incremental changes within routines (Tripsas and Gavetti 2000; Vergne and Durand 2011; Miller, Pentland and Choi 2012). Given the current definition of routines, studies argue that it might apply better to a more stable environment (Eisenhardt and Martin 2000). Nevertheless, this can lead to outdated routines and inflexibility in rapidly changing environments. However, this issue has not been thoroughly addressed in the literature, posing a challenge for dynamic capability theory to explain how routines adapt in highly uncertain environments.

Such a limitation is salient in the context of digital platform organisation (DPO), which often endows the nature of constant morphing and generativity, especially in China. The blueprint of a DPO might not present a clear future and relies on incremental changes and iterations (Li 2021). Hence, the organisational routine for DPO needs to change continuously and reactively to cope with the uncertainty (Helfat and Raubitschek 2018) and highly fluctuating environment (Zeng and Mackay 2018; Helfat and Raubitschek 2000; Teece 2018). Therefore, the extant DC theory is insufficient to explain the unique mechanism of DPO, and I urgently need to unpack the dynamism of routines further to achieve more understanding.

Noticing the issue, it has been argued by many studies that routines that construct dynamic capabilities could incorporate a lot more complex mechanisms than what is currently defined (Obstfeld 2012; Salvato and Vassolo 2017). Especially for those organisations that face high uncertainties, we need to shift the focus from the idiosyncratic organisational routine to actions behind the creation and discovery of new opportunities, the concept of which is represented by the dynamic capability (Helfat and Peteraf 2003; Adner and Helfat 2003; Helfat and Martin 2015). Although there have been some discussions on the performative nature of organisational routines, which focus on the actions and enactments involved, I argue that these discussions have not been adequately explored in the existing literature. Scholars

have called for a deeper understanding of the performative aspect of routines, highlighting the need for more research on how creative activities occur within routines (Wenzel, Danner-Schröder, and Spee 2020; Sargis-Roussel, Belmondo, and Deltour 2016). Furthermore, researchers have emphasised the importance of comprehending the performative aspect of routines in order to gain insights into their dynamics (Salvato and Vassolo, 2017; Felin, Foss, Heimeriks, and Madsen, 2012).

The *managerial system view* offers a conceptual framework that recognises the interconnected nature of managerial processes within an organisation. By considering managerial activities as a series of interacting activities across multiple processes, we can better understand how dynamic capabilities are developed and maintained in response to market changes. While the managerial system view highlights the importance of managerial processes and their interconnectedness, there is still a need for further exploration of dynamic capabilities. Current literature predominantly focuses on the top management perspective and the firm-level routines, often overlooking the contributions and perspectives of lower-level agents who are closer to real-time issues and local contexts. This gap in research limits our understanding of how dynamic capabilities unfold within digital platform organisations. Therefore, scholars have called for additional investigations into the interconnections among different activities and individuals within organisations to gain deeper insights into dynamic capabilities and how they sustain their dynamism. By examining the interactions and shared managerial activities across various levels, including middle managers and lower-level employees, we can uncover the mechanisms through which capabilities are renewed and leveraged to respond to environmental changes effectively. By addressing these research gaps and adopting the managerial system view, we can enrich our understanding of dynamic capabilities in the context of digital platform organisations and shed light on the intricate interplay between managerial processes, activities, and organisational performance.

The dynamic capability of a digital platform organisation can benefit from further enrichment by the managerial system perspective for at least two reasons. Firstly,

existing dynamic capability theories primarily focus on firm-level routines, considering routines as predetermined activities to solve problems (Wilden and Gudergan 2015; Huang et al. 2013; Pavlou and El Sawy 2011; Gebauer et al. 2012; Koufteros et al. 2014). However, these theories often overlook the deployment and variation of capabilities in different business conditions, such as different projects or participants (Biesenthal, Gudergan, and Ambrosini 2019). In the context of a digital platform, which operates with high levels of variation and flexibility due to its generative nature, routine dynamics are shaped by the diverse contributions from the ecosystem (Zittrain 2008). Each contributor brings their own perspective on the problems and opportunities (Garud, Jain, and Tuertscher 2008). As a result, routines must be constantly reshaped and redefined to adapt to the evolving situation. Therefore, explaining the capability dynamism of a digital platform organisation requires more than focusing on the organisational "rules." It necessitates a deeper understanding of intentional actions by different actors that contribute to capability renewal (Garud, Kumaraswamy, and Karnøe 2010; Biesenthal, Gudergan, and Ambrosini 2019). The managerial system view offers a valuable theoretical framework for investigating the interconnections among managerial processes and how managers integrate various activities to foster routine and resource dynamism within a digital platform organisation. This perspective recognises the significance of going beyond top-level decisions and explores the intricate ways in which managers coordinate and leverage diverse activities to drive organisational dynamics in the context of a digital platform. By examining the managerial system, we can gain insights into how managers navigate the complexity and uncertainty inherent in the platform environment, enabling the continuous renewal of capabilities and adaptation to emerging threats and opportunities.

Second, a majority of dynamic capabilities (DC) studies have focused on a top-management perspective, where senior managers lead the process of designing organisational routines (Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). This perspective suggests a direct connection between top-management activities and firm-level results, often

overlooking the role of lower-level agents responsible for real-time issues (Salvato 2009). However, in a digital platform organisation operating under an open business model, centralised authority over external parties is relinquished, leading to high information asymmetry between local conditions and top-level members. This creates a situation where top managers' knowledge and capabilities are insufficient for solving various local issues (Noda and Collis 2001; Guth and MacMillan 1986; Wooldridge et al. 2008). Unlike traditional organisations, digital platforms rely less on top-management decisions (Ciborra et al. 2001) and more on the contributions of lower-level employees who are positioned closer to real-time problems. The lack of attention given to these lower-level individuals in DC theory makes it insufficient to explain the dynamism of digital platforms. The managerial system view provides a theoretical perspective that examines activities responding to market changes as a complex system involving multiple processes and diverse agencies. Consequently, this viewpoint aligns with my previous arguments and serves as a valuable theoretical framework for organising my argument coherently. It also assists me in effectively addressing the research question by providing a logical flow to my analysis.

We observe the managerial system within an organisation using the middle manager's perspective. Filling up the missing perspective, middle managers are more directly exposed to local issues (Natarajan, Mahmood, and Mitchell 2019) and have more opportunities to discover opportunities and threats from the environment, championing them to the top managers (Baron 1995; Kanter 1982; Dutton, Ashford, and O'Neill 1997). By mediating between different levels, they connect top-level decisions to lower-level problem-solving activities (Wooldridge, Schmidt, and Floyd 2008; Jelinek and Schoonhoven 1990; Bower 1982; Noda and Bower 1996). Therefore, their managerial actions and capabilities help us understand how capabilities are renewed in a digital platform organisation and how different activities and individuals are connected through shared managerial activities.

2.0 Findings

Tencent is famous for its fast speed of reacting to market changes and customer demands. Said the director of the China information technology and network economy office—Qiping Jiang:

Tencent is a typical customer-centred company. Its core value is extracted from getting closer and closer to its customers. (Qiping Jiang, guest in 2013 CCTV Interview with Huateng Ma)

In the findings sections, I will elaborate on how Tencent adaptively reacts to external changes and manages to "get closer and closer with its customers". This section is divided into two parts. The first part shows the general change-reaction process respectively on the front-line individual, organisation, and middle manager levels. This part shows how employees at different levels within Tencent take actions to react to external changes and how their reaction processes interplay with each other organically and efficiently. It is important to elaborate the reaction process on different levels because it illustrates an overall operational strategy within the organisation and the unique role of middle managers, thus, setting a base for a deep understanding of the following part. The second part focus on unpacking the routine of middle managers at Tencent. I develop a 4-step process model to elaborate on how middle managers play their role in establishing new projects and thus contribute to the organisation's dynamic capability and timely reaction to external changes.

2.1 The general internal process of reacting to the market change.

In Tencent, there are mainly two types of approaches to reacting to market changes: the *top-to-bottom* approach and the *bottom-to-top* approach. Within the top-to-bottom approach, the change is initiated by a top manager (in the form of organisational-level strategic change) or a middle manager (project change/project creation). Any front-line employee could initiate the bottom-to-top change. This

section will carefully illustrate these two types of processes and offer an overall picture of the micro foundation for Tencent to react to external changes.

2.1.1 The bottom-to-top approach for reacting to market changes.

In Tencent, front-line individuals are highly empowered and can react to a market opportunity independently. There are mainly two ways to react to changes 1) initiating a new project; 2) finding a way to improve an extant project. Despite which approach they decide to take, the rationality of making changes is the emerging market trend.

The fact is that we are not the "creator of the world". Most of the time, something emerges in the market, and then I seek collaborations with collaborators who are more mature. For example, when they (front-line individuals) are doing projects of advertisement, they proposed that maybe I should try something in the novel-content business, which might provide some cash-ability. Meanwhile, they found themselves having a little extra energy while operating the extant project and wanted to try it. Everyone would like to try something new to see if there are new directions in a new area, and they will use a certain amount of data flow to do experiments in the area. (Team leader in the investment team, Tencent Platform and Content Group)

After a front-line employee detects an opportunity and decides to make changes to it, they have almost full autonomy to *plan and design the project and develop solutions*. In an ideal setting, the whole process of reacting to change could have limited interference by middle managers.

I would not force them to have any large-scale adjustments because front-line employees are highly dynamic and empowered. For example, if he/she wants to do a new business,

he/she can do it with a free hand, as long as the business is valuable and he/she has the energy to experiment with it. If he/she thought the objective was too high, I could discuss that together. If I thought it was okay, whereas he/she thought it was too high, then maybe you have issues with resources, power and methods. Conversely, if he/she thought the objective was acceptable, he/she could do it by himself/herself. (Team leader in the product team of the to-B department, Tencent Corporate Development Group)

Designing a project includes designing what the product/service is, how the product/service is, how it would profit, deciding whom to talk to and collaborate with, and writing a business proposal. When a front-line individual reports a new project to a manager, it should be more than a business/technology idea but a complete proposal and plan, in an even better situation, with tested results. Then, to further push forward the plan, front-line individuals need to *integrate resources* for the initial execution of a plan. According to most interviewees, human resources are the most critical resource to integrate.

For example, since I focus on commercialisation, I need to collaborate with the basic-product team, the operation team, the development team and the designing team. Meanwhile, the development team could be constituted into different small teams. I need to communicate with many different teams. I also need to collaborate with cooperation channels. (e.g.) If you are doing advertisement-related projects, you must communicate with certain advertising channels such as Tencent Advertisement Platform and myapp.com. If you are doing the game combined operation, you need to communicate with people in gaming businesses. If you are doing VIP membership, you need to collaborate with the capability provider or my data middle platform. (Team leader in the to-B product team of the commercialisation department, Cloud and Smart Industries Group)

An individual employee needs to communicate with different professionals within and external Tencent to obtain help and capabilities. More than one front-line interviewee mentioned that they need to figure out how to gain support from other professionals by themselves. They need to either use a strong business proposal to showcase their projects' value or get closer to other professionals to become business friends and gain their trust and support. The idea is that a front-line individual must have the spirit of "*being a master*" of the project, which means he/she needs to try everything to fuel the project before asking for help from manager-levels. The resource integration process is often challenging throughout the whole project development process. Thus, a successful project would bring value to the individual and expand his/her relation network and personal resource pool, which could facilitate the development of more projects. The following steps are *Testing—Proving—Reviewing*, whereby front-line employees test their resources and plan to see if the initial idea is to collect or not, and more importantly, proving to their partners that the project is profitable. If the project is proven to be potentially feasible, they need to review and detect what issues should be refined in the next stage. The key to testing the project is to do "*small things*" and "*move quickly*" because resources and time for individuals are limited, so they have to "*sufficiently prove their project with the smallest amount of resource*". The small test could be quickly developing a small demo, channelling a small amount of data flow to the product/service or putting the product/service on a small platform to test customer reactions.

You need to figure out how to prove to your partners very quickly that you are the best. This is one of the critical points of working at Tencent. Otherwise, it is difficult for you to integrate increasing resources (for your project). (Director in the income team of to B department, Cloud and Smart Industries Group)

Usually, the three main actions in this stage do not work in a linear approach but rather in a loop. Often, a project might not pass the initial test because the result is terrible or manager-level employees dislike the project. In this case, if the employee

is confident significant about the project and willing to try it again, he/she would seek help from middle managers, review the whole process, and allocate the key issue together. Then, they quickly make changes and go through the process again until the project is proven and recognised. The key to surviving the testing is the project initiator's (the front-line individual) faith in the project and his/her capabilities to define issues and persuade the middle manager to help him/her. The following steps are *refinement* and *further development*, which involves continuous actions of improving and developing the project. Projects must be constantly developed by repeating the previous steps, and front-line employees must continuously report to middle managers and assure their collaborators inside and outside the organisation. Competitors and market changes would constantly challenge the project, so it will be cancelled or paused whenever it performs poorly. When a project's profitability or capacity achieves a considerable level, it will be *adopted* by managers and become an officially established project in Tencent.

I want to call this individual reaction process the "Basic Individual Reaction Process" (BIRP, more explanations in Table 5). The BIRP shows that 1) front-line individuals are highly autonomous; they are responsible for reacting to the local market change by taking actions independently and have less direct interference by managers. 2) Front-line employees can directly connect with the market and collaborators, so their performance and project outcomes give relatively precise information about the market and issues. 3) Since the BIRP is complex and highly iterative, the result and feedback shown by the project tend to be more accurate and precisely reflect the market demand. 4) Each stand for a comprehensive and independent resource pool.

Order No.	Activity types	Activity descriptions	Examples
1	Detecting an opportunity	When a new trend emerges in the market or the top-management team announces a new strategic direction, the front-line individuals are encouraged to find opportunities under the change and create an efficient approach to achieve their own KPI, thus contributing to the team and organisation.	The executor of the specific part of a project (initiates the innovation), we (middle managers) are not the initiator of everything. When a trend emerges in the market, we need to collaborate with some of the mature business partners in the market and conduct small experiments and innovations. Therefore, for example, when they (front-line individuals) are doing the advertisement business, they find good opportunities in the content industry, which shows the good potential of cashability. Meanwhile, they find themselves having spare time to try this business. Everyone wants to try something new, find new directions in different areas, and use a certain amount of data to test if it works. (MM in the to-B project team of the income department, CSIG Tencent)
2	Planning and designing the project and developing solutions	Front-line individuals need to decide how they are going to do the innovation and how they are going to solve the issues independently.	...in the weekly meeting, team members will present the data, which reflects what they have done in a week, which means they have already made the decision (on how to do the project); they simply report to me. They would tell me (for example) that they have tested it and launched a 3-yuan coupon, and customers are more willing to pay for the service, and then they will be doing some further experiments. (MM in the to-C project team of the income department, CSIG Tencent)
3	Integrating resources for the project	Front-line individuals can access certain resources and integrate the resources to execute the innovation.	When they want to do the innovation, they must persuade their collaborators because it requires development and testing resources. They need a collaborator who has collaborated with them many times to do this experiment. This really needs the person to have a strong capability (to get the resource they need). (MM in the to-C project team of the income department, CSIG Tencent)
4	Testing-proving-reviewing	With the resource, the individual needs to do multiple quick and small tests and prove to everyone that the idea is feasible.	They will try to prove it to me. They need to test it and show me the result to prove whether this direction is correct. The data shows us the business efficiency (of the project). For example, if we match 100K ad impressions to a small ad position, how much income would it create for me? Also, when compared with other models, does the income increase or decrease? They need to prove it to me. (MM in the to-C project team of the income department, CSIG Tencent)
5	Refinement, modification or cancelling	Developing the innovation further and detecting issues during the development.	They will detect some problems during the execution, and we will encourage them to do small experiments, but when they realise that the direction has issues, they will stop doing this and try other things. (GM of the income department, CSIG Tencent)
6	Further development of the project (repeating 2, 3, 4)	Continue to refine and iterate the project until it reaches the ceiling.	During the project, we need to constantly review what we did, constantly refine the project and continuously integrate more resources. Thus, we increase the income. That is pretty much what we do on a daily base. (MM in the product department, PCG Tencent)
7	The project becomes a team-level or organisational-level project	The project becomes so significant that it is adopted by the team or higher-level members and becomes a permanent project.	In the end, they established an independent project team with 50 million (RMB) income per year. The whole project is based on their idea. (MM in the product department, PCG Tencent)

Table 5 The Basic Individual Reaction Process (BIRP)

2.1.2 The top-to-bottom approach for reacting to market changes.

The top-to-bottom reaction approach refers to the changes initiated by the top and middle managers, which is a crucial part of adaptive reactions. The top-to-bottom reaction process also starts with detecting a market change. However, the change detected by managers tends to be broader and more abstract (e.g. a new business area which would be popular next year, the development of the industry, the direction of market change). A single project or solution cannot solve such changes; instead, they could require strategic-level changes that integrate the efforts of a whole organisation or department. Plans for this type of change are often long term ranging from a couple of months to a year. In this case, managers tend to initiate a *new*

direction instead of a new project. The direction initiated by managers could be relatively vague in that it does not indicate a straightforward project or a specific objective; it could simply stand for a general goal (e.g. gross income, market share) in a particular business area or industry.

