Firm Survival and Innovation in Emerging Markets

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Chapter 4

The influence of government affiliations on firm product innovation in a dynamic institutional environment: Empirical evidence from China

Abstract: This chapter studies the influence of government affiliations on firm product innovation in a dynamic institutional environment. It combines resource dependence theory with a dynamic institution-based view and builds on a unique dataset of Chinese manufacturing firms, situated in an environment that is characterized by institutional transition, covering a period of 12 years, with 2,564,547 firm-year observations. The findings suggest that firms with higher-level government affiliations have a relatively high product innovation performance. It finds that this innovation stimulating effect is contingent on the dynamic nature of the institutional environment. To be specific, a high speed of institutional transition may depress the positive innovation effects of government affiliations, while a more synchronized transition speed of institutional components may enhance the positive innovation effects of firms' government affiliations. These findings add to a better understanding of the drivers of product innovation in firms that are situated in environments that are characterized by institutional change, using, and contributing to resource dependence theory and the dynamic institution-based view.

Keywords: Product innovation, institutional transition speed, dynamic institution-based view, China

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4.1 Introduction

Innovation scholars are increasingly devoted to a better understanding of how connections between firms and political authorities may influence firms' innovativeness in emerging markets like China (Gao et al., 2017; Li and Zhang, 2007; Kotabe et al., 2017; Song et al., 2015; Yang et al., 2019). In this research trend, studies have largely concentrated on two types of political connections, that is on political ties between firms and authorities (Peng and Luo, 2000; Zhang et al., 2019), and on state ownership of firms (Rong et al., 2017). In China, the situation of political connections is a bit complicated. A unique institution that is called the *lishu* relationship (meaning "subordinate to" or "affiliate with") is used by the government to administrate or control China's firms (Li et al., 2018; Tan et al., 2007; Wang et al., 2012). That is, there are five government levels that control firms in China. To be specific, firms are subject to one or more of five levels of governmental control or administration, which are central, provincial, municipal, county, and town governmental control. In other words, firms may affiliate with one or more of these five levels of government. Although this *lishu* relationship has been weakened during the pro free market reforms since 1978, its role remains (Ding et al., 2018). Specifically, as a unique kind of political connection, the *lishu* relationship is an area that according to the literature needs further research to improve our understanding of firm innovation (Li et al., 2018; Wang et al., 2012; Genin et al., 2020). Thus, this study aims to contribute to knowledge development in this area and concentrates on a specific political connection of Chinese enterprises that is most neglected in the innovation literature: Chinese firms' affiliations with governmental bodies, arguing that such affiliations have a stimulating effect on Chinese firms' innovativeness. That is, this chapter is going to explore what and when do affiliation levels influence firm' product innovation in transitional China.

We draw from resource dependence theory (Pfeffer and Salancik, 1978) and the dynamic institution-based view (Banalieva et al., 2015; Peng et al., 2008) to examine how government affiliations based on *lishu* relationships contribute to firm innovation in dynamic environments in China, which are characterized by institutional change. Resource dependence theory (RDT) suggests that firms with competitive advantage must develop ways to deal with environmental uncertainties, manage resource dependence, and mitigate risks outside organization boundaries (Pfeffer and Salancik, 1978; Hillman et al., 2009). For example, all five governmental levels in China control crucial resources that firms need in their new product development. In such a situation, firms' dependence on the government is a starting point in their innovation trajectories. Chinese firms that are affiliated with one or more levels of the Chinese government may be advantageous in obtaining specific resources

that are under control of the Chinese government, such as land, bank loans, and regulatory information. In addition to RDT, the dynamic institution-based view (dynamic IBV) stresses the importance of changing institutional contexts where firms cope with external dependencies (Chen et al., 2017; Banalieva et al., 2015; Hillman et al., 2000; Kim et al., 2010; Xu and Meyer, 2013). China is characterized by pro free market reforms (Kafouros and Aliyev, 2016; Li and Zhang, 2007) that switch the economy from a mainly planned to a more market-based economic system (Child and Tse, 2001). Such reforms usually lead to dynamic institutional change that gives rise to more uncertainty, turbulence and risk (Peng, 2003; Shi et al., 2017), and may restructure firms' external dependencies on the government (Dess and Beard, 1984; Hillman et al., 2000; Pfeffer, 1972), for example firms' dependence on political connections with the five levels of the Chinese government (Drees and Heugens 2013; Hillman 2009).

A combination of RDT and dynamic IBV is used in this chapter to hypothesize that firms' affiliations with the government have a positive effect on these firms' innovativeness, and that these effects vary in distinctive areas of China, areas with different modes of institutional change. We empirically examine when and to what extent the dynamism of the institutional transition in different areas in China influences this effect.

A large dataset of Chinese manufacturing firms, that covers 2,564,547 firm-year observations during 12 years (1998-2009), is applied to test our hypotheses. Empirical results support our theoretical predictions. That is, firms with higher-level government affiliations show a higher performance on innovativeness than firms with lower-level government affiliations. It is found that this effect declines when firms are located in a Chinese province that has a relatively high speed of institutional transition; whereas a more synchronized transition speed of institutional components enhances the positive effect of government affiliations on firms' product innovation. These findings contribute to extant literature by means of deepening the understanding of the drivers of firms' product innovation through concentrating on firms' government affiliations in an environment that is characterized by institutional change, a largely unexplored empirical field of research. It constructs and applies a combined framework of RDT and dynamic IBV to structure this empirical study, which provides vivid empirical evidence of how different dynamic institutional environments influence the benefits firms may derive from an external dependency like a dependence on the government.