For example, I had a rights-and-interests platform, which I believed had a promising future. However, at that time, I did not have the human resource, capability and experience to do it...meanwhile, I believed this would be my priority after over half a year. Therefore, I told everyone (in my team) to start to observe how this kind of business works and have small experiments in this area to accumulate experience and operational skills. Also, everyone should have a clear idea of my resource and capability advantages in this business area...after over half a year...I started to use my capabilities to do it. (Director in the income team of to B department, Cloud and Smart Industries Group)

When top managers initiate a direction, middle managers need to break down the direction into specific and small directions which suit their teams (see more examples in Table 6); the direction would be delivered in a level-by-level "*net structure*". Then, under the direction, front-line individuals need to do experiments to test and understand the direction and develop concrete projects to contribute. Thereby the BIRP comes into play again. Front-line individuals need to do experiments under the direction to see if the direction is correct or not. Feedback on BIRP would be delivered to managers in a level-by-level "*reversed net structure*". If experiments fail multiple times, the direction could be unfeasible and must be re-directed by managers. Also, by putting the direction into concrete practices and projects, front-line individuals give specific meanings to the direction and make the direction become clearer and more profitable.

I might be able to predict 70%-80% of the issue. There might be some environmental issues, resource issues...I must go on and do concrete things, and after this, I will be able to see the issue so I can understand if the direction is feasible or not. The primary thing is to experiment with it. (Middle manager in the technology department in PCG—Tencent)

The direction is highly malleable and emergent, which managers could *modify, continue and cancel* depending on *feedback* from lower-level employees (process reproduced in Figures 15 and 16). A general strategic direction initiated by top managers could be modified every half a year by top managers; the team-level and project-level direction could be modified frequently from time to time by middle managers.

If you look at the records, you can see many small changes in Tencent. I can see that I did Todayfocus.cn for a while, then I stopped doing it, saw things like TikTok, and started to do things like this. My teams go through these changes all the time; it happens fast...The change is too significant. (Director in the income department in CSIG—Tencent)

Figures 15 and 16 show that managerial processes heavily connect with BIRPs. According to the structure of the models, BIRPs form a foundation for managers' direction and modification. This means managers do not dominate the reaction process; they only make directional decisions and leave significant space for creation and experimentation. They make changes depending on quick feedback from the front lines.

The organisation might not have a clear idea of what to do next or even have no idea. Because the internet business develops extremely fast that a small market trend emerges quickly and dies quickly, the organisation can no longer have in-depth

Initiator	Examples
Top managers	1. (The income target) could be broken down level by level...(for example) the top-management team decides that the whole department should achieve n*100 million of income. Then this target breaks down into n*10 million income in the gaming line, n*10 million in the advertisement line, and n*10million in the value-adding service line. Then, the target would be further broken down by the teams. For example, the gaming team need to decide how much Tencent games should earn, how much non-Tencent games should earn, and how much the other small games should earn. Eventually, the target will break down to each front-line employee, and everyone needs to check the target and ensure it can be achieved. (MM in the income department, CSIG Tencent) 2. ...it is a directional thing, as for how to do it, at the time of the year we actually do not know what to do, it could be direction 1, 2 or 3...every front-line individual has to do some exploration. (GM in the income department, CSIG Tencent) 3. Top levels usually will not give a specific objective to achieve when they announce the direction. Usually, they will provide a direction and let you do all of the experiment to test if the direction is correct or not, and you need to report to them. They might decide the general thing to do, but in terms of how to do it, we need to break it further down, discuss it with everyone, and eventually establish something concrete. We need to communicate with the top levels constantly. (MM in the product department, PCG Tencent)
Middle managers	1.personally, I would give them a general direction. For example, we might not do the value-adding thing at this stage; instead, we want to develop more functions and advantages. I would assign it to about 2 members...after deciding the specific direction and having an overall thought, we do further customer surveys and develop about 5 functions. Then, we pick one function out of the five...and start to write the demand report and do all the specific tasks. We pass the demand to the development team and choose a time to launch after the evaluation. After launching, we will track the result, review the project, and conduct further iterations. (MM in the product department, PCG Tencent) 2. I think managers at Tencent have this characteristic. We need to be highly professional in our area and give our subordinates a direction. The direction should be a high-potential thing in the market. We also need to know how this thing should be improved. We are the establisher of the overall direction and structure. Then, every front-line team member needs to design how to do this. They need to find ways to operate and refine their module. (MM in the to B product department, CSIG Tencent) 3. People in different roles will report to me. I will receive feedback on resource input and feedback on output. It is actually easy to see whether we should continue or cancel the direction after running it for a while. I would need to communicate with different members constantly. It is not a direct decision-making process. It is a process of mutually persuading. (GM in the to B product department, CSIG Tencent)

Table 6 Examples of the top-to-bottom reaction process

2.2 Middle managers' routine for developing new projects.

2.2.1 Middle managers' routine

The previous section highlights the foundational position of BIRP and points out that managers' function in Tencent is to direct the project depending on the result and feedback of BIRP. While the last section shows certain unique themes, such as "*directional*" and "*flexible*" managers' roles, in this section, I provide more detailed elaboration and data to illustrate the actions and routines of middle managers.

I find that middle managers' ultimate responsibility is to bring dynamism to their team by facilitating *1) new ideas to experiment with; 2) new projects to be established*. Therefore, in this section, I try to follow the logic of developing a project. Through this logic, I observe how middle managers direct the project and how they facilitate developing a good project.

2.2.1.1 Matching—finding the right people to do the right things.

As the founder and CEO of Tencent—Huangteng Ma emphasised that:

Companies do not compete through capital and data flow in today's market. Instead, I compete through my teams, the sense of mission and crisis. (Online article written by Huangteng Ma, on <https://blog.csdn.net/> the sentence is the title)

Since front-line employees are proven to be very important in developing projects, it is equally important for middle managers to “*match the right people to the right thing*” so team members would have more passion and work in a valuable area. The *matching* activity often contains two steps: cultivating employees with solid capabilities and knowledge of multi-area; matching them with suitable jobs (right people). The second step is to identify the market trend and match the team structure with the market trend (right thing).

First, when middle managers in Tencent try to train front-line employees for their team, they often assign their team members to a series of tasks and let them practise skills and accumulate resources and experiences while solving problems. A front-line employee will encounter variant issues and approach different teams during the process, which helps them to develop their capabilities and social network within the organisation. While communicating with different people, employees will develop a comprehensive understanding of a project and become familiar with how their team do business.

...demands come from many different modules at the same time. For example, in terms of stock data, I might not know which dimension to analyse. I can consult the colleague who is responsible for this module within Tencent. I often talk to them directly and listen to their advice. (Intern data analyst in Financial Application Line and Basic Payment Platform of Financial Products Department, Tencent Corporate Development Group)

Additionally, front-line employees would find their preferences of directions and positions within the team as they realise their potential capabilities and which area interests them.

...letting more team members participate in developing the project plan..., which shows them how things are executed and broken down. Then, let every member express the direction of his/her interests. For example, the employee finds direction A or direction B attractive, and then he/she would try and seek value from direction A or B and execute his/her idea. This is a process of learning and understanding. (Team leader in the backstage engineering Team, Tencent Technology and Engineering Group)

Middle managers are responsible for encouraging team members to self-explore and offer professional suggestions. By constantly evaluating employees' performance and listening to their opinions, middle managers assign and reassign employees to different positions to maintain their enthusiasm and dynamic. This matching process guarantees that front-line employees are not "locked-in" by their titles. Instead, they can try as many different tasks as possible to find a suitable position and contribute to projects.

... they might have some confusion about the direction of personal growth...for example, there is one of my employees...he/she is not a social person, then I will help him/her to try and see if he/she could overcome the problems or not. If not, I can try other positions that might suit him/her. The position where he/she can mind his/her own business and communicate less with others. I can make this adjustment. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

The second step is to *match the team structure to the market trend*. A middle manager usually supervises multiple projects that form a team's basic structure. However, the value of projects significantly depends on the market condition, which means only limited projects can be continuously profitable. In contrast, most projects would fluctuate, reach values ceilings or fade in the market.

The way the Internet works is very ephemeral. They usually do not thrive for a long time, like WeChat. If you look at it from this point of view, there are only one or two successful projects at each point in time. Like WeChat Red Envelopes, its critical point lasted for one or two years. (Similar examples) Including the WeChat Mini Program and WeChat Official Account. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

Therefore, the focus of a team does not stay changeless. Middle managers need to sensitively detect market changes' direction and devote more emphasis and human resources to exploring the trending business area. Certain team members would be assigned to different directions; other members who cannot adapt to the restructure would have the chance to transfer to other teams. In some significant restructuring, middle managers would recruit talents to help the team to do new businesses.

I will bring in some of the industry's best or most aggressive young people. During a great change, the original team cannot be 100 per cent adapted to the change. It is ok to have only 50 per cent of the members adapt to the change. New people will join the team, and old members will be quitting. It is a necessary process. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

The team structure is constantly shaped and reshaped by middle managers according to market changes to urge front-line employees to do the "right thing" at

the moment and continue to fuel the team's dynamism. (For more explanation, please see table 7)

2.2.1.2 Directing—keeping things on a valuable track.

Although employees have considerable autonomy within their respective roles, it is important to note that this freedom does not imply unrestricted behavior. They should exercise caution and avoid acting impulsively, as their actions may be misguided, misaligned with market conditions, or inconsistent with the overall team dynamics. Hence, when venturing into the realm of business, it is essential for employees to have the guidance of proficient middle managers who possess expertise and can offer support to ensure the project's worth, maintain reasonable expenses, and prevent disorder within the team.

Finding a valuable direction is the beginning of every successful project. Under the strategic direction announced by top managers, middle managers need to find a specific direction suitable for their team and potentially profitable. A direction, as mentioned, could be a general goal (revenue, market share, user volume) for the whole year in a particular business area (gaming, advertisement, telecommunication). When the middle manager points out a direction, every team member should experiment with projects by following the direction. Therefore, a valuable direction guarantees that front-line employees are doing projects in a profitable market despite how many different experiments they have done. Thus, they are more likely to develop successful projects. Additionally, the direction also functions as a "common ground" for the team. No matter how far employees explore their creativities, they are spending efforts on the same goal and keeping the teamwork and the entire organisation in order.

After new ideas emerge under the direction, middle managers need to facilitate the employees to make the idea "doable" by helping *develop a project plan*. The first step to establishing the structure is to *separate the project into multiple stages*. Usually, a goal is difficult to achieve because time and resources are limited.

Therefore, it is important to separate the project into different stages so employees can achieve small accomplishments quickly and review the project to judge if it passes the test and proves its value.

The product team might come up with an expectation that they will reach goal A in one month. However, I may not have the technical solution and human resources to achieve that goal in one month, so I may have to break down this task. I will divide this goal into stages A1, A2 and A3. I must achieve a small goal at every stage to eventually get that product on the shelf. (Team leader in the technology development Team, Tencent Technology and Engineering Group)

Meanwhile, the project might be redirected to different stages. The development of a project is not a linear path. Middle managers need to constantly monitor the performance at every stage and change the strategy or methodology when the outcome reflects a weak performance or a change in a market. Most of the time, middle managers need to constantly redirect the strategic focus, modify the business goal and help their team members to re-establish operational approaches to the project so that they can keep the dynamism and profitability of the project. Then, eventually, achieve the ultimate objective.

For example, it was after the 3Q war that I had my current product. From the beginning, the goal was to establish the logic of the product. I wanted a great product, so I needed to invest many human resources in internet-safety-related modules. It was the first stage. Then when I developed the internet-security capability, I had the same capability as the competitors, but we were still far behind them. Therefore, another change was to think about how I could outpace my competitors in terms of user size or internet security coverage, which was also a changing

stage for us. I changed from an inward-oriented R and D team to an outward-oriented team and connected with external parties. After a while, security products became less important to customers, which was the start of another stage, and I had to figure out how to establish a new business model. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

Middle managers also need to *detect keynotes* while doing the projects. A keynote is the critical timing for an important event or action to happen, which requires the middle managers to have an in-depth understanding of the project, team and the market. Middle managers should be able to sense the market changes, the emergence of strong competitors or good collaborators, and how much resources have been accumulated by the team. Then, according to the sensitivities, they should be able to decide when to restructure the team, when to communicate with collaborators again, the timing of a mission, and whether the team has significant resources. Precise timing is very important for a team because the digital business evolves quickly, so others would take the opportunity at the next second if the team fails to catch it. This is also called the "*next-second culture*" in Tencent. It is worth mentioning that the concept of the keynote is similar to but different from stage separation. While the stage separation is an overall road map of a project, the keynote requires more sensitivity and reflexive actions toward changes. These two different concepts work hand-in-hand to keep the project dynamic and flexible.

The other two actions that facilitate the formation of the structure are *risk management* and the *performance appraisal setting and adjusting*, which also works hand-in-hand with each other. First, risk management is more like a continuous evaluation process that judges the feasibility of a project. In Tencent, cancelling an infeasible project effectively is equally important as all other actions within the project. This means middle managers must monitor projects continuously and stop them when they cannot generate value. Second, the performance appraisal system stands

for the KPI and OKR for each employee. I have many illustrations of *directing the project* in the previous section, but the concept remains vague despite how much I explained. My answer here is that the KPI and OKR for team members can make the directional decision more visible and specific. Middle managers need to set up KPI and OKR for team members with concrete numbers so they will know how much to achieve in what area and, thus, have a clear understanding of the direction. Meanwhile, when middle managers review the KIP/OKR of an employee, they will have a clear sense of whether he/she is in the right direction and if he/she is doing the project efficiently. If not, maybe the current project is not very valuable and needs to be stopped, or the employee needs help and adjustments; and middle managers need to conduct *risk management* timely.

Furthermore, in Tencent, KPI/OKR is not controlled by middle managers. Instead, they usually will have meetings to settle the number with their team members to ensure everyone is happy with their directions. When the market changes or someone initiates a potential project, middle managers need to re-evaluate the KPI/OKR and make adjustments to reflect the change of direction.

The last action to direct the project is to *set up boundaries*. The previous actions of Directing are about "*where to go*" and "*what to do*". Conversely, this action is about ensuring "*where not to go*" and "*what not to do*". Compared to previous actions, this has more to do with managerial power and organisational system to avoid a "rat race" across teams and chaos. As employees are highly empowered, they could be exploring too much and intruding on other teams' businesses, which harms healthy relationships among teams. To avoid the situation, middle managers would *set up a clear track* for the team, and they can only compete and use resources within the boundary. On the other hand, middle managers also need to set up time and resource limitations to indicate when to stop the project if it does not generate value. Since every innovation would cost resources and time of the team, middle managers would not allow projects to use too many resources and eat up space for other projects. With an explicit restriction being established, everyone in the team needs to be cautious about initiating a new project because every middle manager has a

cruel system to stop the project despite how much time and resources they have put into it. (For more explanation, please see table 8.)

2.2.1.3 Providing—fuelling the project with resources.

After the *matching* activities set up the basis for a new project to be developed, and the *directing* actions keep the project on the valuable track, middle managers need to *provide resources* to fuel the development of projects. As mentioned, front-line individuals often do resource integration because they are highly empowered and can communicate with collaborators directly. However, on certain occasions, employees cannot obtain resources because the resource could be scarce, cross-teams/organisations or on a higher level (licensing; higher-level approval), so middle managers need to use their social network and power to obtain the resource to support those good projects.

He/she needs to do this by him/herself rather than asking someone else to help him/her do it. (However) When they do not have this capability, and my team currently does not have this capability either. If there were some new risks to occur, their capabilities are weak...They still want to try this project, but if they cannot get resources, they can give me feedback, and I will try to seek resources with them. (Team leader in the income team of the to-C department, Cloud and Smart Industries Group)

The resource to support a project come from four dimensions, respectively the *intra-team resource*, the *cross-team resource*, the *higher-level resource* and the *external-Tencent resources*. First, the *intra-team resource* refers to support from team members. It is important to notice that Tencent is structured under the "*small team culture*", and a team of 9-12 members usually runs multiple projects and represents a small independent strategic unit of the organisation. Therefore, teams within Tencent need to be cross-functional, assembled with members of different

capabilities (e.g. product management and development, data analysis, project planning) to provide essential capabilities to develop new projects independently. In this case, it is most convenient for a front-line individual to seek resources from within the team to support a new project. Usually, the individual is allowed to talk to his/her team members directly to obtain support. However, the support does not come easily because every member's resources and time are limited; the rearrangement of time and resources would affect the work of other team members. When the resource integration activity within the team does not proceed smoothly, middle managers would step in and evaluate the project and then orchestrate the intra-team resources. Suppose the individual can prove the value of the project. In that case, middle managers will use their knowledge and power to help design and structure (using the previously described structuring technic) the within-team collaboration to allocate more resources to the new project.

I found that one of my team members has poor executive capabilities. He/she always has good project planning ability, meaning the plan is often written beautifully. However, when it comes to actual execution, he/she has been inefficient. Nevertheless, since his/her plan is usually not bad, I did not want to discourage him/her. The solution was that I formed a three-person team for the project, and I assigned two other team members to work with him/her on the project. In this way, he/she would feel that he/she was leading a small project, and the two members would help improve the execution. (Team leader in the to-B product team in the commercial income department, Cloud and Smart Industries Group)

Integrating intra-team resources is a highly complex process because it involves adjustments of KPI/OKR settings for team members, the arrangement of extant projects and plans and the resource allocation among team members. Again, middle managers need to be highly professional and deeply understand the market and the

team to be more precise and efficient when rearranging team resources. Hence, middle managers need to organise meetings frequently to synchronise project feedback and team members' feelings about their current job arrangement.

The second type of resource to fuel the project is the cross-team resource. It is important to highlight that although a team in Tencent is cross-functional, it does not mean they will have all of the capabilities to build a project (they only have the basic capabilities). Developing a project is a highly complex process that requires many capabilities and collaborations, not to mention that the project per se. is highly iterating. Therefore, front-line employees must constantly seek support by collaborating with other teams within Tencent. However, employees sometimes cannot gain resources from other teams because they failed to prove the value of the project or they only have a small social network within Tencent. In this case, middle managers are responsible for seeking resources from other teams to support the good project.

This year, I want to develop project A (the name has been hidden), a big project. The project required the full strength of the development team for two months. While I still had all these base products and services due to be iterated. As a result, several team members responsible for the product iteration would panic, saying they did not have significant time or capacity to meet the requirements of iterations. In this case, it was up to my director and me to report to higher-level managers and tell them that I needed support from other teams. As a result, I had an extra developer come to my team. (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

The middle managerial actions of cross-team resource integration are crucial for the team's dynamism. It is because, first, it facilitates the project and helps to expand the front-line individual's social network, thus, further empowering the individual and

enhancing his/her capabilities. Second, it facilitates resources to flow among different teams; it makes flexible uses of resources inside Tencent and exerts more resource value.

Other teams and my team within Tencent all belong to Tencent, so I have a natural advantage in internal communication. Therefore, I can integrate internal capabilities very quickly compared to external businesses. This means that when Tencent finds something new in the market, I can create something unique and iterate quickly. (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

The third type of resource is *upper-level resource* support which usually comes into play when a project shows significant value or achieves a critical mass. When such situations occur, middle managers need to report this project to higher-level managers and gain even more support beyond their social network and managerial power. In certain significant cases, the resource support would be upscale to the organisational level that the upper-level team would officially announce the project and requires resource supports from every relative team and establishes a *virtual team* for the project.

The virtual team would be given an official title. The purpose of establishing it is to develop a project. Virtual team members usually belong to different teams, for example, some from the product team, some from the operation team, and some from the development team. I have to gather some employees to do a critical project. Such actions usually require an official announcement by the company, sometimes at the departmental level. (Senior team leader in the to-C product team of the

commercial income department, Cloud and Smart Industries Group)

A very outstanding example is the development of Tencent Meeting (a digital meeting application) during the outburst of COVID-19. Since people in China suddenly need to work online, which is not a traditional working approach for most Chinese, Tencent wanted to seize the opportunity and contribute to society by developing an online meeting application. However, the market change came so quickly that the Tencent Meeting team was not ready for such a big change. Therefore, the project was taken to the organisational level, and the top-manager team officially required that all of the relative team should provide resources to help the project. Tencent Meeting thus quickly become a robust application for smooth online meetings and one of the top players in the market.

For example, the Tencent Meeting cannot just do it with the resource of a small team. It is more likely to be a small team plus many of Tencent's operational resources and development resources, some new product managers, and new development staff. They formed a large team to launch and iterate the product quickly to cope with the massive volume of data traffic caused by COVID-19. A stable version was finally made, and the data shows promising results. Like this emergency project, they had to mobilise substantial resources directly. I assigned many employees and devoted all of my time to do this. (Team leader in the technology development Team, Tencent Technology and Engineering Group)

The fourth important resource for supporting a project is the *external-Tencent resource*. Middle managers need to seek resources and capabilities support from teams outside Tencent to support a good project. It is because even Tencent does not possess certain capabilities to fulfil quickly changing market demands. Thus, a

front-line individual might not be able to find every capability he/she needs within Tencent, and he/she would have to turn to external parties and collaborate with them to fuel the project. Middle managers need to step in and talk to the external parties if they find the project worthless or the front-line individual insignificant to talk to. A comprehensive project usually involves internal and external collaborations, so Tencent's teams often connect with multiple external parties to develop competitive projects (For more explanation, please see table 9).

2.2.1.4 Adopting—establishing the project as a regular unit.

After a project continuously shows improvement and becomes considerably profitable, middle managers would report this project to the upper level to *officially adopt the project as a regular project* or even help develop an independent team to run the project. An adopted project would have a formal title and, thus, become a new capability for the team and the organisation; it starts to provide products and services to many internal and external parties and contribute to the entire platform ecosystem. The new project would considerably impact the KPI/OKR settings because it is now officially included in the performance appraisal system; it will also impact the team or department structure, depending on its significance level. The team/department would be arranged by middle and higher-level managers to adapt to the emergence of new projects and, thus, continuously reshape as the market changes.

In addition, middle managers would try to facilitate the adoption of projects by *benchmarking*. On certain occasions, the new project is potentially influential but yet to show significant value, and middle managers consider it as a project worth adopting. In such cases, middle managers often seek to benchmark the project, which codifies the methodology of the specific project into a repeatable business model after the project is successfully developed. As the benchmarking approach makes the model of a project reusable and potentially more valuable, collaborators and higher-level managers tend to show more interest in the project, which makes a

project more likely to be supported and adopted. Once the benchmark succeeds, it would not only stand for a successfully developed team project, but it also stands for a brand new business model created by the team, which can be reused to develop other projects and teams.

Finally, yet importantly, middle managers would also help whoever made significant contributions to the project to increase the personal influence within the organisation so the member would be more likely to establish projects or teams in the future. After a successful project is adopted, middle managers will often bring their teams to workshops, meetings and conferences to showcase the team's new project and outstanding capabilities. During the showcase, middle managers will also mention the names of specific employees who did the job nicely and praise their performance, which gives them a good reputation, so more people are willing to collaborate with them. This would facilitate people with strong capabilities to be recognised and help to boost their careers. (For more explanation, please see table 10)

To sum up this part, middle managers' routines tend to be 4-steps: Matching, Directing, Providing and Adopting (reproduced in Figure 17); these four main actions follow a logical order of developing a new project. The routine reflects that middle managers are highly important for Tencent to develop new projects and capabilities because middle managers are more experienced, more powerful and have a more robust social network. Although front-line employees are empowered, they are not significant to establish good projects without help from middle managers. Middle managers first need to *Match* employees to suitable jobs to develop a fertilised ground for creativity. Then, they need to *Direct* new projects to a valuable track by continuously evaluating the project and modifying risks, constantly adjusting the team structure and performance appraisal system and setting strict boundaries to filter un-useful projects. They also *provide* resources to support the development of the new project, as they can access a larger scale of resources and guarantee that a good project would obtain the supports it deserves. Furthermore, middle managers need to facilitate the project to be *Adopted* and become a new regular capability that supports the organisational evolution. It seems that middle managers do not make

direct decisions and instead co-work with front-line individuals to understand and cope with the market change.

Personally, I rarely decide what they should do. When one of them wants to do something, I tend to ask for their opinions on doing this direction or that one. (Operational director in Tencent Wireless Security Product Department, Tencent Corporate Development Group)

I do not understand (what youngsters want now), but I wish my team could understand, and that is why I am handing over the power. (Yidan Chen explaining "How to manage the post-90s generation in the workplace?" in the TV program "The Voice" on CCTV)

To conduct the routine efficiently, middle managers must maintain tight connections with front-line individuals by frequently communicating with them and carefully analysing their feedback, through which they develop a good project together with them.

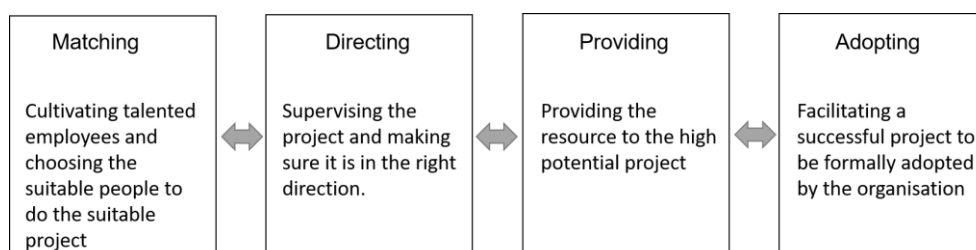


Figure 17 Overall middle managers' routines

Key activities in the middle manager routine		Examples
Matching	1. Choosing suitable members for a project	① Cultivating There was a new girl in my team...she had worked in my team for 3 months and felt that the adjustment to the project was quite frequent and asked why I made these adjustments...I think before she decides to do something specific, she should experience different types of projects. For example, she has tried projects of advertising, software and gaming. During the first half of a year at Tencent, she has involved with 3 different projects. After one year of working with me, I told her it was time to choose an area, and she picked the gaming area. (Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group)
	② Matching the task with suitable people	I have two teams working for me, and they are very different. Some of their work relates to the dig data, which could be highly logical. This group of people might not be able to accept the change in a short time, so I will let them do more regular tasks...they will stay in the previous area. The other group of members will be put on the new track...they need to do more explorations while running the extant projects. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)
	2 Matching the team structure with the market trend	from 2017-2019, the advertisement business earns the highest income in the to-C department, representing the biggest portion of our strategic planning...However, our advertising business is shrinking because of the Covid-19 situation and changes in some of our collaborators. So we will move more strategic emphasising to the gaming section. In terms of team structure (for example), in 2018, we had 5 members in the advertisement section and 3 members in the gaming section; but this year, we only put 1 member in the advertisement and more people in the gaming area. (Team leader in the business team in the telecommunication business department, Tencent Corporate Development Group)

Table 7 Middle managers' routine—Matching

Key activities in the middle manager routine		Examples
1. Finding the valuable direction		1. For example, we must choose a suitable project for the to-B business. (For example) Our SAS project requires limited deployment and customisation; it could take only 3 days to finish, but it is not very profitable. In this case, I need to decide whether we should find a very big customer and do a challenging (but highly profitable) project or a large number of small projects (like SAS). (Team leader in the to-B product team of the commercial income department, Tencent Corporate Development Group) 2. By now, the advertisement business has reached a bottleneck. Also, starting last year, the market does not accept its business model. In this case, we need to shift from the advertisement direction to the gaming and value-adding service direction. (Team leader in the to-B product team in the commercialisation department, Tencent Platform and Content Group)
	① Stage Separation	We will do a road mapping at the beginning of the project. I will separate the project into stages 1, 2 and 3 and decide what capability to develop in each stage. After one stage, we will review the efficiency of the capability developed in this stage. Then, I will evaluate the previously decided direction and decide if we need to modify it in the next stage. If the direction is generally ok, then we will continue the project. Otherwise, we must cancel the project. Most of the time, it is "both right and wrong". We often realise that we need to change something before we continue. (Front-line professional software developer in the government affairs department, Tencent Cloud and Smart Industries Group)
Directing	② Key notes detecting	1. I would not focus so much on details of their (front-line employees) working progress...I focus more on the time nodes/critical timing of their working process. Usually, I need to guarantee that all of them accomplish their tasks in the time node. (Team leader in the product innovation team in the telecommunication business department, Tencent Corporate Development Group) 2. I think in Tencent, there is always a besting timing (key node) for everything to be done. For example, the organisational restructure might be the key node for my career; when customers start to complain, it might be a key node to restructure our team...we need to solve the issue dynamically in every key node. (Team leader in the product innovation team in the telecommunication business department, Tencent Corporate Development Group)
	③ Risk management	The product team will give you "stories" (demand reports), sometimes, it is small and easy, and then we will be okay with it. However, sometimes it is very broad. Then, we will need to have a look at the ROI. The product team occasionally over-brain-stormed, and the technical investment becomes so significant that it could take months to do that and might not be efficient. We might decide not to do that after evaluation. (Professional technology developer in the data platform development department, cross BG (CDG/IEG/MIG/CSIG))
	④ KPI/OKR/Other performance appraisal system setting and adjustment	1. The performance-appraisal communication is important for delivering messages to different levels. For example, the targets for our department include a certain amount of income increase and user activation...etc. Then, our team is responsible for the part of income. We further divide it into a gaming section, advertisement section, VIP user section and value-adding services section. We, then, need to decide the specific responsibility for each member and develop their performance appraisal. (Team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group) 2. We have regular communications upon the performance appraisal...Here we make sure that the organisation's overall strategic direction is precisely passed to the front-line employees by middle managers like us. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group) 3. The OKR he decided at the beginning of the year might become a totally different thing. We will adjust it in the middle of the process. Sometimes we switch to a different project; sometimes, we have workload problems and human resource problems...we will review and adjust the OKR every one or two months. (Team leader in the technology development Team, Tencent Technology and Engineering Group)
3. Setting boundaries	① The restriction of the "track"	We have a concept of "track" (during the competition with other teams). For example, if the "track" of our team is the mobile business, operation and selling businesses, we must not do things other than this. Even though it is profitable, all managers will challenge the project's feasibility. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)
	② Resource and time limitations	In traditional organisations, employees tend to do assuring things. However, in Tencent, there are much more things that we cannot be assured of. There will be a cost to experimenting with those things that are not assured. You must set a boundary for it; when it fails the test, you must stop doing it. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

Table 8 Middle managers' routine—Directing

Key activities in the middle manager routine Examples	
1. Intra-team resource integrations	I temporally gave him 2 members of my team. He originally developed a good scheme, but I am not satisfied with his speed in pushing forward the project. Therefore I told him, "how about we establish a team, and you can have three people to get the job done quickly". (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group)
2. Cross-team resource integrations	1. For example, if we are the commercialisation team, and we need to collaborate with the product team, operation team, designing team and development team...if you are doing advertisement, you would need to collaborate with the Tencent Marketing Solution team and the Myapp.com platform...etc. (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group) 2. I will remove the barrier of collaboration with other teams for them. Sometimes they need the resource, but their level is not high enough. I will talk to the other team for them to obtain the resource. (Team leader in the WeChat TV program team, Tencent WeChat Group)
3. Upper-level resource supports	Sometimes we need to get the license and upper levels to explain our project's importance to the government department. Also, you need to continuously report to the upper levels about the feasibility of the project, how much you have achieved, and how much you can improve to give higher-level managers confidence so they will spend the effort to help you get the licence. (Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group)
4. Resource supports from externals	Sometimes it is difficult to do things by ourselves. For instance, we have a big customer that requires us to provide a smart channel for them to send messages to their users. Such a capability, in fact, is quite marginal, and it is not our core capability. Therefore, we do not want to develop it, so we introduce an external partner who has the capability and fulfils the customer demand by collaborating with the external partner. (Team leader in the backstage engineering Team, Tencent Technology and Engineering Group)

Table 9 Middle managers' routine—Providing

Key activities in the middle manager routine Examples	
1. Formally establishing the project/team	We have a shuttle bus service in Tencent... in the beginning, the shuttle bus system belonged to the administration department, and they could not develop a digital system to track the bus. Then, a guy designed a couple of codes and created a search bar to check the bus's route and timetable. After that, he realised that the system would crash at a certain point every day, so he reported to the manager, and then, the upper levels also agreed that it was important. By now, it is a significant product on the intra-organisational website, and many people benefit from it. (Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group)
2. Benchmarking the project	When the value of the project is not very big, we sometimes choose to benchmark it. For example, when our project collaborates with an advertisement department, we benchmark the project and codify it into a cooperation model. Then, we can copy the model when we collaborate with QQ...the model is reusable, so the project is no longer a small thing but an amplifier. When we use the amplifier with other collaborators, it will produce significant income. (Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group)
3. Increasing the personal influence (of the front-line employee) in the organisation	There was a developer who had supported our project. We will report to the top levels that this employee did his job outstandingly. This person will attract more attention from upper-level managers. More people in his area will also know him. (Team leader in the basic product team in the telecommunication business department, Tencent Corporate Development Group)

Table 10 Middle managers' routine—Adopting

2.2.2 Middle managers' routine and new project development

As described in the last section, middle managers' routines are for supporting front-line individuals to develop new projects. However, I also depicted that developing a

new project (mainly referred to as BIRP) is highly complex, non-linear and iterative. That is to say, middle managers' routines should be complex, non-linear and iterative to support the development of projects.