The remainder of this chapter is organized as follows. Section 2 conducts a literature review and develops theoretical hypotheses. Section 3 presents research methods, measures, and

analytic strategies. Section 4 structures the empirical findings. And finally, section 5 discusses these findings and draws main conclusions.

4.2 Literature review and hypotheses development

4.2.1 Government affiliations and firms' product innovation

Chinese firms' affiliations with the government developed significantly in the past four decades. Before the institutional reforms began in 1978, firms were directly administrated by different ranks of the government. When forty years ago the pro free market reform process started, Chinese governments gradually withdrew their interventions from business transactions, however, their administrative linkages with firms and businesses were retained (Li et al., 2017; Tan et al., 2007). Keeping administrative linkages and thus obtaining governmental support helped firms to mitigate external uncertainties and reduce environment dependencies (Hillman et al., 2009). While in the beginning decades of the process of pro free market reform the Chinese government used *lishu* relationships to grow commercial business activity, more recently, the past decade and the coming decade China puts an increasing emphasis on innovation as a driver of business change, and by this, further growth. Accordingly, China's central and provincial governments more and more devote themselves to incenting firms' investments into new product and technology development. The higher-level governments (e.g., central and provincial governments) aim to transform the country to be more innovation-driven, while lower-level governments (e.g., municipal, county and town governments) focus more on increasing local economic output (such as GDP increase) (Ring et al., 2005). These divergent goals differently shape the affiliated firms' strategic behaviors and innovation propensities (Liu et al., 2018; Peng, 2003; Yang et al., 2015). Higher-level governments, such as the central government, may set up ambitious technology development projects and innovation plans, and view the affiliated firms as major means to achieve innovation objectives. Thus, firms affiliated with higher-level governments are obligate to conduct innovation activities, and innovation-related resources flow from higher-level government to these firms (Hillman and Hitt, 1999; Liu et al., 2018). In contrast, lower-level governments' primary goals are to boost the local economy and increase revenue, employment, and tax, which would, in turn, make local officials get promotions. Therefore, firms affiliated with lower-level governments are likely to comply with and support local governments', mainly non innovation-based, operating growth expectations.

Government-controlled innovation-related resources may disproportionately flow to firms that are affiliated with higher-level governments. Higher-level governments are more

powerful and able to allocate financial resources such as bank loans and government-initiated venture capital to affiliated firms (Shi et al., 2014). Firms affiliated with higher-level governments have more opportunities to obtain financial support for their innovation activities (Li et al., 2018). Empirical studies show that firms that are affiliated with higher-level governments are participating more intensively in government-initiated innovation programs and receive more government funding than other firms (Gao and Zhang, 2011; Guan and Yam, 2015; Li et al., 2017). Although China has made a remarkable achievement in marketization and privatization in the last forty years, central and provincial governments remain in control of strategic business sectors, for instance in the financial industry (Shi et al. 2014), through state-owned banks such as ICBC, BOC, and CCB. For example, the central government directly appoints the leaders of these banks. An affiliation of firms with higher-level government thus is valuable in gaining access to financial capital (Arnoldi and Villadsen, 2015; Zhang, 2006). Therefore, firms that maintain administrative linkages with higher-level governments tend to have an advantage to acquire substantial financial resources for more risky but promising innovation projects (Michelson, 2007; Shi et al., 2014).

Chinese governments usually facilitate economic development by means of various plans, such as five-year plans, industrial development projects, innovation support schemes, and high-tech zones. However, reforms conducted by lower-level governments have to comply with higher-level governments' reform frameworks (Liu et al., 2006; Rawski, 1995). In addition, higher-level governments can mobilize more resources to fulfill innovation objectives, and have a strong influence on a move of the economy towards an innovation-driven system. Firms affiliated with higher-level governments are better informed regarding the potential innovation policies and prospective innovation programs, and even lobby the government to devise or revise the regulations that enable them to obtain policy favors (e.g., government procurement) (North, 1990). In contrast, firms affiliated to lower-level governments have disadvantages to obtaining such innovation-relevant regulatory information that is issued by higher-level governments (Zheng et al., 2015).

This leads to our first hypothesis.

> ***Hypothesis 1 (H1):*** *Government affiliations are positively associated with firms' product innovation. That is, the higher-level government the firm is affiliated with, the higher the firm's product innovation performance.*

4.2.2 The contingent role of dynamic institutional environments

Generally, we can capture the institutional transition from two fundamental dimensions: the static perspective (Yang et al., 2015) and the dynamic perspective (Banalieva et al., 2015). The former perspective treats institutional change as a discrete and static event (Kim et al., 2010). Scholars who hold this perspective usually focus on the extent to which the institutional system approaches to be more market-based (Yang et al., 2015), i.e., the institutional transition scope. The latter views institutional transition as a dynamic process which considers the influence of the pace of pro free market reforms over time (Chen et al., 2017; Shi et al., 2017; Wang et al., 2012). Scholars with this perspective stress the importance of the speed of institutional changes, i.e., the institutional transition speed (Banalieva et al., 2015).

Most extant studies have used the static perspective to explore the complicated interactions between the institutional transition scope, political connections, and firm innovation performance (Yang et al., 2015; Yang et al., 2019). As the institution-based view (IBV) argues, the institutions, i.e. 'the rules of the game" (North, 1990), are key determinants of firms' strategic behaviors (Oliver, 1991, 1997; Peng, 2003; Peng et al., 2009; Wright et al., 2005). More developed institutions tend to enhance firms' innovation propensity by inducing competitive markets, supporting technology transfer, improving knowledge infrastructure, cultivating market channels for transactions, and securing intellectual property rights (Nguyen and Jaramillo, 2014; Oluwatobi et al., 2015; Peng, 2003; Yang et al., 2015; Yi et al., 2017; Zhou et al., 2017). However, less developed institutions often lead to inefficient markets, loose enforcement of laws, and high transaction costs (Peng and Luo, 2000; Peng and Heath, 1996; Williamson, 1993). In such environments, firms rely more on ties with external agents such as political connections to cope with uncertainty and turbulence arising from the undeveloped institutions (Peng, 2003; Peng et al., 2008). Accordingly, IBV scholars propose that the positive value of political connections on firm innovation would decline as the institutions develop. However, this prediction gets paradoxical support of empirical evidence in innovation academia. For instance, Gao et al. (2017) find that the developed institutions suppress the positive influence of political connections on product innovation, and Zhou et al. (2017) indicate that state ownership has no influence on innovation investment regardless of the institutional environment, while Yang et al.'s (2019) study suggests that political ties have stronger influence on firms' product innovation in regions with a more developed financial system. These mutually inconsistent findings may imply that the static perspective cannot fully explain why "political connection—firm innovation" links vary distinctly.

In response to these mixed results, IBV scholars recommend a dynamic perspective of

institutional transition (Kim et al. 2010; Xu and Meyer, 2013). This recommendation also fits the practices of pro free market reforms in the Chinese provinces. In China, the institutions are unevenly developed in sub-national regions (i.e., provinces) due to an unbalanced regional development (He et al., 2008; Luo, 2007; Schlevogt, 2001), so does the institutional transition speed. To be specific, in certain provinces institutions change with a high speed, while in other provinces the institutions change slowly (Luo, 2007; Schlevogt, 2001; Xu and Meyer, 2013). Furthermore, in a specific province, the institutions often do not change with exactly the same speed over time, i.e., the institutions may change slowly in one year, but faster in another year. These varying transition speeds indicate dynamic institutional environments. Dynamic IBV highly stresses these dynamic changes of institutional transition and deepens the understanding of the variations of firms' strategic behaviors (Heeley et al., 2006; Shi et al., 2017). Particularly, dynamic institutional environments induce dynamic uncertainties, risks, and constraints, which make firms' external environments more complex and unpredictable (Banalieva et al., 2015; Chan et al., 2008; Khanna and Palepu, 2000; Shi et al., 2017). To manage and cope with such dynamic constraints, firms may resort to the established government affiliations at varying degrees (Xin and Pearce, 1996; Shaffer and Hillman, 2000; Kotabe et al., 2017; Li and Zhang, 2007; Peng and Luo, 2000). We contend that dynamic institutional changes may determine firm innovation by reshaping firms' external dependencies such as government affiliations. Empirically, however, little is known about the mechanism of how dynamic institutional environments shape firms' product innovation (Banalieva et al., 2015; Chen et al., 2017). To better capture this influence, we specifically depict the dynamic institutional environments through two constructs i.e., the institutional transition speed (Banalieva et al., 2015; Chen et al., 2017) and the synchronization of transition speeds of institutional components (Banalieva, 2014; Shi et al., 2017).

The institutional transition speed

Institutional transition speed refers to the rates of achievement of a market-based economy, over years (Banalieva et al., 2015). In China, provinces can implement marketization reforms at their own pace, which leads to mutually different transition speeds towards a more market-based economy. These varying speeds would induce different institutional pressures concerning market efficiency, stability, and predictability (Hoskisson et al., 2000; Peng, 2003; Banalieva et al., 2015). A gradual institutional transition introduces reforms more slowly and incrementally, and a province departs from a planned economy with steps that can be expected. Such transitions release moderate pressure, which allows for cultivating innovation-supported environments in a predictable way. More specifically, gradual

institutional changes usually allow new regulations to co-exist with existing market rules (Peng, 2003). As a result, firms can rely on already established administrative linkages to secure their benefits under the existing system, and they are also given more time to learn and adapt to new rules of the game that are imposed by the government. Additionally, a slow introduction of a new governmental force on a market allows for a less stressful adjustment of firms' behaviors and strategies. Also, in provinces with a gradual transition speed, governments steadily retreat their business interventions such as weakening their administrative linkages with firms; firms thus have more time to restructure political connections. These considerations imply that given government affiliations may not change suddenly, and the value of government affiliations may sustain (Arnoldi and Villadsen, 2015; Zhang, 2006; Shi et al., 2014).

Conversely, a rapid institutional transition indicates that the old governmental rules are quickly withdrawn while the new governmental rules are quickly established, aiming to move a province rapidly towards a more market-based economy. Although a fast speed of transition may help to build legitimacy for a reform in a short time and may deter reform reversals (Havrylyshyn, 2007), an increasing transition speed also contributes to a more turbulent and unforeseeable external environment that may be a huge challenge for firms to allocate resources, combine knowledge, transfer technology, develop new products, and particularly exploit administrative linkages with the government (Boyd, 1990; Hoskisson et al., 2000). Summarized, rapid institutional transition often gives rise to high market-uncertainty and more intense competition (Havrylyshyn, 2007). For instance, state-owned enterprises (SOEs) that swiftly withdraw from a monopolistically organized market sector leave a huge market void, which would evoke fierce market competition, due to the participation of heterogeneous agents, with an unexpected speed (Banalieva et al., 2015; Xu and Meyer, 2013). To benefit from these voids, private and foreign firms must quickly learn to grasp new opportunities, obtain new knowledge, and develop new technologies. Otherwise, the high turbulence and competition in the market may erode their yields from operation and innovation (Xue and Meyer, 2017). Although high-level governments often plan and direct the reforms in a larger geographic context, it is the lower-level governments that locally implement these reforms. That is, lower-level governments often have autonomy in implementing reforms and have control over locale-specific resources that enables them to effectuate this autonomous position. To facilitate reforms, lower-level governments may support the affiliated firms to mitigate environmental uncertainties by providing crucial resources such as land, business permits, local-tax preferences, and R&D subsidies (Faccio et al., 2006; Khwaja and Mian, 2005). Thus, lower-level government affiliations would be more helpful for firms to cope with outside turbulence.