It is difficult to use general words to explain (the middle managers' routine). I need to use specific projects. The process is too dynamic. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

Therefore, based on the understanding of routines in the last section, in this section, I describe a comprehensive story of how middle managers conduct routines dynamically to support project development. Through the story, I combine the middle-manager routine and the BIRP. I show how middle managers' routines reshape as the BIRP proceeds and how middle managers leverage their routines to support project development.

Certain background information before the elaboration. The comprehensive storyline is developed with interview data from three middle managers. The younger manager of the three established an independent project team in 2018 and got promoted to a managerial level. The other two managers are the director of multiple teams and the senior middle managers. The young manager (the project developer) developed the project with support from the other two middle managers. I encouraged them to describe the project development process from their own perspectives; and, together, provide a comprehensive story. The storyline is reproduced in Figure 18, which is designed based on the BIRP model; I show five instances to depict the story. Numbers in the middle represent steps of the BIRP model, the upper part of the figure reports interview quotes that describe the corresponding step of the BIRP; the middle part of the figure reports interview quotes that describe how middle managers support corresponding steps of BIRP according to the actual situation. Interview quotes are provided by different interviewees, so I mark the quote-provider of *the project developer* and *manager* to facilitate the reading. The lower part of the figure

shows the accomplishment of establishing the project and developing new capabilities.

In step 1, the project developer can develop a Background Operation System to facilitate the operation of digital products owned by the team; he *detected an opportunity* while talking to a collaborator by realising that the background operation system is a potentially profitable service. He then quickly ran a small test, brought this idea to the middle manager, and convinced the middle manager with his plan and test results. Then, the middle manager *set up a clear time and resource limitation* for the person; and temporarily removed certain workloads away from the employee so he could have more time to develop the project. In step 3, the project developer *integrated certain resources* and developed demos with his collaborators; he found that customers were willing to pay for the services, the result of which was quickly feedbacked to middle managers. The middle manager was quite satisfied with the result and agreed to provide more time and resources to support the project's development. Following step 3, the front-line employees *continue to do more tests* on the project in step 4 by collaborating with other teams and providing the background operation system to other services and products. As a result, the operational background continued to pass tests, and other teams welcomed it. The remarkable progress was encouraging while taking up resources and time beyond the individual's capacity. Therefore, the middle manager *evaluated the project* and decided to help the individual *borrow resources from an external team* to compensate for the individual's capacity. In step 6, the project entered a *development and iteration phase*, and the developer continued to reshape the project plan, integrate more resources and test the result. The data performance showed an overall satisfying result, and the individual continued reporting to middle and upper-level managers. In such a case, middle managers decide to do all of these things together with the individual and help him to *integrate more resources* and *communicate with upper-level managers*. As a result, the project has been constantly refined and enlarged. Eventually, in step 7, the *project achieved a certain critical mass*, and the individual got a chance to establish an independent team

during the 930 Revolution of Tencent. The middle manager decided to help the individual to find *suitable team members that matched the project*; and offered the individual an opportunity to seek team members from other teams. Middle managers brought this project to the upper levels and finally got the grant to *adopt* the project team as a regular team in the department. Thus far, the team has been continuously earning considerable profits for the organisation and stably providing core and new capabilities to Tencent and external parties.

The process model of Figure 18 shows that middle managers do not necessarily conduct the routine in a fixed order. Instead, they reshape the routine according to the performance of the individual and the project. In this storyline, middle managers start by *setting boundaries* and then continuously *provide resources* to the project. The *matching activities* were conducted together with the *adopting activities* in the last step because they needed to establish a team. Since the project developer possesses solid capabilities and the project proceeded smoothly, middle managers tended to provide more support and encouragements rather than interventions and restrictions. Middle managers would act differently in other types of projects with the same goal of directing and facilitating the development of new projects.

It is difficult to abstract the routine because every case is so different. (Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group)

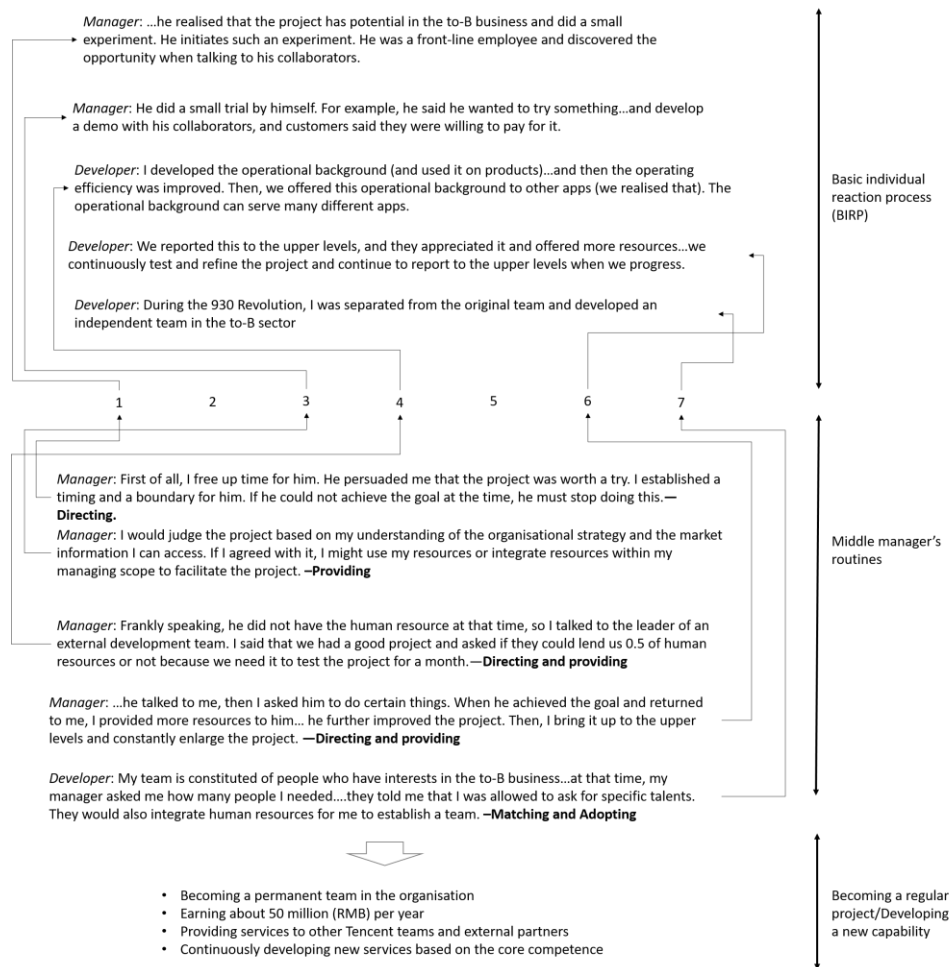


Figure 18 The case of developing a new project

3.0 Discussions and theoretical contributions

3.1 The shifting managerial leadership within the digital platform organisation—reconceptualising the dynamic capability.

Most studies depict managers' "heroic" leadership in designing organisational routines and creating dynamic capabilities (Augier and Teece 2009; Teece et al. 1997; March and Simon 1958; Chesbrough and Rosenbloom 2002). Conversely, my studies reconceptualise the concept by arguing that the formation of middle managers' routines is not an outcome of managerial decisions. Instead, the formation of middle managers' routines is an interactive process shaped and reshaped through interactions among top managers, middle managers and frontline employees. Extant dynamic capability studies have been highlighting the decision-

making role of managers in that they emphasise the significance of managers' experience and knowledge in creating routines (Adner and Helfat 2003; Helfat and Martin 2015; Helfat and Peteraf 2015). Managers dominate the process, such as setting the vision, evaluating the market and organising people for the entire organisation (Ambrosini and Altintas 2019). Their actions tend to be directly connected to the outcome of routines. A few studies have, to a certain extent, acknowledged the importance of employees and managers other than the top team. For example, Verona and Ravasi (2003) have studied non-hierarchical organisational structures and emphasised the importance of empowering lower-level professionals so that they can develop creative initiatives. Nevertheless, we still need more elaboration and exploration of such ideas. The single emphasis on managers' skills and experience offers limited space for creative actions to alter the routine incrementally and adaptively. However, digital platform organisations generally adopt an opening business model (Economides and Katsamakas 2006; Karhu and Ritala 2021; Karhu, Gustafsson and Lyytinen 2018), which relinquish control over the external parties (Katz and Shapiro 1986; Kende 1998; Morris and Ferguson 1993; Shapiro and Varian 1998; West 2003). Managers tend to have information asymmetries with the user side and are no longer sufficient to predict and solve a spectrum of continuously emerging issues (Noda and Collis 2001; Guth and MacMillan 1986; Wooldridge et al. 2008). Therefore, the current underlying logic of dynamic capability is insufficient to explain the mechanism of digital platform organisations. Studies have been calling for reconceptualisations of the role of a manager; and how they increase resource dynamism by distributing their dominant power and involving employees on different levels in the process of reacting to market changes (Teece 2007).

My story illustrates a mechanism different from the traditional dynamic capability views. Departing from the current application of DC that emphasises the dominant power and automatic executions of managerial decisions (Zollo and Winter 2002), I find that neither upper-level managers nor middle managers can directly make decisions in the digital platform organisation. The "direct" means directly

implementing the decision or a decision being strictly followed. Through the observation of middle managers' routines, I find that managerial levels usually make "directional decisions" which are incomplete and waiting for further experimentations and confirmations by frontline individuals, which leaves a large space for individuals to be creative. Frontline employees are highly empowered to conduct the BIRP independently. Their feedback is critical to confirm if the "directional decision" is valuable or if it remains to be modified. Managers no longer dominate the organisational process. Instead, lower-level employees' creativities and actions are important in forming a decision.

In addition, according to my process model of middle manager routines, I find that the actions of *Matching*, *Directing*, *Providing* and *Adopting* are conducted under consulting the upper-level strategic direction and project feedback by lower levels. Middle managers rarely decide what to do next by themselves; instead, they adaptively adjust their actions and process according to the change in strategies and the progress of project experiments. I realise that I can establish the logical order of middle managers' actions, though the actions vary from case to case in terms of enactments. Therefore, developing new routines and capabilities is not a managerial-led process but rather emergent and situated. Routines are shaped and reshaped by the *dialectic interaction* among middle managers, top managers, frontline individuals and the market.

I react to callings for the reconceptualisation of managerial leadership (Teece 2007) and unpacking the collective efforts to develop routines (Salvato and Vassolo 2017; Salvato 2009; Obstfeld 2012). I contribute to the DC theory by revealing the formation of middle managers' routines and answering how routines support stability and flexibility (Feldman and Pentland 2003; Pentland and Feldman 2005).

3.2 Designing vs optimising—reconceptualise the micro-foundations of organisational routine.

The extant dynamic capability studies either emphasise the routine on the firm level or the top-manager level; thereby, the micro-foundations of new capabilities and routines are considered entrepreneurial activities conducted by the firm or top-level individuals. For instance, Teece (2007) define the process of developing capabilities as sensing, seizing and reconfiguring activities mainly conducted by top managers; Eisenhardt and Martin (2000) identify the "simple rule" adopted by the organisation to solve emerging market issues. The majority of studies define the DC as the aggregation of carefully designed routines or abstract frameworks that fulfil the entrepreneurial purpose of developing new capabilities and routines (Kay, Leih, and Teece 2018). As such, DC studies have limited attention on the non-entrepreneurial part carried out by lower-level employees, which focus on the enactment and optimisation of routines and capabilities (Salvato 2009; Salvato and Vassolo 2017; Salvato and Rerup 2011). However, the uncertainty is extreme in the context of digital platform organisations. It is difficult to predict pre-existed alternatives and choose the optimal solutions as traditional strategic management does (Garud, Jain and Tuertscher 2008; Simon 1996; Romme 2003). The abstract and systematically designed micro-foundations are insufficient to support the dynamic capability. The fast-changing environment requires real-time actions and flexible alterations to solve emerging issues (Dutton, Ashford and O'Neill 1997; Schon 1983; Garud, Kumaraswamy and Karnøe 2010). Therefore, the entrepreneurial designs of routines and capabilities are essential to DC but not significant. It could lead the DC toward erosion because the previous design could become rigid and struggle to create "the next big change". Therefore, studies are calling for the further unpacking of the performative aspect of routines and understanding of the micro foundation of routine, which eventually leads to heterogeneity (Feldman and Pentland 2003; Pentland and Feldman 2005; Wenzel, Danner-Schröder, and Spee 2020; Parmigiani, and Howard-Grenville 2011; Felin, Foss, Heimeriks, and Madsen 2012).

Reacting to the callings, my study attempt to deeply unfold the middle-manager routine to understand the source of dynamism within managerial routines. Converse to the traditional DC micro-foundations studies that focus on entrepreneurial actions and top-tiers' strategic domination (Kay, Leih, and Teece 2018; Teece 2007), I proffer that non-entrepreneurial actions, which refer to the enactments and optimisations are crucial for maintaining DC as well. Through analysing the BIRP and middle managers' routines, I find that middle managers' actions highly depend on the conditions of the BIRP. Meanwhile, the BIRP represents lower employees' regular processes of analysing the market and optimising the extant product and services. Thus, middle managers' routines (e.g. supporting a good routine; or removing a bad one) are largely affected by frontline employees' daily observations and experiments. Putting this another way, lower-level individuals' daily analysis and optimisation fuel managerial actions of developing new routines and creating new projects. Furthermore, middle managers are responsible for discovering some small creativities during the optimisation and facilitating them to become big projects through *Matching, Directing, Providing and Adopting* activities. In short, in the digital platform organisation where changes happen every day, non-entrepreneurial actions of enactments and incremental optimisations are highly important, which has become another vital source of resource dynamism for the organisation. In comparison, it becomes risky to solely count on the strategic-level entrepreneurial decisions on the top tiers or an abstract framework carefully designed by the organisation.

I contribute to the study of DC by providing the BIRP model, the middle manager routine model and the reaction routine model to enrich the current understanding of micro-foundations of DC in the rapidly changing environment. I discover complex processes of performative routines and dynamic micro-foundations to fuel the routine dynamism continuously.

3.3 Capabilities development as an outcome vs Capabilities development as a process—enriching digital platform studies from an operational perspective

I also enrich the current explanation of the strategic incompleteness of digital platform organisations from a dynamic operational perspective. Garud, Jain and Tuertscher, (2008) have pointed out that the strategic design of a digital platform organisation is naturally incomplete due to its "generative nature". As the generative nature requires opening the resource base and developing an opening business ecosystem (Helfat and Raubitschek 2018; Hagiu 2006), boundaries between the organisation and its environment become blurry. It is difficult to define what demands are to be fulfilled and what performances are expected (Garud, Jain and Tuertscher 2008). The continuously shifting boundary and fast-changing environment significantly challenge the organisation in terms of developing clear strategies or a completely designed system at any stage of development. Conversely, the strategic design is emergent and situated, and solutions can only be created during the agencies' participation (Garud, Kumaraswamy and Karnøe 2010). However, digital platform organisations' strategic incompleteness has only started to gain attention in recent years (Garud, Jain and Tuertscher 2008). Meanwhile, the study of digital platform organisation only remains on an aggregate level (Adner and Kapoor 2010). I have limited studies focusing on the internal routine micro-foundations of the organisation, whereby agents on different levels co-creating the process of nurturing a new strategy to react to fast external changes.

I react to the callings and fill the theoretical gap by investigating middle managers' routines of creating new projects and capabilities. Departing from the traditional approaches of thoroughly analysing the market and developing a comprehensive coping strategy (Romme 2003; Simon 1996), I find that middle managers' project development routine is an emergent and ongoing process that does not have an official end-point. As the BIRP of lower-level individuals continuously test and experiment with the extant project and try to react to market demands in a better way, a project would always have space to become a better project or potentially

give birth to a brand new project. During the BIRP, middle managers' primary responsibility is to use their professional knowledge and resources to direct and facilitate better solutions to be nurtured and created. This means even the successful development of a project does not mean the finish of a journey, agencies on different levels would constantly challenge it, modify it and try to build something new on top of it. Therefore, the internal operational process of a digital platform organisation is also incomplete.