A rapid institutional transition may make policy environments more unpredictable. As the old rules suddenly withdraw, firms are unforeseeably exposed to new and unfamiliar business regulations. A rapid retreat of existing rules may endanger firms and lead to an erosion of their market position (Chari and David, 2012). It also challenges firms' responses to and predictions of consumer expectations, further reforms, and innovation policies (Xu and Meyer, 2013). During the transition, lower-level governments are delegated to design and plan local economic development (Zhang, 2006). Thus, lower-level governments may issue their specific policies and even execute local protectionism to buffer the suffering of firms that arise from the fast reforms (Tan et al., 2007; Zheng et al., 2015). Swift introduction of market power and new regulations also exerts huge pressure on levels of governments that are devoted to transforming a turnover-increasing economy into an innovation-oriented economy. A fast-changing environment compels governments, especially lower-level governments that directly connect to markets, to build the capability of rapid responding to changes, and of maintaining solid government-business interactions. Thus, lower-level governments are usually more responsive than their higher-level counterparts, which leads to timely support for affiliated firms' innovation. Therefore, firms with administrative linkages to lower-level governments may be advantageous in obtaining specific regulatory resources or policy favors to mitigate the risks originating from a swift institutional change.

Rapid reforms mean that higher-level governments more quickly retreat their market interventions, and relatively quickly delegate their power to lower-level governments. In provinces with rapid pro free market reforms, higher-level governments may quickly withdraw their control of resource distribution, and weaken their administrative linkages with the affiliated firms. It thus devalues the higher-level government affiliations through which firms obtain resources, support, and regulatory information. On the other hand, lower-level governments are delegated the authority to implement policy designs, regulations, and local taxing and subsidizing systems. Rapid reforms may lead to a quick delegation of authority, making lower-level governments more autonomous in their policy implementation and locally-specific regulation design. As transition speed increases, firms with lower-level government affiliations thus would be more advantageous in obtaining innovation-related resources (Zheng et al., 2015). Overall, lower-level governments can shield the affiliated firms from the adverse influence arising from increasingly fast reforms. Yet, this does not take away that a high speed of institutional transition may weaken the positive effects of firms' affiliations with higher and lower governments.

Taken together, this leads to the second hypothesis.

Hypothesis 2 (H2): *The interaction between institutional transition speed and government affiliations negatively influences firms' product innovation such that the higher the institutional transition speed, the lower the positive effects of government affiliation on product innovation.*

The synchronization of transition speed of institutional components

The synchronization of transition speed of institutional components (hereafter *synchronization*) refers to the extent of coordination and equivalence of the transition paces of multiple institutional components over time (Banalieva, 2014; Yang et al., 2015). Generally, a country or province may conduct reforms on each institutional component at a different speed. In provinces with a high synchronization, governments give similar priority and energy to each institutional component, and all types of reform are conducted concurrently (Banalieva, 2014). That is to say, synchronization — i.e. each institutional component of the institution system is evolving at a similar pace — clearly indicates that the government conducts an all-round reform by equally concentrating on each institutional component. A synchronization sends the signal that governments have a strong confidence in conducting long-term reforms by means of stressing all institutional components (Shi et al., 2017; Xu and Meyer, 2013), i.e., the synchronization displays the governments' willpower to robustly propel a reform. Higher-level governments usually take charge of reform designs that decide on a reform's goals, content, and steps to take. To conduct a synchronized reform, higher-level governments usually mobilize crucial resources and have a strong persistence in building an innovation-supporting infrastructure. Synchronization may better motivate and enhance the innovation expectations of firms that are affiliated with higher-level governments, since the latter are more committed to innovation investments. In contrast, a non-synchronized reform implies that governments invest more energy in some or certain institutional components while neglecting the others, which makes some components changing faster. Such reforms can indicate that governments' perseverance in an institutional reform is less balanced, or limited. It may demotivate the innovation propensity of higher-level government-affiliated firms (Banalieva, 2014).

To synchronize an institutional transition, governments may strive to balance the development of components of the institutional reform (Banalieva, 2014; Shi et al., 2017; Yang et al., 2015). Generally, it views a set of institutions as an organic system that is composed of differentiated but synergetic components (Scott, 2014). When one component of institutional reform changes with a higher speed than other components, such as certain obsolete regulations are quickly abolished while the others remain, the synergy between

institutional components and the stability of the whole institutional system are challenged (Kim et al., 2010; Xu and Meyer, 2013). Conflicts among institutional components are expected to emerge, which lead to a turbulent institutional system that gives rise to unexpected external risks (Shi et al., 2017). Comparing to higher-level governments, lower-level governments are usually responsible for implementing new-issued policies and realizing reform goals that are set by higher-level governments (Zhang, 2006; Zheng et al., 2015). In such environments, lower-level governments may make their implementations more locally adapted by initiating series of specific plans and schemes, such as technology upgrade projects, R&D subsidies, tax reduction of new products, and talent attraction plans. In addition, lower-level governments are reported to better provide locally-focused resources, to be more autonomous in subsidizing prospective technology programs, and to better implement more locally adapted policies (Tan et al., 2007). Thus, lower-level governments may cope relatively well with external environmental turbulence and conflicts arising from an unsynchronized transition speed of various institutional components.