Additionally, I find that the digital platform's routine incompleteness is highly similar to the incompleteness of dynamic capability's micro-foundation. According to Collis (1994, p144), the best source for dynamic capability is "*the ability to innovate the structures that innovate the structures that produce better product innovation*". Meanwhile, as shown in Figure 19 (the reproduction of Tencent's project emergence process), I consider a project team as the basic strategic unit inside Tencent. I can see that every team member is conducting their independent BIRP to optimise the project under facilitations by middle managers' routines (see structure 1). Then, one of the individual BIRPs performs outstandingly, becomes an independent project, and establishes its own team under middle managers' directions and facilitations (concrete example in Figure 18). Eventually, the new project team functions independently and has its own BIRP processes to optimise the project; the process continues (see structure n+1). Figure 19 shows the logic of "structure creates structure" that an established project is considered an iterative unit, which is not only capable of developing new capabilities but also capable of giving birth to other independent projects. The logic is highly similar to what was depicted by Collis (1994), and Teece (2007) has also pointed out that the micro-foundations of DC are naturally incomplete. Therefore, I find that the development of DC and platform strategies are both ongoing processes, and the logic of these processes is closely connected. In sum, my study contributes to establishing the connection between the concept of DC and the platform strategy and clearly illustrates how the connection works. I also further confirm the necessity and urgency of studying the digital platform strategy through the theoretical lens of DC and widen the path for future studies.

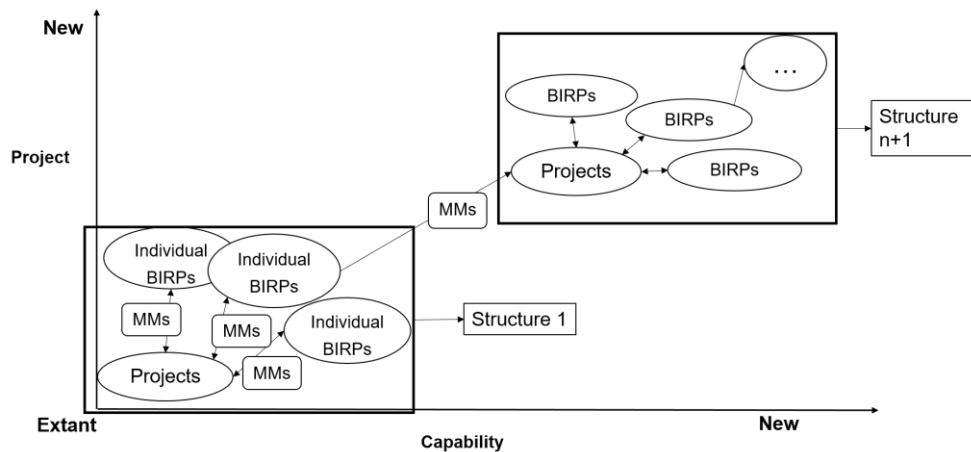


Figure 19 The model of the incomplete internal operation process of a digital platform organisation

A potential direction for my future research:

A further discussion depends on outcomes and theorisations of the previous two case studies. The strategic pattern of the digital platform ecosystem—the co-existence and co-function of the internal and external parts of the ecosystem.

1.0 Initial motivations and the introduction of my future discussion

My research ultimately aims to answer how an ecosystem is orchestrated dynamically to create value from the theoretical lens of dynamic capability. As I have reviewed previously, the topic of the ecosystem has become highly fashionable in strategic discussions in recent decades. Since James Moore (1993) officially brought the concept into the business discussion, it has provided a unique perspective to the field of management study. Researchers have defined the ecosystem as a network/system that aligns the focal firm and external parties to create a value proposition and achieve value co-creation. Extant studies have made a whole spectrum of contributions to the discussion on the interdependency, interaction and alignment between the focal firm and the external parties (complementors, customers, stakeholders, shareholders) and how their connections facilitate the achievement of more customer value and innovations (Adner 2017). Nevertheless,

most of these studies did not include the perspective of an internal organisation where managers and employees function to make decisions and operate the organisation. As I theorised in the case study of middle managers' routines in the platform organisation, I argue that the micro-perspective is also crucial for platform organisation to develop dynamic capability and yet we have limited discussions on the specific topic (Salvato and Vassolo 2017; Ambrosini and Altintas 2019; Teece 2016; Kuratko, Ireland, Covin and Hornsby 2005). Then, I managed to use this perspective to enrich the current theorisation of dynamic capability in the platform organisation through the middle manager perspective. My research shows that the entire ecosystem would naturally involve the part of an external organisation (platform and external parties) and an internal organisation (managers and employees); simply put, the missing of either part would cause the incompleteness of the ecosystem strategy.

Studies have pointed out that the digital platform ecosystem strategy being applied to the organisation raises the challenge for managers to figure out how to organise both its external parties and internal processes (Hanelt, Bohnsack, Marz, and Antunes 2021). Echoing the notion, some other researchers also insist that with the digital platform ecosystem being established, organisations need to develop an entire set of new management models and processes to fit with and support the functioning of the ecosystem (Li and Chan 2019; Hanelt, Bohnsack, Marz and Marante 2021). Therefore, scholars have pointed out that with new concepts and the idea of business strategy emerging, we need to study the strategy from multiple perspectives. We should also pay attention to other relevant components of this strategy and try to include them to form a comprehensive discussion (e.g. Huang, Henfridsson, Liu and Newell 2017). Moreover, while I acknowledge the complexity of an ecosystem, it has also been pointed out that we need to study the ecosystem from a multi-layered perspective (Visscher, Hahn and Konrad 2021). For instance, Meynhardt et al. (2016) argue that ecosystems need to be discussed at a macro level and micro level, meanwhile other scholars have addressed the niche-level and regime-level alignment based on a multi-level perspective (Walrave et al. 2018;

Geels 2002; Kemp et al. 2001). Also, as Kurtz and Snowden (2003) proposed, different perspectives fundamentally form the sense-making of both organisations and researchers. Thus, a study which manages to incorporate diverse perspectives could potentially give a more comprehensive picture than single-perspective research can do.

Nonetheless, ecosystem studies tend to concentrate on defining characteristics of capabilities (Mikalef, Boura, Lekakos and Krogstie 2019; Siaw and Sarpong 2021; Helfat and Raubitschek 2018; Haim, Faridian and Neubaum 2020), factors that impact the effectiveness of capabilities (Sunder and Marathe 2018; Haim Faridian and Neubaum 2021), and firm-level processes (value co-creation, platform development and lifecycle) (Giudici, Reinmoeller and Ravasi 2018; Teece 2017; Shi, Li and Chumnumpan 2020). Hence, they tend to focus on perspectives such as idiosyncrasies of the capability, complementarity, interdependency and network effect without justifying the internal process that supports the external diversity and complex connections. However, studies also highlight the importance of connecting internal and external parties of the platform that *“the internal and external linkage generates opportunities to learn from customers, suppliers and competitors.”* (Cho and Pucik 2005; Dahlgaard-Park and Dahlgaard 2010; Lin 2009; Renko et al. 2009; Dadfar, Dahlgaard, Brege and Alamirhoor 2013, p824). In other words, connecting a platform's internal and external parts is essential for bringing new ideas and dynamism to the platform organisation. Therefore, I could establish the assumption that a successful digital platform organisation need to incorporate a set of harmoniously interconnected and co-functioning internal and external organisational structures. However, the extant platform organisation literature has limited explanations of such a topic. *The extant studies of platform ecosystems tend to assume that the internal process would automatically line up with the ecosystem strategy and create a profitable ecosystem.* At the same time, my middle manager routine research and extant studies share the concern that an appropriate internal process that supports the digital platform does not exist naturally (Hinings et al. 2018; Hanelt, Bohnsack, Marz, and Antunes 2021). Researchers and organisations must

deliberately study and design it to support the outer part of the platform. However, I have limited research on an ecosystem's external and internal perspectives. We have little explanation of the co-function and co-existence of internal and external organisation actors who build a healthy and profitable ecosystem together. Such a circumstance makes the current results of discussions potentially incomplete and fragmented (Visscher, Hahn and Konrad 2021). We urgently need more understanding of how actors and resources of internal and external organisations connect and co-function with each other and form a comprehensive and valuable ecosystem.

Over such an issue, I see great potential in exploring the concept of platform ecosystems using insights from both case 1 and case 2. I might gain fruitful insights by discussing the connection and co-function of the internal and external ecosystem, and form multi-perspective views of the orchestration of a platform ecosystem. The orchestration of a digital platform ecosystem needs dynamic capability because the platform organisation runs in a turbulent environment (Shapiro and Varian 1998; Dutta and Segev 1999; Porter 2001; Eisenhardt and Martin 2000; Wang et al. 2015). Meanwhile, my research on the single case—Tencent have proved that both the external complementary orchestration and the internal performative routine are essential for sustaining the development of the digital platform ecosystem (for more explanation, please go back to case1 and case 2). In addition, the current dynamic capability studies have emphasised the importance of studying internal and external resource configurations and reacting to the ever-changing environment. Extant dynamic capability studies have already covered the discussion of the internal organisational perspective and resource base configuration (e.g. Verona and Ravasi 2003); and external organisational perspective and resource base configuration (e.g. Tripsas 1997). However, the internal and external perspectives do not naturally align with each other. In other words, harmoniously co-functioning internal and external organisational perspectives are developed with effort. The dynamic capability theory indicates the importance of aligning internal and external assets. (e.g. *"In rapidly changing environments, there is value in the ability to sense the need to reconfigure*

the firm's asset structure, and to accomplish the necessary internal and external transformation."(Teece et al. 1997, p520) Meanwhile, the influential works of Teece (2007) and Teece, Pisano and Shuen (1997) have been continuously highlighting the importance of integrating both internal and external resources simultaneously to react to environmental change. Therefore, it is essential to study the internal and external organisational perspectives simultaneously to have a more holistic understanding of the dynamic capability and how organisations constantly evolve and react to the environment. As Teece, Pisano and Shuen (1997) have already submitted that *"firm capabilities need to be understood not in terms of balance sheet items, but mainly in terms of the organisational structures and managerial processes which support productive activity"* (Teece, Pisano and Shuen 1997, p517). Such a statement means that it is necessary to study the dynamic capability from both the "structure" (macro/external/system) level and the "process" (micro/internal/routine) level. The underlying emphasis of both internal and external perspectives suits my discussion and provides a matching theoretical lens for understanding the entire ecosystem.

Meanwhile, my research outcomes also reflect that internal and external parts of the organisation do not naturally align. Take the examples of my studies; despite the high dynamism and complexity of the feedback loop and the resource reconfiguration process between the platform and platform users (case1), I still managed to find a complex and carefully maintained internal process implemented by middle managers and employees. I show that the internal and external parts of the organisations (in my case, the Tencent ecosystem) do not automatically guarantee each other's efficiency; instead, both are formed intentionally with many unique dynamic capabilities and actors. In this case, the dynamic capability is insufficient to explain the unique mechanism of the digital platform organisation. We need more explorations of how platform organisations orchestrate the co-functioning internal and external perspectives of the ecosystem simultaneously and react to extreme environmental uncertainty. However, the extant studies of dynamic capability have limited explanations of connecting the micro-level (internal layer of

the ecosystem) and macro-level (external layer of the ecosystem) resources to form a ecosystem. Researchers constantly call to study the dynamic capability from macro-, meso- and micro-perspective (Murthy and Madhok 2021; Salvato and Vassolo 2017; Felin, Foss, Heimeriks and Madsen 2012). We still have a limited understanding of how internal (micro-level) and external (macro-level) ecosystem resources are managed simultaneously to form a resource base.

Define the Macro-level and Micro-level of the ecosystem. In this additional discussion, I first consider the entire ecosystem as a whole unit, including an organisation's internal and external parts. In this case, I define the *macro-level perspective* as what I conceptualised in case 1, which shows how the platform connects with complementors and customers and profits from interdependence. I then define the *micro-level perspective* as internal actions, routines and processes for managers and employees to develop projects and connect internal and external parties. Therefore, the macro-level perspective in my discussion means the big picture of an ecosystem and how actors interconnect. The micro-level perspective shows the internal implementation of the strategy of an ecosystem and tells us how the dynamism and connections of the external layer happen. As pointed out by a study, “...research has shown that the decisions managers make concerning organisational structure and process influence outcomes by establishing the authority relationships, operational protocols, role responsibilities, task priorities, information flows and behavioural standards necessary for goal attainment (Scott 1992)” (Grevesen and Damanpour 2007, p116). Accordingly, the internal arrangements such as power relationships, operational protocols, tasks and activities set the foundation for establishing the organisational structure and process. Extant studies support my definition, and I pick the constructs identified by scholars to build the macro-perspective and micro-perspective.

The additional discussion of the platform ecosystem strategy is also inspired by Adner and Kapoor (2010). The paper submits that innovation challenges of an ecosystem are not just affected by the magnitude and first-mover advantage. It is also affected by the structure of an ecosystem, which is constituted by *actors with*

different roles, interdependent ties among actors, innovation locations of the structure, input and output, and flow of activities within the structure. The paper submits that studies of the ecosystem aim to solve the problem of how organisations align (Adner and Kapoor 2010; Burford, Shipilov and Furr 2022), so these ecosystem elements need to be studied and explained.

However, I will not define or analyse an ecosystem's structure. Again, I focus on the process of resource reconfiguration. Since my research uses dynamic capability as the theoretical lens to study the phenomenon of the platform ecosystem, I essentially focus on the reconfiguration of resources and the constant evolution of the organisation's resource base. Meanwhile, my outcomes of the resource reconfiguration process reflect these elements brought up by Adner and Kapoor (2010). According to the definitions provided by Adner and Kapoor (2010), my researches, including the first and second cases, indicate the components of the internal and external parts of Tencent's ecosystem. As defined, the first research shows the macro level of the ecosystem (external parts of the organisation) and the connections among complementors and the platform; the second research reflects the micro level of the ecosystem (the internal parts of the organisation) and interactions among managers and frontline professionals. My process models reflect *different actors* in Tencent's ecosystem and detailed back-and-forth interaction processes among *independent and interdependent actors* in different ecosystem *locations*. I also show the "*flow of activities*" wherein resources and information are bundled by actors during the interaction, and eventually, the *input* of resources becomes valuable *outputs*. As shown in Figure 20 (taken from paper 1) and figure 21 (taken from paper 2), my process models reflect these crucial parts of an ecosystem. I can use Adner and Kapoor's (2010) concepts to define different parts of my process models and enhance my understanding of the ecosystem. **I can use Adner and Kapoor's (2010) framework to break down my extant models and use the components to build a new model. Eventually, I can form a model that includes components from both macro and micro perspectives.**

In addition, as I further breakdown the model, I find that Figure 21 (from case 2, the model of micro-level perspective) represents the reproduction of the part between "user data" and "complementors" in Figure 20 (from case 1, the model of macro-level perspective). This part stands for the internal reconfiguration of resources. Therefore, Figure 21 is the inner layer of the ecosystem embedded within the external layer (see reproduction in Figure 22). Since these two models are based on the same single case, their relationship is justified by themselves. Therefore, by combining these two models, I can potentially build a more comprehensive model containing *macro- and micro-level perspectives, actors with different roles, interdependent ties among actors, innovation locations of the structure, input and output, and flow of activities*. In this additional discussion, I use the elements defined by Adner and Kapoor (2010) to justify the model I build, which includes the macro- and micro-level perspectives of the ecosystem. Thus, I could potentially contribute to the ecosystem study by positing that the harmonious co-functioning of the internal and external ecosystem perspectives can constitute a valuable digital platform ecosystem.

In the following section, I will first compare the patterns of models from case 1 and case 2 from the perspectives of *actors with different roles, interdependent ties among actors, innovation locations of the structure, input and output, and flow of activities*. I will try to observe if the micro-level of the ecosystem reflects any similarities, differences or connections to the macro-level ecosystem. Then I will further develop processual models to combine these perspectives and reveal how they connect and co-function harmoniously to make a valuable ecosystem.