Also, synchronization may enhance the value of support and complementary resources from higher-level governments to affiliated firms. It can touch upon an ideal situation in which each change of an institutional component harmonizes with governmental support for firms' product innovation. For example, law system reforms could strengthen the law enforceability of firms' patent rights (Nguyen and Jaramillo, 2014; Oluwatobi et al., 2015); or, new free market mechanisms might enable firms to efficiently obtain outside resources, such as venture capital, technology, and engineers (Fan et al., 2010). A synchronized transition speed then may imply that provision of resources from governments to affiliated firms fits with the transition speed of all institutional components (Banalieva, 2014; Shi et al., 2017), and that these resources may complement each other (Yang et al., 2017; Tripsas, 1997). For instance, accompanying the development of the market, technology transactions may be adequately secured due to synchronizing reforms in the legal system (Yi et al., 2017; Kafouros and Aliyev, 2016). Higher-level government affiliations can enable firms to be better informed about the portfolio of reforms, reform speed, and about reform directions that induce the provision of complementary resources.

This leads to the final hypothesis.

> ***Hypothesis 3 (H3):*** *The interaction between synchronization of transition speed of institutional components and firms' government affiliations positively influences firms' product innovation such that the higher the synchronized institutional transition speed, the higher the positive effects of government affiliation on product innovation.*

4.3 Data and analytical methods

4.3.1 Data

As a unique emerging market, China provides an ideal context to unravel the relationship between government affiliations, dynamic institutional environments, and firms' product innovation. This chapter thus uses data from China to test the proposed hypotheses. The empirical data comprises two sources. Firstly, firm-level data are extracted from the Annual Census of Chinese Industrial Enterprises (ACCIE) during the period 1998–2009. This annual census was conducted by the National Bureau Statistics of China, and covers all firms in China whose annual sale is over 5 million Yuan (about 0.72 million USD). The dataset recorded firms' basic information such as the registration date, ownership, location, government affiliations, industry, annual sales, employees, and product innovation. After excluding incomplete and repeated records, our micro-data set contains 2,564,547 firm-year observations spread over 12 years. Secondly, the measurements of the institutional transition speeds are building on the yearly Marketization Index (1997-2009), which is compiled by the National Economic Research Institute (NERI) (Fan et al., 2010). This index indicates the annual development of Chinese marketization at the provincial level through five sub-indices i.e., business-government relationship, non-state economy development, product market development, factor market development, and development of market intermediary and law environment (Fan et al., 2010). Both datasets are of panel nature and are widely used in extant studies (e.g., Arnoldi and Villadsen, 2015; Gao et al., 2010; Xu et al., 2014; Yang et al., 2015; Zhou et al., 2017). In addition, we set 1997 as the base year when the speed is calculated. Thus, our measures of dynamic institutional environments finally cover 12 years (1998-2009). Lastly, the above micro- and macro-data are merged by using provincial locations as the identifier.

4.3.2 Measures

Product innovation

Product innovation, which refers to introducing new or improved products into markets, is viewed as a crucial indicator of firms' competitive advantage in dynamic environments, especially in emerging markets like China (Barney, 1991; Cohen and Levinthal, 1990; Grant, 1991). The ACCIE annually surveys and records the output of firms' new products. Thus, we measure firms' product innovation by the logarithmic transformation of firms' annual sales of its new products, which is widely used in extant literature (e.g., Li et al., 2018; Yi et al., 2017).

Government affiliations

Unlike the political ties, which are usually measured by board member's political backgrounds (e.g., Arnoldi and Villadsen, 2015) or the share of state ownership of a firm (e.g., Rong et al., 2017; Tan et al., 2007), *government affiliations* (GA) refer to firms' administrative linkages with one of five governmental levels *i.e.* central, provincial, municipal, county, and town government (Li et al., 2018; Wang et al., 2012). The ACCIE data contain adequate information about which level of government the firm is affiliated with. Thus, we measure GA by identifying the government rank that a firm is affiliated with. That is, we code "5" to firms that are affiliated with central government, "4" to firms affiliated with provincial government, "3" to firms affiliated with municipal government, "2" to firms affiliated with county government, "1" to firms affiliated with town government, and "0" to firms with no governmental affiliations.

The speed of institutional transition

Building on the NERI Index (Fan et al. 2010), we construct a measure to illustrate the speed of the institutional transition each year at each province. Following the methods used by Banalieva et al. (2015) and Heybey and Murrell (1999), we first define the actual speed of the institutional transition as the difference between the degree of marketization at the current year and the degree of marketization at the base year (i.e., year 1997), divided by time span between current year and 1997. The formula is as follows:

$$Actual\ speed_{current\ year} = (Marketization_{current\ year} - Marketization_{1997})/(Current\ year - 1997) \ldots.(1)$$

However, the marketization extent in 1997 was divergent across provinces due to that each province had its own development pace since 1978 (Banalieva et al., 2015). Lacking an identical starting marketization in 1997, it may be inappropriate to use this actual speed measure for comparison between provinces. To mitigate this bias, we then divide the actual speed by the potential maximum speed that the transition speed of a province may achieve in a year, as Banalieva et al. (2015) recommend. The potential maximum speed of each province is defined as:

$$Max\ speed_i = (Full\ marketization - Marketization_{i,1997})/1 \ldots.(2)$$

Fan et al. (2010) assigned 10 to a province that achieves full marketization. Thus, the potential max speed in province i is $10 - Marketization_{i,1997}$. Taken together, our

measure of Speed is:

$$Speed_{i,t} = Actual\ speed_{i,t}/Max\ speed_i.$$

Finally, the speed measure is calculated for 12 years, from 1998 to 2009.

The synchronization of transition speed of institutional components

Drawing on Fan et al.'s (2010) marketization index, we construct a measure to indicate the synchronization of the transition speed of institutional components (synchronization) in Chinese provinces. Fan's index depicts the market-oriented institutional reforms in China through five components: business-government relationship, development of private economy, product market development, factor market development, and development of market intermediary and law environment (Fan et al., 2010; Shi et al., 2017; Yang et al., 2015). The government may conduct reforms in each institutional component at a different speed (Banalieva, 2014; Havrylyshyn, 2007). The synchronization construct intends to measure the extent of consistency of the transition speed of five institutional components. To this end, we first calculate the transition speed of each dimension of marketization in province *i* at year *t* as presented above (Banalieva et al., 2015). Then, we use an entropy measure to calculate the synchronization for province *i* at year *t* (Yang et al., 2015):

$$Synchronization_{j,t} = \sum S_{ijt} * \ln\left(\frac{1}{S_{ijt}}\right)\ldots.(3)$$

where $S_{ijt} = \frac{Transition\ Speed_{ijt}}{\sum Transition\ Speed_{ijt}}$, *i* stands for *i*th dimension of marketization, *j* indicates *j*th province, and *t* denotes *t*th year.

Control variables

We control firm- and industry-related factors that may influence firms' product innovation. Our first control variable is *firm size*, which is measured by the natural logarithm of total annual sales. Large firms usually have more innovation resources, skilled employees, and technology-development experiences and thus often perform better in innovation output (Damanpour and Aravind, 2006; Shefer and Frenkel, 2005). Thus, the effect of firm size cannot be ignored. Then, *firm age* is included as a control variable by counting the number of years since the firm started. Older firms have more industrial experience for innovation activities, but they might tend to be conservative in developing new technologies (Balasubramanian and Lee, 2008; Sorensen and Stuart, 2000). This uncertain effect indicates

that the including of firm age is necessary. In the Chinese context, state ownership is a unique indicator to unveil the drivers of firm innovation activities (Yi et al., 2017). This chapter considers this effect by including a control variable *ownership*, which takes value 1 when the firm is state-owned and 0 otherwise. Additionally, R&D investment is largely confirmed as a crucial predictor of firms' innovation ability and innovation output (Dosi, 1988; Leiponen and Helfat, 2010). We further control firm's R&D investment by using *R&D expenditure* (logarithm of total R&D expenditures of a firm each year) and *R&D intensity* (the ratio of R&D expenditures to the firm's employees). Moreover, we control for firm's performance-related factors, *liability ratio* (the ratio of debt to total assets), and *ROA* (return on assets, the ratio of net income to total assets), which are reported as important predictors of firms' product innovation. Existing studies indicate that firms with more financial resources are likely to generate more innovative products (Damanpour and Aravind, 2006). In addition, we control for firm *productivity* since more productive firms usually have more capabilities to develop new technologies and products. Thus, we use total factor productivity (TFP), which is building on the Solow residual measure, to capture the firm's productivity (Wang et al., 2012). Lastly, we control for *industry competition* by using market concentration that is calculated by the Herfindahl index measure (the sum of the square of the market shares of all firms in an industry). Given literature often suggests that firms in more competitive markets tend to introduce new products and develop new technologies that enable them to build and sustain their competitive advantage (Aghion et al., 2005; Marshall and Parra, 2019).

4.3.3 Estimation methods

The dependent variable, firm's product innovation, takes non-negative values (i.e., firms' product innovation cannot be less than 0) and involves many zero values (i.e., 92% observations have no product innovation). Clearly, our dependent variable is left-censored. To estimate such censored data, Tobit models with panel considerations are usually recommended (Adkins and Hill, 2011; Li et al., 2018; Wooldridge, 2010). Thus, we choose the panel Tobit model with random effects to test our hypotheses since the likelihood estimation for fixed effect of the panel Tobit model is biased and inconsistent and there is no Stata command to fit a parametric conditional fixed-effects model (Amore and Murtinu, 2019).

4.4 Regression results

4.4.1 Empirical results

Table 4-1 presents the descriptive statistics, i.e., mean, standard deviation (s.d.), and correlations among variables. The variance of inflation factor (VIF) test indicates that all VIF values are lower than 2, which are distinctly below the threshold value of 5. It implies that multicollinearity is not a serious concern in our study.

Table 4-2 shows the results of the Tobit regression estimations. Model 1 only includes control variables. Model 2 examines the main effect of government affiliations on firms' product innovation. Model 3 and 4 test the moderation effects of the institutional transition speed and the synchronization of transition speed of institutional components on 'government affiliations—product innovation' links.

Table 4-1 Descriptive statistics and correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13
1.Product innovation	1												
2.GA	.125*	1											
3.Speed	.008*	-.347*	1										
4.Synchronization	.001	.229*	-.48*	1									
5.Firm size	.164*	-.144*	.182*	-.159*	1								
6.Age	.106*	.404*	-.169*	-.142*	-.10*	1							
7.SOE	.092*	.60*	.278*	.208*	-.256*	.438*	1						
8.R&D expenditure	.164*	-.052*	.185*	-.055*	.237*	-.002*	-.080*	1					
9.R&D intensity	.007*	-.02*	.038*	-.008*	.015*	-.011*	-.025*	.210*	1				
10.Liability ratio	.001	.027*	-.007	.014*	-.007*	.032*	.030*	-.002*	.000	1			
11.ROA	-.000	.000	-.001	.001*	.004*	-.001	.000	-.000	-.000	.056*	1		
12.Productivity	.004*	-.201*	.064*	-.040*	.63*	-.23*	-.305*	.059*	-.004*	-.023*	.015*	1	
13.Market concentration	.063*	.145*	-.089*	.085*	.020*	.047*	.110*	-.017*	-.010*	.007*	.003*	.007*	1
Descriptive statistics													
Mean	.66	.82	.07	2.38	9.83	9.79	.12	2.38	.16	.58	2.67	.06	.002
S.d	2.44	1.21	.04	.54	1.85	10.83	.32	4.20	1.42	1.70	299.98	.72	.003
VIF		1.75	1.47	1.33	1.87	1.32	1.81	1.15	1.05	1.0	1.0	1.83	1.03

N=2,564,547. * P<0.05.