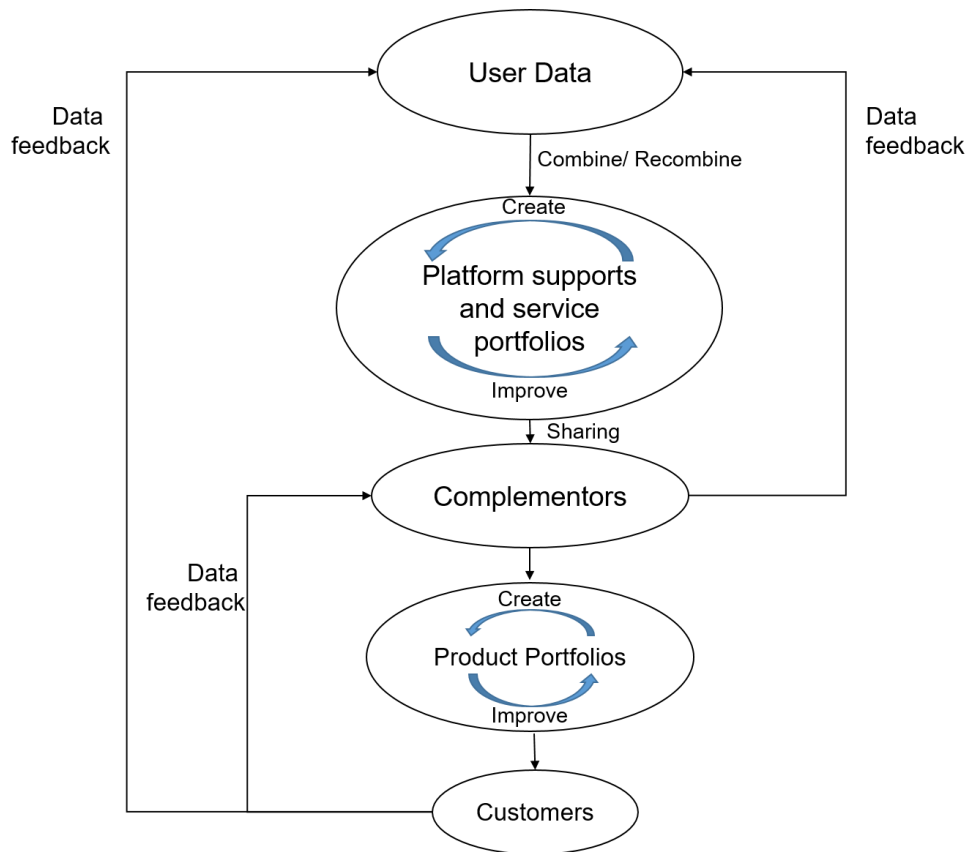


Figure 20 The macro-level perspective of the Tencent ecosystem (model from case 1)

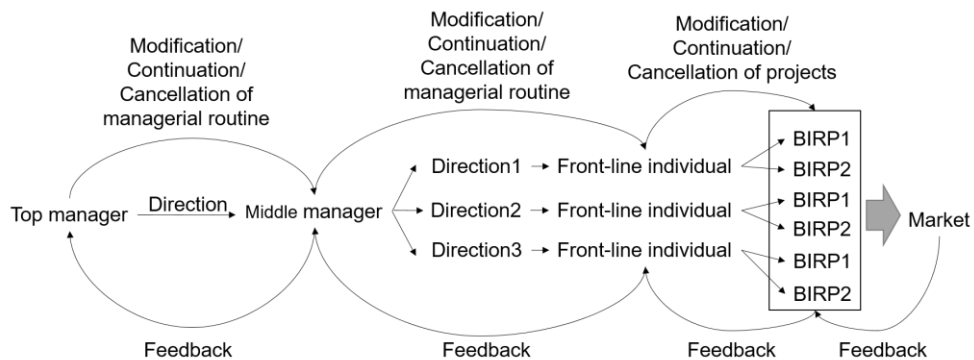


Figure 21 The micro-level perspective of the Tencent ecosystem (model from case 2)

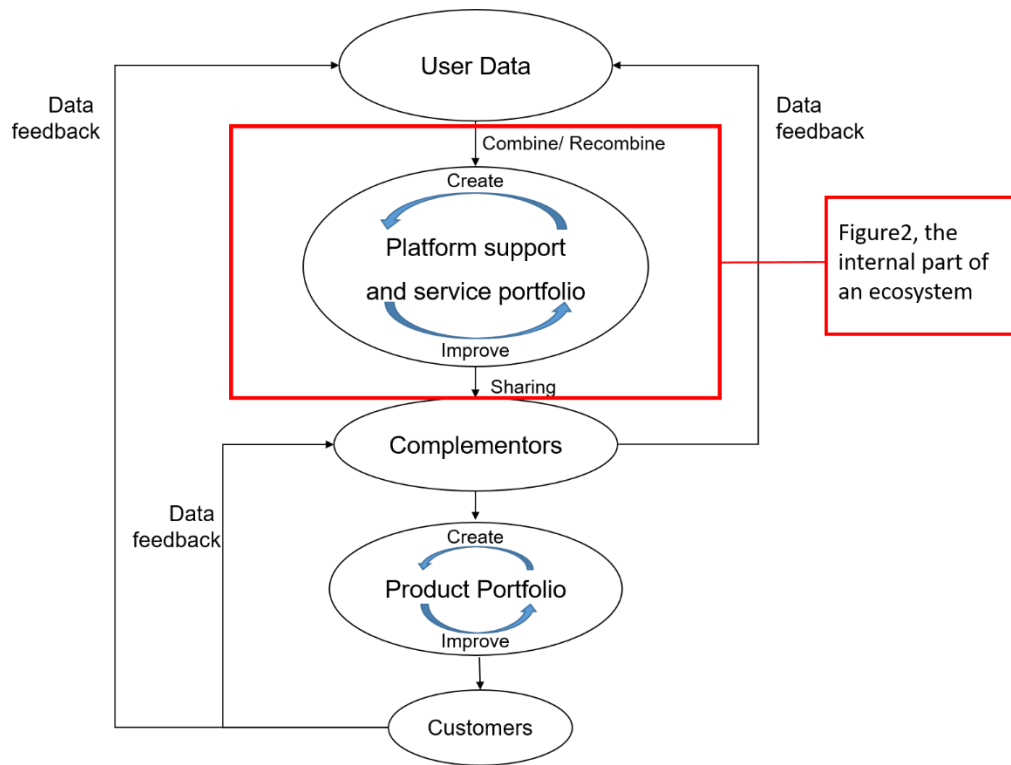


Figure 22 The model combines external and internal layers of the ecosystem
(combining Figure 20 and Figure 21).

2.0 The Macro-level perspective of a platform ecosystem vs The Micro-level perspective of a platform ecosystem

As I compare the models of macro- and micro-level perspectives, I surprisingly find components of *"actors with different roles, interdependent ties among actors, innovation locations of the structure, input and output, flow of activities"* for internal and external parts of the ecosystem show significant similarities. The similarities are listed down below:

2.1 Models of both perspectives are constituted by independent and interdependent actors.

Elaboration of point 1: All currently defined actors in both internal and external parts of the ecosystem are not fully controlled by higher-level actors. Individual actors' business activities are mostly conducted autonomously to fulfil personal interests and ambitions. At the same time, they connect to the other parties through resource sharing, data exchanging (feedback), and the overall value proposition established by top managers.

2.2 In models of both perspectives, resources are bundled through the activity flow of back-and-forth interactions.

Elaboration of point 2: The organisation shares resource around frontline employees/complementors to generate value. Resources are shaped and reshaped through interactions between parties (Figure 23).

It is worth mentioning that I find it very interesting to consider middle managers as small platforms within Tencent. As middle managers (MMs) have accumulated more capabilities and access to more resources, they are like platforms with bottleneck resources. MMs facilitate projects to be developed by sharing resources with frontline individuals depending on their feedback, just like a platform that shares the resource base and encourages external innovations. As a middle manager at Tencent said:

*we are dynamic resources. (Team leader in the business team
in the telecommunication business department, Tencent
Corporate Development Group)*

Middle managers act as a platform and share resources dynamically to stimulate better resource recombination. This also shows that the internal and external reconfiguration logic shows high-level similarities regarding activity follow, input and output.

Further elaboration on middle managers being a “small platform”: According to the literature and my case findings, middle managers naturally possess more resources and capabilities than lower-level employees. Middle managers were frontline employees who performed outstandingly and accumulated a considerable amount of resources and experience. They were later promoted and established their own teams and projects. Therefore, middle managers have outstanding skills, experience, understanding of the market, and plentiful resources in the industry. They are like platforms that have accumulated certain resources and are ready to share them with external parties. For example, Tencent was already a strong organisation and possessed a strong resource base before it opened up.

Additionally, middle managers need to facilitate project innovations through frontline employees by using resources to support them. As mentioned in the case findings, middle managers should provide resources to support projects that they consider profitable. When a frontline employee successfully develops a project, it can, in turn, benefit the whole team and the middle manager. Working in a similar way, an open platform organisation also shares its resources with externals to stimulate more innovations and complementary contributions. Moreover, middle managers relinquish control over frontline employees, and they need to reshape their managerial routines based on feedback from frontline professionals. As mentioned in the case, middle managers decide how to allocate resources based on feedback from the BIRP. This mechanism is highly similar to what I defined as the “interactive reconfiguration logic” of the platform organisation in Case One.

All in all, the role and mechanism of middle managers in the organisation are highly similar to that of a platform in the industry. So I call them “small platforms within Tencent.” With each middle manager acting as dynamically as a platform does, the organisation would be more likely to obtain long-term dynamism.

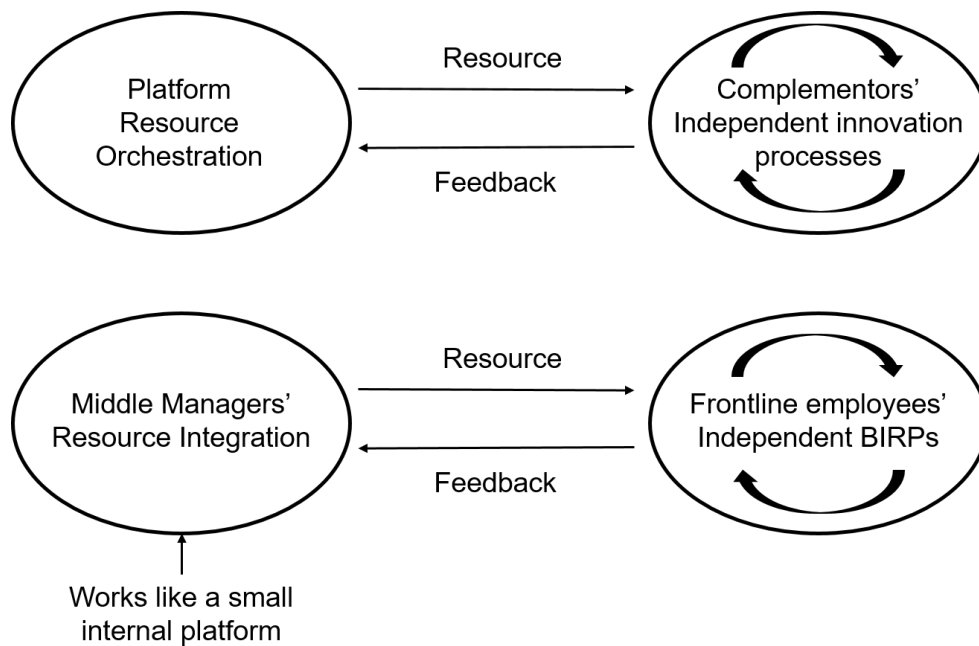


Figure 23 Middle managers act like a platform.

The facts of the co-existence of the internal part (micro-level perspective) and external part (macro-level perspective) of ecosystem, the significant similarity between the two perspectives, and the significant success of Tencent's ecosystem strategy raise my interest in building a multi-perspective ecosystem model and explaining the value creation process of this two perspectives of an ecosystem functioning together. To explain how the digital platform ecosystem copes with uncertainty and creates significant values.

3.0 A brief sum up of the additional discussion

This section aims to point out certain potential directions for my future research. One of my purposes in writing this section is to reveal the tremendous potential in my study and research data. I can still develop abundant insights based on my topic and data. As shown in the discussion in this section, there are some outstanding patterns between the case findings of case 1 and 2. They both reflect an interactive logic, with actors remaining independent and interdependent on each other. We can notice

that it takes a unique internal organisational process to support a unique organisational design. It might incur highly interesting conceptualisation and contributions by comparing the resource management patterns internally and externally to the organisation. My research might generate significant contributions even after I graduate and continue my research journey.

Secondly, this part has another special purpose, which is to reflect how case 1 and case 2 complement each other's insights. In other words, why I choose to compose my dissertation in this way. As I argue in this section, strategic innovation requires a comprehensive internal operational system to support it. To construct a profitable platform organisation and its ecosystem, the organisation must adopt creative managerial activities and routines accordingly. The understanding would tend to be relatively incomplete without looking at the macro-level and micro-level mechanisms simultaneously. Therefore, my research on case 1 and case 2 complement each other by showing different perspectives of the resource reconfiguration of a platform ecosystem. In this way, we can at least obtain a certain multi-level understanding of such a phenomenon and gain more insights in terms of its dynamic capabilities and resource reconfigurations. Hopefully, this section can make my research seem more valuable and coherent.

Chapter 5 Conclusion of the Thesis—Research Recap, Limitations, Implications for Managers and Future Studies

1.0 Recap— Research motivations and designs

The main question for my research is to explore how dynamic capabilities help platform organisations to evolve into an ecosystem and maintain rapid growth. I conducted two processual case studies to reveal the mechanism for a digital platform organisation to develop its ecosystem and maintain rapid growth. I deeply unfold how actors in the ecosystem (platform, users, complementors, top managers, middle managers and lower-level employees) reconfigure the resource base during interactions. I produce 19 process models to show how a digital platform organisation deals with the extreme diversity of platform players, the uncertainty of the future, and the incompleteness of platform design. Thus, I expand the meaning of the dynamic capability at an ecosystem level and surpass the traditional conceptualisation within a firm boundary.

I start the thesis by building a strong literature base and defining a clear direction for my research. I summarised the basic assumptions of dynamic capability, which mainly focus on resource reconfigurations on a firm level and yet have a few discussions of the mechanism that resides in the external organisation. The extant dynamic capability literature still depicts an "omnipotent" character of an organisation and attributes a little attention to value creation which significantly engages efforts made by a diverse range of external parties. Such a theoretical insufficiency appears to be salient in the context of digital platform ecosystems as they have 1) the shifting leadership 2) the externalised value proposition, and 3) the dynamic evolution process. I argue that the digital platform organisation and its ecosystem have certain unique characteristics which make it difficult to be explained by the extant dynamic capability literature. Firstly, under a loose leadership, the platform organisation focuses on enabling and encouraging external innovations and benefits from the

contribution of external parties (Altman and Tuschman 2017; Adner and Kapoor 2010; Gruber, MacMillan and Thompson 2008). It allows its partners to enter the platform by their own decisions and self-select the tasks and the platform resources to use in their businesses (Olleros 2008; Busquets, Rodon and Wareham 2009; Yoo, Henfridsson and Lyytinen 2010). The external business partners/complementors are directly connected to the market and improve their products and services as the market changes (Wareham, Fox and Cano Giner 2014). A platform organisation distribute its central authorities and focus on helping the external parties to conduct innovation and grow together with the platform. Secondly, the value proposition of a digital platform organisation tends to be highly externalised. A distinguishing feature of platform organisations is the network effect, where the value accruing to network users arises from the size of the installed base, i.e., the number of other users with whom they can interact in the same network (Katz and Shapiro 1985). For example, Airbnb connects the travellers who book rooms with the providers who have spare rooms to rent out for a short term. The more travellers using Airbnb, the greater the platform's value to renters, thus, increasing the overall value of the platform. Also, by externalising the value creation process and activities, platform users play the role of designing, producing and operating products or services, which used to be the responsibility of the focal firm. Studies have discussed many different forms of externalised value creation, such as crowdsourcing (Howe 2008; Afuah and Tucci 2012), open-source software (Foss, Frederiksen, and Rullani 2015; O'Mahony and Bechky 2008) and open innovation (Baldwin and von Hippel 2011; von Hippel 1986). Therefore, the platform organisation significantly relies on external parties' contributions, and it needs to build up external communities to improve its competitive advantage constantly. Lastly, the dynamic evolution process stands for the platform organisation's cumulative and emergent growth process (Dattée, Alexy and Autio 2018; Nambisan 2017; Lyytinen, Yoo, and Boland 2016). An ecosystem of a platform faces uncertainty, which makes it cannot be foreseen and pre-designed. Since the platform establishes on a group of generative assets and evolves with unfiltered external innovations, the platform business constantly needs to deal with

flux organisational boundaries, incomplete product designs and innovations (Lyytinen, Yoo, and Boland 2016). In addition, the loose leadership makes the resource base highly flexible, which could result in significant uncertainty. Thus, it is challenging for a platform to have a design of the evolution path. Instead, the platform organisation needs to constantly improve its strategy as it gradually unfolds the development path of a platform ecosystem. These characteristics significantly distinguish the platform organisation from traditional organisations and cause difficulties and uncertainties in the platform resource reconfiguration, which also hamper my understanding of the mechanism behind the platform organisation. The extant dynamic capability literature mainly focuses on evolutionary mechanisms within the firm boundary. Therefore, it is insufficient to explain the mechanism of the phenomenon, which is much more externalised and complex. Therefore, studying dynamic capabilities in a platform ecosystem context promises a fruitful outcome in the field.

Since the dynamic capability theory mainly focuses on the resource reconfiguration within firm boundaries and the dominant leadership of an organisation, studies related to dynamic capability often miss the discussions on 1) the resource reconfiguration in the demand-side economy 2) the incomplete evolution path, 3) the ecosystem-level dynamism. These three gaps hamper my understanding of the reconfiguration process of a platform organisation. Hence, I will have a deeper understanding of the mechanism of orchestrating a platform ecosystem by exploring how resources are obtained, distributed, and recombined in the platform organisation.