Table 4-2 The Tobit regression results

	Model1	Model2	Model3	Model4
GA (H1)		1.042***	1.561***	.352***
		(.020)	(.030)	(.055)
Speed × GA (H2)			-7.676***	
			(.320)	
Synchronization × GA (H3)				.283***
				(.022)
Speed			12.80***	
			(.744)	
Synchronization				-.125***
				(.059)
Firm Size	2.173***	2.185***	2.167***	2.214***
	(.018)	(.019)	(.019)	(.019)
Age	.058***	.041***	.041***	.041***
	(.002)	(.002)	(.002)	(.002)
SOE	3.617***	1.938***	1.828***	1.852***
	(.074)	(.080)	(.080)	(.080)
R&D expenditure	1.02***	1.021***	1.015***	1.022***
	(.000)	(.007)	(.007)	(.007)
R&D intensity	-.016***	-3.961***	-3.996***	-3.971***
	(.007)	(.069)	(.069)	(.069)
Liability ratio	-.195***	-.236***	-.248***	-.237***
	(.037)	(.037)	(.037)	(.037)
ROA	.000	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)
Productivity	-1.930***	-1.935***	-1.894***	-1.963***
	(.027)	(.026)	(.027)	(.027)
Market concentration	304.42***	265.80***	261.0***	257.56***
	(7.012)	(7.059)	(7.086)	(7.11)
Constant	-50.13***	-50.60***	-51.36***	-1.819***
	(.212)	(.212)	(.216)	(.017)

*** P<.001, ** P<.01, * P<.05, + P<.10; standard errors in parentheses.

Hypothesis 1 predicts that government affiliations are positively associated with firms' output of product innovation. More specifically, it proposes that the higher-level government the firm is affiliated with, the higher the firm's product innovativeness. The coefficient of GA in Model 2 is positive and significant ($\beta = 1.042, P < .001$). To obtain a detailed understanding of this effect, we calculate the marginal effect of GA on product innovation for firms that have not been censored (i.e., product innovation output is above zero), controlling all other variables at the mean (Adkins and Hill, 2011; Li et al., 2018). The result reveals that one level increase in GA leads to a product innovation increase by 15%. Thus, we confirm the assertion of H1.

Hypothesis 2 suggests that a relatively high institutional transition speed would depress the effects of government affiliations on firms' product innovation. Results in Model 3 indicate that the coefficient sign of the interaction term of GA and speed is negative ($\beta = -7.676, P < .001$). We further draw Figure 4-1 to display details of this interaction effect. Figure 4-1 visualizes that the effects of government affiliations on firm product innovation decrease as the speed increases, and the higher-level government the firm is affiliated with

the more the effect decreases. For example, when the speed increases from low- (-1 S.D below the mean) to high-level (+1 S.D above the mean), the central government affiliation leads to a firms' product innovation decrease by 10.17%, while the no-government affiliation leads to a firms' product innovation increase by 3.80%. In addition, government affiliations distinctly benefit firm product innovation regardless of the speed of the institutional transition. Thus, H2 gets support.