Research design. I adopt a qualitative case study method to explore the resource reconfiguration process of the Chinese top digital platform organisation—Tencent while following an inductive inquiry logic. I recognise that Tencent has managed to stay at the top of the digital industry in China, where governments encourage the digital economy. I chose to study Tencent because I believe it succeed in such a competitive environment for several strategic reasons. I choose the design of a single case study because it is suitable for exploratory and historical investigations,

and it facilitates us to develop insights from a novel phenomenon by studying an exceptional case (Flyvbjerg 2006). Given the under-exploration of such a topic, I use the single case study to obtain as many details as possible to develop thick descriptions for the case to enrich my understanding of such a phenomenon and topic efficiently. During the research, I continued to observe and document a significant amount of resource reconfiguration activities within the Tencent ecosystem and extracted patterns from these activities. Using both primary and secondary data, I achieved triangulation and data crosschecking, and I went through a series of coding processes to extract meanings. Eventually, I create multiple process models based on an intense amount of qualitative data collected from diverse sources and informants. I show the unique mechanism underlying the resource dynamism of the platform organisation in rich detail. I find out the unique dynamic capability of platform organisations and also roadmap the evolutionary journey for a platform organisation to build up and maintain an ecosystem.

2.0 Recap—Major findings and contributions

In terms of the case studies, I conduct one case study from the ecosystem level perspective and another from the middle management perspective. Through these two case studies, I study the same case from different angles and observe the resource reconfiguration inside and outside the platform organisation. I find that the resource reconfiguration process revealed in these two studies shows common patterns which indicate the underlying logic for maintaining the platform dynamism. My findings answer my ultimate research questions, which aim to discover the unique mechanism of dynamic capability on an ecosystem level.

2.1 The ecosystem-level dynamism—Embrace the incompleteness and evolve alongside the "conversations."

As I highlighted in the previous discussions, the design of a platform organisation is often incomplete. It is because, first, the platform organisation tends to relinquish

control over the external partners and let the platform users decide whether they will join the platform and self-select their tasks (Olleros 2008; Zittrain 2008; Altman and Tushman 2017). With less control over external resources, the platform organisation face higher difficulties in tracking and predicting the activities of the external parties, and thus, the platform encounters uncertainty. Hence, although a platform organisation might have a particular design in a specific timeline, the organisation's design cannot be considered complete in the long run. Second, as the platform organisation tends to scale up quickly, the growth process becomes less bounded (Nambisan 2017). As the platform quickly attracts more external parties and spans its firm boundaries, the resource base needs to be reconfigured continuously (Zittrain 2008). Products and services tend to be frequently re-designed to adapt to the fast-changing internal and external environment (Lyytinen, Yoo, and Boland 2016). Third, the digital platform organisation is fuelled by generative technology (Zittrain 2008). Based on an opening architecture, the digital platform shares multiple aspects of its innovation and technical progress with external parties (Boudreau 2010). In turn, it obtains unfiltered contributions that are contributed voluntarily by complementors (Zittrain 2008). Therefore, the design of the platform organisation is inevitably incomplete and does not follow a linear development path. Instead, the direction of evolution could be persistently changing, and the platform needs to continuously re-organise the resource base as the development process of platform organisations gradually unfolds. However, the dynamic capability theory tends to have little explanations of the incompleteness of platform organisations. First, dynamic capability literature largely maintains that top managers can design a systematic resource reconfiguration process depending on their experience and profound insights (Zollo and Winter 2002; Easterby-Smith and Prieto 2008; Zott 2003; Helfat and Peteraf 2003; Winter 2003). However, many dynamic capability studies neglect that a platform organisation might evolve without substantially pre-existed insights of future challenges (Dattée, Alexy and Autio 2018; Nambisan 2017). I need more discussions on how a platform organisation copes with the significant uncertainty. Second, the dynamic capability literature often only reveals a snapshot of the

resource reconfiguration and new capability development (Obstfeld 2012; Zahra, Sapienza and Davidsson 2006; Winter 2003); and leaves the question of how to continue the changes in a blank space (Zollo and Winter 1999; Obstfeld 2012).

In my studies, I find that with the level of strategic incompleteness, the platform organisation's resource reconfiguration process and dynamic capability become drastically different from that in the traditional concept. My findings show that the platform continuously reconfigures the resource base by constantly interacting with external parties. I call this unique interaction "conversations" because it is a bilateral process of communication going back-and-forth between the platform and platform users. In the first case study, I find that the platform would provide resources, infrastructures and common grounds to the external parties during the process of developing the ecosystem. Then, the external parties will provide feedback by transferring customer data toward the platform or directly providing feedback on their performance in the market. After analysing the data feedback and evaluating the platform's and external users' performances, the platform will reconfigure the resource base and seek a better resource mix. Departing from the majority stance of the dynamic capability literature, my process models of case 1 show that the resource configuration goes alongside an interactive process. The value proposition of the digital platform organisation could be highly externalised rather than keeping resources controlled internally. Issues and understandings of the market would gradually emerge during back-and-forth interactions among the firm, complementors and customers. This would, in turn, guide the firm to reconfigure the resource base of the platform ecosystem. I posit that dynamic capabilities in the context of digital platform organisation are no longer designed and created by the firm or top managers unilaterally in a manager-led process. Instead, the dynamic capability is formed and re-formed during the dynamic interaction among the platform, complementors and customers.

My second case study of middle-management routines reflects a similar logic of the "incompleteness" and "continual conversations". Through analysing the Basic Individual Reaction Processes (BIRPs) and middle managers' routines, I find that

middle managers' actions highly depend on interactions with BIRPs. The BIRP represents lower employees' regular processes of analysing the market and optimising and developing projects. I find that middle managers' routine activities of matching, directing, providing and adopting are largely affected by feedback from frontline employees' BIRPs. In other words, feedback from lower-level individuals' daily analysis and optimisation activities fuel managerial actions of developing new routines and creating new projects. This means managerial and organisational routines would no longer have a static design; they would rather evolve constantly as frontline employees' BIRP activities proceed. In short, in the digital platform, organisational routines would constantly shape and reshape as ongoing interactions between managers' routines and frontline employees' non-entrepreneurial actions of experiments, project development and incremental optimisations continue to unfold. It becomes risky to solely count on the strategic-level entrepreneurial decisions of the top tiers or an abstract framework carefully designed by the organisation.

Further elaborations. The "conversation" happens when an employee interacts with the organisational resource and proves different performance, and managers reconfigure the resource base depending on the performance. With frequent conversations between employees and managers, members of the organisation will be matched with resources that suit the most to their current condition. Thus, resulting in the competitive advantage of the overall organisation. The resource base will continuously renew as employees in the organisation grow, succeed or fail. The other study also reflects a similar process. The platform organisation will be able to find a better resource reconfiguration depending on the data feedback and the performance of the external parties. The "conversation" happens when the platform develops infrastructures, services and tools and offers them to external developers, external parties will use these resources to grow their businesses and generate performance and data feedback. The platform will be able to improve the infrastructures, services and tools under the guidance of the feedback. The back-and-forth interaction process shown by the case study reflects the similar logic of embracing incompleteness and following the "conversation".

My first conclusion shows that reconfiguring the platform resource base is an ongoing process that follows the back-and-forth interaction between the platform and platform users. Current discussions have criticised the capacity of dynamic capabilities to sustain resource dynamism in uncertainty (Salvato and Vassolo 2017; Obstfeld 2012). They argue that the extant dynamic capability literature mainly focuses on the strategic decisions of top managers (Strauss 1993; Salvato and Vassolo 2017; Salvato and Rerup 2011; Adner and Kapoor 2010). As a result, it is insufficient to explain resource reconfigurations within the context where the platform scales up in a less fixed pattern (Gruber, MacMillan and Thompson 2008; Zittrain 2008). I contribute to dynamic capability and platform organisation literature by explaining the process for a platform organisation to evolve and tackle uncertainty and incompleteness. I fill the missing part of dynamic capability that is insufficient to fully explain the resource reconfiguration within the context where the platform has to largely involve unfiltered external parties and co-evolve with them while continuously interacting with them. I also react to recent calls for a new perspective on how digital firms such as digital platform organisations and their ventures navigate opportunities and challenges (Nambisan 2017; Nambisan, Siegel and Kenney 2018; Helfat and Raubitschek 2018) from the dynamic capability perspective (Teece 2018; Helfat and Raubitschek 2018; Zeng and Mackay 2019). More importantly, I fill the theoretical gap by answering how dynamic capabilities are developed on an ecosystem level. I provide a relational view for researchers to unfold further the dynamic resource reconfiguration process in a platform ecosystem where values are co-created by the focal firm and ecosystem players. Those multiple process models I provided show complex feedback loops between the platform and its users. They reflect the mechanism for a platform organisation to navigate through the contributions from complementors, connect its resource base with ecosystem-level resources, and facilitate the interdependence and co-development among resources from different sources in the ecosystem.

2.2 The ecosystem-level dynamism—A shifting leadership and the depreciation of the “heroic” power of top managers

As aforementioned, the platform organisation operate in a demand-side economy. First, in a platform organisation, innovation, transaction, product and service development processes are largely externalised. Users from the demand side of the platform drive the value creation (Gruber, MacMillan and Thompson 2008; Zittrain 2008). In addition, externalisation is different from traditional outsourcing because the platform organisation deal with multilateral relationships (Gulati, Puranam, and Tushman 2012; Evans and Wolf 2005). Plus, platforms relinquish control of the time and quality of a product developed by the platform users (Lehdonvirta, Kassi, Hjorth, Barnard, and Graham 2018; Parker et al. 2016). Simply put, a platform not only highly depends on the contribution of multiple users but also strategically relies on them to develop a unitive development direction and common ground to build up a platform. However, dynamic capability studies tend to emphasise the dominant role of the top-management team (Teece 2007; Ambrosini and Bowman 2009; Helfat and Peteraf 2003). Extant studies highlight that top managers are responsible for learning from experience (Zollo and Winter 2002), generating knowledge (Zott 2003) and designing the systematic resource reconfiguration process (Winter 2003). Studies of dynamic capability have limited attention to platform users' rising value proposition and autonomy. They have a few discussions that focus on how to reconfigure the resource base to align the activities and value creations between the focal firm and external users (see exceptional examples in Giudici, Reinmoeller and Ravasi 2018; Zeng and Glaister 2016; Helfat and Raubitschek 2018). I need more explanation on how the platform reconfigure resources when they are not entirely under control and have an increasing value proposition in the organisation.

My researches reflect that management teams in a platform organisation should not dominate resource reconfiguration; instead, it should be driven by the needs of the demand side. Managers in my study focus on detecting the demands of the platform users by interacting with them and rapidly reconfiguring the resource base when the

external demand changes. For example, in my middle manager routine study, employees are treated as highly empowered individuals instead of lower-level members controlled by managers. The manager tends to play the role of a facilitator and resource provider but a controller of the employees. Middle managers in Tencent are responsible for collecting the personal data of employees and interpreting the data to have a precise evaluation of the performance and quality of employees. Depending on the evaluation, middle managers assign the employees to matching positions and provide the team with appropriate resources, with the ultimate aim of helping the employee to develop and find a suitable position. As a result, employees in the organisation are more likely to achieve their full potential. They have more passion for their job, thus, contributing to the dynamic capability of the platform organisation. Similarly, my firm-level study finds a similar principle of building up the resource base. I find that the platform organisation reconfigure its resource base to help the external parties to grow, develop products and conduct innovations. As managers detect new demands from external developers, they will reactively improve the infrastructure and develop more services and tools.

My studies find that platform ecosystems are neither fully purposefully designed by the platform owner nor fully controlled by them. Since the platform needs to reconfigure the resource base in favour of the development of the platform users, a platform organisation should consult the requirements from the demand side of the platform. I find that the platform evolution is not an isolated activity conducted by the platform. Instead, the evolution is interconnected with diverse stakeholders (Parker and Van Alstyne 2018). I contribute to dynamic capability and platform organisation literature by showing how the platform copes with the externalisation of the value proposition and reconfigure the resource base to play a non-zero-sum game and achieve ecosystem-level evolution.

2.3 The ecosystem-level dynamism—Resource versatility rather than resource possession.

As dynamic capability is essentially a theory of reconfiguring internal and external resources, my study of DC in the digital platform organisation allows us to tap into resource management literature in an ecosystem-related context. The extant dynamic capability still emphasises the control and orchestration of resources and partnerships. It insists that it is the firms' responsibility to reconfigure the internal and external resources to create difficult-to-imitate capabilities and, thus, obtain competitive advantages. Therefore, DC discussions of the organisational strategy still follow the basic logic of the dominant paradigm of the resource-based view that emphasises the possession and control of resources. The current theorisation still emphasises the valuable, rare, difficult to imitate and non-substituted (VRIN) framework (Barney 1991) and highlights the possession and identification of superior resources. The resource-based view considers the nature of a firm as a bundle of resources so that the competitive advantage is generated by possessing heterogeneous resources (Barney 1991; Penrose 1959), which could also be understood as viewing resources from an inside-out perspective. In addition, the extant literature inherits the view of the "isolating mechanism" which secures the economic rents by creating a resource base that is difficult to imitate by competitors (Barney 1991; Rumelt 1991; Wernerfelt 1984; Teece, Pisano and Shuen 1997). Therefore, the underlying logic is to consolidate the possession and control over resources and lock them with the organisation for a longer time.

On the contrary, in my first case study, I find that the platform's database needs to be shared with different actors to facilitate the development of an understanding of the ecosystem and market, which would be put into action later. I posit that platform leaders no longer try to control or isolate their database to achieve the resource-position barriers and eventually obtain the exclusive economic rent in the traditional sense (Wernerfelt 1984; Barney 1991; Rumelt 1991). Conversely, platform resources need to achieve versatility by being shared among ecosystem players.

This would then reform the current resource base and become more applicable to a diverse range of business usages. Therefore, the research provides a unique perspective to view resources as not controlled by the focal firm and remain static. Instead, platform resources are dynamic and versatile, which means they could be put into multiple different usages and serve the growth of both the platform and the other ecosystem-related parties. The focal firm could develop an interdependent relationship with ecosystem actors and achieve co-evolution.

My second case study also finds a similar resource orchestration logic within the platform organisation. The findings of my second case study show that one of the main activities of middle managers' routines is providing resources to frontline employees. Such an outcome indicates that managers in a platform organisation no longer focus on controlling the power and resources. Instead, they need to share their resources with the employees to stimulate project innovations. Different employees would acquire resources for conducting their BIRP activities and develop a wide range of new capabilities; meanwhile, these capabilities can also be shared among the organisation and fuel more innovations. Furthermore, with feedback provided by employees, managers would have a better understanding of the market. They can re-integrate resources and provide appropriate resources to help employees create good capabilities. The point is that managers who usually possess important resources can put their resources to more users without focusing on controlling resources and employees and avoid the sticky nature of organisational resources. Employees can potentially create more applications of platform resources to cope with a rapid market change. This reflects that the platform resource base is highly dynamic and versatile, and the leader maintains interdependent relationships with different agencies.

Every team is a part of Tencent. For example, with so many different teams (with different resources and capabilities) in Tencent, I naturally have the advantage of resource interdependency among teams. I can integrate my internal

capabilities (efficiently), which is an advantage when competing with competitors in the market. Therefore, when Tencent find an opportunity in the market...I can quickly create some unique features on my own and quickly iterate (Team leader in the product innovation team in the telecommunication business department, Tencent Corporate Development Group).

To sum up, resource versatility and resource sharing make resource orchestration in the context of the opening digital platform stand out from the traditional understandings of resource management and reconfigurations. Through studying Tencent's approaches to remixing resources and driving the growth of the platform ecosystem, I find that resource sharing and versatility are critical strategic themes in such a platform organisation. The key is to involve more players in the resource reconfiguration process to avoid the sticky nature. This discovery helps us address arguments related to resource base theorisation, such as the sticky nature of resources and the externalisation of the resource value proposition (Priem, Butler and Li 2013; Schmidt and Keil 2013). Thus, I enrich current understandings of resource reconfigurations and answer how resources are reconfigured in the ecosystem and how such an organisation reacts to uncertainty and rapid market change.

3.0 Practical implications

The research paper presents several practical implications regarding the understanding and management of resources within platform ecosystems. One key implication is the need to transition from a traditional perspective that emphasises owning and controlling resources to a more flexible approach that emphasises resource sharing and adaptability. I will further elaborate on the practical implication to reflect the value of my research outcomes in the field.

According to my findings, in platform ecosystems, the emphasis should be on sharing and exchanging resources rather than exclusively possessing and

controlling them. Managers of an open digital platform should view their databases, particularly customer data, as versatile resources that can be shared and utilised by various actors within the network. This approach to resource sharing improves data communication, facilitates resource coordination, and leads to improved configurations and knowledge. Practically, this implies that platform leaders should establish mechanisms and platforms for sharing resources with diverse external parties, such as complementors and customers. By sharing resources like data, capabilities, finance supports, and expertise, platform leaders can promote strong interdependence and co-development with ecosystem partners. This collaborative approach enables the platform ecosystem to evolve and grow collectively, benefiting all involved parties.

Moreover, my studies underscore the significance of recognising the versatility of resources within platform ecosystems. Rather than considering resources as static and solely controlled by the focal firm, resources within platform ecosystems are dynamic and adaptable. They can be employed for various purposes and contribute to the growth of both the platform and its peripheral partners. Practically, this implies that platform organisations should actively explore and leverage the adaptability of resources within their ecosystems. They should encourage ecosystem partners to utilise and contribute to the platform in ways that align with their own interests and business objectives. By embracing the versatility of resources, platforms can harness the collective intelligence and capabilities of the ecosystem to drive innovation and growth.

My research also implies that platform organisations should foster non-entrepreneurial actions within the organisation. To promote the ongoing development and adaptation of routines and capabilities within digital platform organisations, it is crucial for managers to recognise and value the non-entrepreneurial actions carried out by lower-level employees. These actions involve the optimisation of routines and contribute significantly to organisational growth. Managers should empower frontline employees to conduct their own analyses,

experiments, and optimisations, creating a culture that appreciates their insights and feedback.

Moreover, given the rapidly changing and uncertain nature of digital platform organisations, it is essential to foster a culture of continuous adaptation. My study emphasises the importance of middle managers' routines in responding to market changes and facilitating the development of new projects. Higher-level managers should provide support to middle managers in dynamically adjusting their actions and projects based on evolving strategies and experiments. This entails providing the necessary resources and authority to effectively address emerging challenges.

Last but not least, my practical implication also indicates that digital platform organisations need to acknowledge and embrace the inherent strategic incompleteness resulting from their generative business model. The boundaries between the organisation and its environment are often ambiguous, making it difficult to define clear strategies or fully design systems. Rather than striving for complete and rigid strategies, organisations should encourage a more emergent and situated approach. This approach involves co-creating solutions with various stakeholders, recognising that project development is an ongoing process without a definitive endpoint. Successful projects can serve as platforms for further innovation and development.

4.0 Limitations

It is also important to acknowledge that my research does have its limitations. First, I do not ultimately emphasise generalisability because of the nature of explorative studies and single case studies. Studies argue that case studies should provide in-depth narratives of certain individuals, which lead to nuance and a deep understanding of a particular phenomenon (Tsoukas 1994; Yin 2003). I focus on concluding with a thickly described narrative to enrich the limited understanding of the novel phenomenon and academic topic. Therefore, the replicability of my theoretical contribution is not guaranteed until more large-scale research and tests are done.

Second, since my chosen single case—Tencent is a top Chinese organisation, my contributions could be limited to the context of China and developing economies. However, many worldly acknowledged digital platform organisations, such as Amazon, Google and Facebook, are located in western countries and developed economies. Such a group of organisations also play significant roles in developing the digital platform industry, and it could be risky not to include them in the digital platform ecosystem research. Thus, my limitation resides in only covering the topic in the context of China.

Third, my research focuses on the specific type of digital platform organisation that operates over an opening system and aims to engage unfiltered external parties and enable peripheral transactions and innovations. The specific type of platform organisations like Tencent, Airbnb and Uber stimulate dynamism and innovations by relinquishing control over external parties rather than trying to gain control over resources (Kyprianou 2018). Actors in the ecosystem can conduct self-interested business activities and contribute to the platform organisation. The platform organisation would, in turn, benefit from the flexibility and fast evolution of the ecosystem (Nambisan 2017). Therefore, my research contribution could only shed light on the platform organisations based on an open-ecosystem strategy which rises from generative technologies and the lack of hierarchical control.

5.0 Implications for future studies

Moreover, my research limitations lead to some implications for future studies.

First, since I choose to conduct a single case study, my research is naturally subjected to analytic generalisability. According to Stake (2005), the case study can be intrinsic in that it focuses on understanding the particular case, and its purpose is not to generate generalisable outcomes. However, I would encourage future studies to conduct large-scale historical studies to clarify the cause-effect relationship among constructions (Plakoyiannaki, Tzokas, Dimitratos, and Saren 2007). In addition, by investigating a population of the platforms by conducting multiple case studies, future research can have cross-case checks and comparisons among

different platforms and ecosystems to enrich my research outcomes. I need more studies to explore the ecosystem-level dynamism in various contexts, such as digital platform organisations in western countries/developed economies, opening ecosystems established by other organisations except for Tencent, and dynamic capabilities in different platforms such as game consoles and digital payment systems.

Second, my researches focus on the ecosystem level rather than the firm-level view. Future studies in dynamic capability could pay more attention to building a more robust theoretical base from an ecosystem perspective. For example, as I highlighted in the research contribution, the value-creation process of a digital platform ecosystem largely involves efforts from external parties. Creating a business model to facilitate value co-creation and co-evolution is important. Future studies need to shift the focus from the dominant role of platform leader toward a more relational view which focuses on developing a dynamic co-evolving system and capturing value from external contributions. Besides, I also submit that future analyses of resource reconfiguration can emphasise the resource versatility resulting from resource sharing. It is important to highlight that platform resources tend to be shared with limited conditions in the setting of opening ecosystems. Therefore, researchers and organisations must understand the mechanism of achieving multiple usages of resources and capturing value from research sharing. Furthermore, the ecosystem-level view challenges research under the positivism paradigm. Given the complexity and the number and variety of actors involved in the ecosystem, ecosystem-level constructions and connections would be difficult to quantify and test numerically. However, as I adopt the paradigm of constructivism and qualitative research design, it is naturally criticised by positivism. Therefore, to enrich the theory and ecosystem-level view, future research would benefit from identifying more measurements on the ecosystem level and testing the connections and co-evolution among ecosystem actors through numerical analyses.

Third, my researches also show the value of historical case studies in the field of platform ecosystem. I submit that ecosystem studies could benefit from more

research that covers a long time horizon (Tilson et al. 2010). Also pointed out by Germonprez and Hovorka (2013), because of the generative nature of digital platform organisations, their unique mechanisms revealed by studying a certain period are not likely to be shown in studies that only cover a snapshot. Although studies made different decisions on whether to include time (e.g. Kapoor and Agarwal 2017; West 2003; Rindova and Kotha 2001) or not (e.g. Wareham, Fox and Cano Giner 2014; Dattée, Alexy and Autio 2018), I submit that historical studies is important. Because historical study can reflect the "ever-changing organisational context" faced by digital platform organisations (Zeng and Mackay 2018) and the constantly morphing organisational form (Rindova and Kotha 2001). Nevertheless, I have limited historical studies, which deserve further development.

Fourth, as I highlighted previously, my research context is limited to China—a developing economy, whereas there are many different worldly top digital platform organisations in western countries/ developed economies. Therefore, my research outcomes may not apply to other digital platform organisations in other countries. Future research could benefit from conducting ecosystem-level investigations in the famous digital platform organisations in other countries; or taking a step forward, comparing digital platform ecosystems in different economies. The research outcome is likely to be different by taking other institutional factors (e.g. anti-trust policies; the government's support for the digital economy) into account, which would enrich the current understanding of the digital platform ecosystem.

Fifth, I suggest that researchers could benefit from more multi-perspective analyses of an ecosystem. As I have shown in case 1 and case 2, I can study the dynamic capability of a digital platform from different perspectives. My first case adopts the ecosystem perspective, and I discuss interactions between the platform and a diverse range of platform users; the second study adopts the micro-foundation perspective, which focuses on unfolding the managerial routines and the reconfiguration of internal resources. My outcomes show that both case studies enhance my understanding of the digital platform organisation and its ecosystem, and I could potentially generate more insights by integrating models of these two

cases (discussed in the “further discussion” section). By studying macro-level and micro-level resource reconfiguration, I understand how a platform ecosystem is orchestrated and the underlying logic for actors inside and outside the organisation to connect and interact. By integrating case 1 and case 2, I potentially have a complex and comprehensive view of the digital platform ecosystem. I believe future research can depict a picture of an ecosystem that involves a diverse range of actors and a highly dynamic and complex system by adopting multi-perspective analysis.

Appendix

Appendix 1 Source of the secondary data

Source of secondary data	Description	Use in research and analysis
News, public releases and analysis articles, reports on professional websites, databases recommended by interviewees	https://blog.csdn.net/ ; https://www.iimedia.cn/ ; https://www.tisi.org/ ; https://www.nasdaq.com/ ; https://hbr.org/ Annual reports; Tencent White Paper; strategy analysis articles/blogs; press articles; newspapers; business reviews (Keywords: internal management; project management, project manager, internal organisation management; product management, product manager, talent management; inner organisational ecosystem)	Getting contextual information about Tencent, such as the organisational settings, organisational structure, policies, strategies, reputations and organisational culture. In order to set up a base for future research. Supporting data triangulation and method triangulation.
Published journals	https://www.cnki.net/ ; https://www.sciencedirect.com/ ; https://scholar.google.co.uk/ (Keywords: Tencent Manager; Tencent employee; Tencent organisational management, project management, product management)	To have a general view of the extant strategic and managerial discussions, conceptualisations and theorisations of internal management of Tencent. Collecting cases (e.g. managing resources and front-line employees, developing new projects, coping with challenges, improving routines, restructuring the team), direct quotes and theorisations to build up the storyline.
Published books	Published books (The Tencent Method—the product philosophy of a \$150 billion company, 2014; Tencent Biography, 2017; How Tencent works, 2016; Tencent Industrial Forest: entrepreneurial password in the ERA of AI, 2018; Hua Teng Ma's Tengxun story, 2016; Commercial product manager—Product management thinking taught by Tencent, 2019)	Supporting data triangulation and method triangulation.
Interviews and Conferences recordings	2019 WeChat open-class by Xiaolong Zhang (https://v.qq.com/x/cover/b86kk0n60chvn5/b0029zsv8t9.html) Online training provided by Tencent: Spring is a good time to intern at Tencent! (https://daxuepc.com/detail/v_5c2f495d1a779_WuJKR75E/3) Interviews with middle managers in the investment department (https://haokan.baidu.com/v?vid=8021858840520006237&pd=bjh&from=employees) Tencent founder Yidan Chen: How to manage the post-90s generation in the workplace? (https://v.qq.com/x/page/c0719fwjhos.html) Interview with Ma Huateng on CCTV (https://v.youku.com/v_show/id_XNjk0NTY0MDA0.html)	Collect direct quotes from managers, having a more specific understanding of their actions and thoughts on managing resources and relationships with front-line employees and reacting to market demands. Supporting data triangulation and method triangulation.

Appendix 2 Source of the primary data

Source of Primary Data	Description	Use in research and analysis.
Informal meeting with the key informants	Team leader in the to-B product team in the commercialisation department, Tencent Platform and Content Group (Served for 8 years.)	Getting background information (organisational culture, organisational strategies, department settings, managerial style, potential bias, boundaries of the interview).
	Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group (Served for 4 years.)	Gaining trust from our interviewees.
Formal semi-structured interviews with the key informants	Team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group (Served for 3 years.)	Facilitating further refinement of interview questions to guarantee the efficiency of interviews.
	Team leader in the data analysis team of the commercial income department, Cloud and Smart Industries Group (Served for 12 years.)	Supporting data triangulation and method triangulation.
Following semi-structured interviews	Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group (Served for 10 years)	The initial batch of in-depth primary data.
	Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group (Served for 8 years.)	Get background information such as organisational culture, organisational strategies, managers' department settings, managing style, and potential bias.
Formal semi-structured interviews with the key informants	Team leader in the to-B product team in the commercialisation department, Tencent Platform and Content Group (Served for 8 years.)	The interview boundary (questions they are not allowed to answer).
	Team leader in the to-B product team of the commercial income department, Cloud and Smart Industries Group (Served for 4 years.)	Facilitating us to gain the trust of our interviewees and setting the base for smooth interviews. It also facilitates the further refinement of our interview questions to guarantee the efficiency of interviews.
Following semi-structured interviews	Team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group (Served for 3 years.)	Facilitating us to gain the trust of our interviewees and setting the base for smooth interviews. It also facilitates the further refinement of our interview questions to guarantee the efficiency of interviews.
	Team leader in the data analysis team of the commercial income department, Cloud and Smart Industries Group (Served for 12 years.)	Facilitating us to gain the trust of our interviewees and setting the base for smooth interviews. It also facilitates the further refinement of our interview questions to guarantee the efficiency of interviews.
Following semi-structured interviews	Director in the to-B product team of the commercial income department, Cloud and Smart Industries Group (Served for 10 years)	Facilitating us to gain the trust of our interviewees and setting the base for smooth interviews. It also facilitates the further refinement of our interview questions to guarantee the efficiency of interviews.
	Senior team leader in the to-C product team of the commercial income department, Cloud and Smart Industries Group (Served for 8 years.)	Facilitating us to gain the trust of our interviewees and setting the base for smooth interviews. It also facilitates the further refinement of our interview questions to guarantee the efficiency of interviews.
Following semi-structured interviews	Operational director in Tencent wireless security product department, Tencent Corporate Development Group (Served for 12 years.)	Functioning as an extension and refinement of the previous stage.
	Team leader in the hip-hop music team, Tencent QQ Music Group (Served for 1 year.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	The professional front-line employee in the opening platform team, Tencent WeChat Group (Served for 9 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Team leader in the to-B product team of the commercial income department, Tencent Corporate Development Group (Served for 2 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Team leader in the investment team, Tencent Platform and Content Group (Served for 5 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	A front-line employee in the sports content team, Tencent Platform and Content Group (Served for 1 year.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Team leader in the backstage engineering Team, Tencent Technology and Engineering Group (Served for 4 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Team leader in the technology development Team, Tencent Technology and Engineering Group (Served for 1 year.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Team leader in the WeChat TV program team, Tencent WeChat Group (Served for 6 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Team leader in the product innovation team in the telecommunication business department, Tencent Corporate Development Group (Served for 4.5 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Team leader in the product operation team in the telecommunication business department, Tencent Corporate Development Group (Served for 6 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Team leader in the basic product team in the telecommunication business department, Tencent Corporate Development Group (Served for 6.5 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Team leader in the business team in the telecommunication business department, Tencent Corporate Development Group (Served for 15 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Front-line professional in the business team in the telecommunication business department, Tencent Corporate Development Group (Served for 11 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Front-line professional software developer in the government affairs department, Tencent Cloud and Smart Industries Group (Served for 5 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Product manager in the gaming department, Tencent Interactive Entertainment Group (Served for 6 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Professional technology developer in the data platform development department, cross BG (CDG/IEG/MIG/CSIG) (Served for 4 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Team leader and professional technology developer, Tencent Corporate Development Group (Served for 10 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Project planner in the telecommunication business department, Tencent Corporate Development Group (Served for 11 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	New technology and product developer in the product department, Tencent Cloud and Smart Industries Group (Served for 9 months.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	New employee in the administrative department, Tencent Technology and Engineering Group (Served for 6 months.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	New backstage developer in Open platform Foundation department mini program Center, Tencent WeChat Group (Served for 2 months.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	Intern in Financial application line and basic payment platform of Financial Products Department, Tencent Corporate Development Group (Served for 2 months.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.
	Product manager/planner in the Tencent Meeting department, Tencent Cloud and Smart Industries Group (Served for 1.5 years.)	Facilitating us to further deepen and refine our understanding of the underlying logic of middle managers' practices.
Following semi-structured interviews	9-year frontline professional and team leader in the department of WeChat Opening Platform, Tencent WeChat Group (Served for 9 years.)	We also accumulate enough components to form a complete view of middle-management routines and how their routines contribute to the reflective reaction to environmental change.

Appendix 3 Interview questions

1. Please introduce yourself briefly. (Length of service, job position, business group, area, other work experiences.)
2. Could you please briefly describe your routines for developing a project? (Which part of the routine is most important; have your routines changed in recent years?)
3. How do you communicate with your subordinates? What do you discuss when you communicate with them? Could you please give some examples? (Specific issues, the purpose of discussions.)
4. Whom would you contact apart from your subordinates? How do you communicate with them? What do you discuss when you communicate with them? Could you please give some examples? (Specific issues, the purpose of contacting them.)
5. Tencent has been evolving quickly; can you feel the change (does the change affect you and your team)? Could you please give some examples?
6. How do you (and your team) deal with these changes? Could you please give some examples?
7. Have you encountered significant problems/crises during these years? How did you and your team deal with the problems/crises? Could you please give some examples?
8. Tencent's products and services are highly iterative and innovative. How are these innovations created? Who initiates these innovations? Could you please give some examples?
9. What role do you play in innovations? Could you please give some examples?
10. If you and your team encounter difficulties during the innovation, how would you deal with them? Could you please give some examples?

11. How would you describe the relationship between different teams (inside and outside Tencent)? What role do you play in competing/collaborating with other teams? Could you please give some examples?

12. How would you describe your relationship with your subordinates? Could you please give some examples?

13. Do you have other working experiences? How is the working experience at Tencent different from that at other companies? Could you please give some examples?

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