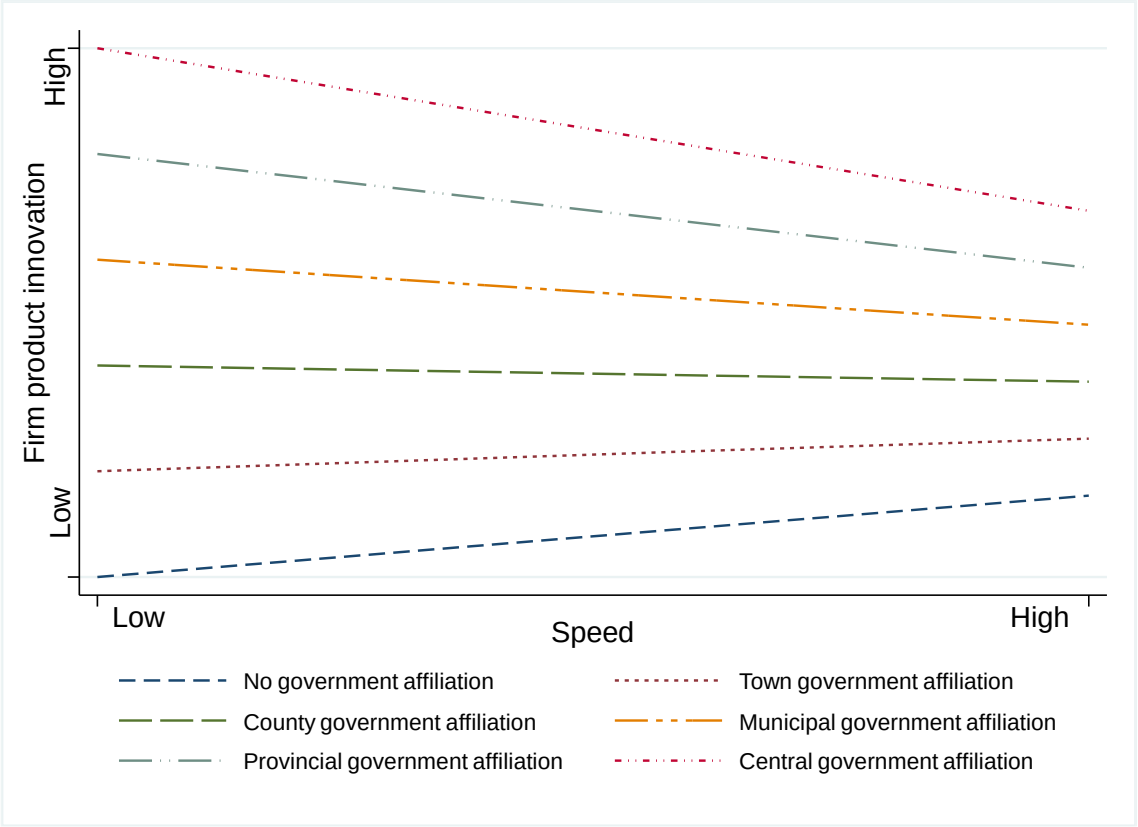

Figure 4-1 The interaction effect of GA and speed on firms' product innovation

Hypothesis 3 suggests a positive moderation effect of synchronization on the 'government affiliations—product innovation' relationship. This means that that the higher the synchronized institutional transition speed, the higher the positive effects of government affiliation on firms' product innovation. Estimates in Model 4 in Table 4-2 reveal a positive coefficient of the interaction term of GA and synchronization ($\beta = .283, P < .001$). We plot Figure 4-2 to present this interaction effect.

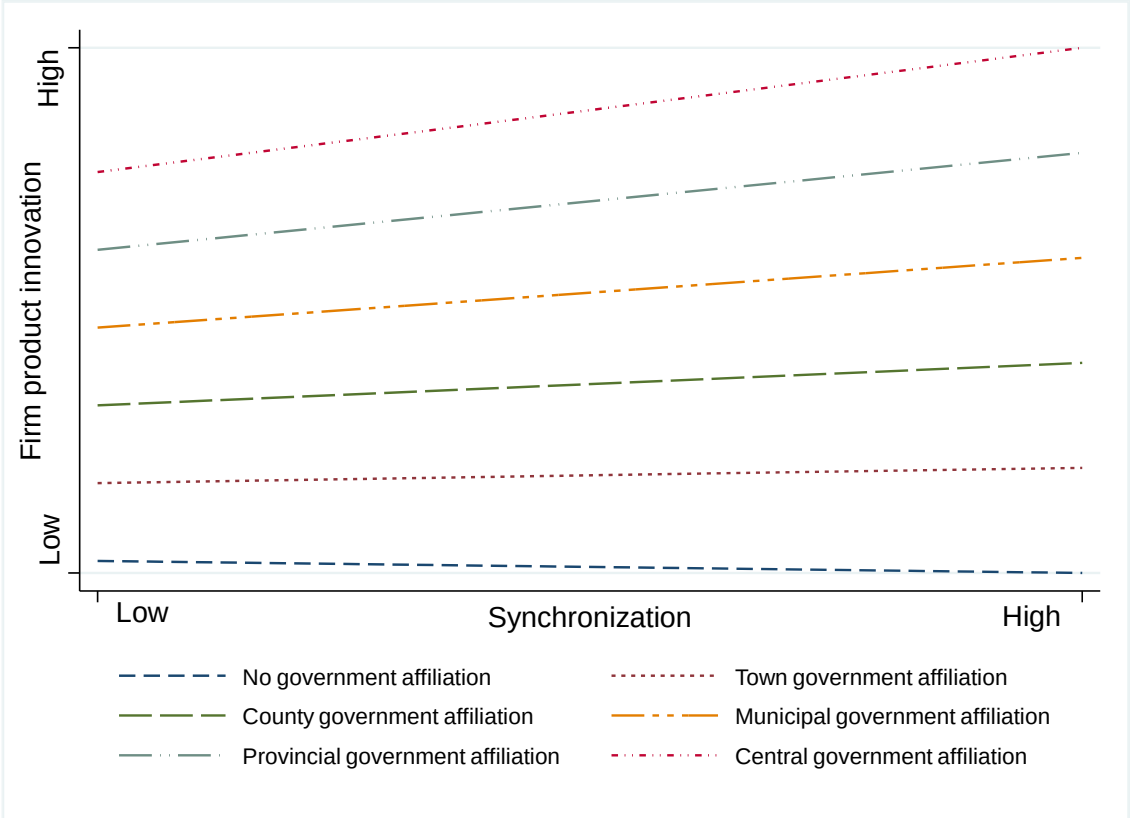

Figure 4-2 The interaction effect of GA and synchronization on firms' product innovation

As shown in the figure, as synchronization increases, the influence of government affiliations on firms' product innovation increases accordingly. Specifically, when synchronization is low (-1 S.D below the mean), one level increase in government affiliation (e.g., from provincial government affiliation to central government affiliation) leads to an increase in firms' product innovation by 12%. When synchronization is high (+1 S.D above the mean), one level increase in government affiliation leads to an increase in firms' product innovation by 17%. Clearly, the output gap of product innovation between firms with a different level of government affiliations increases when the transitional speed of institutional components becomes more synchronized. In addition, the innovation stimulating effects for firms that are affiliated with higher-level government are more distinct. For example, for firms affiliated with central government, a synchronization with an increase of one unit (i.e., from low (-1 S.D below the mean) to high (+1 S.D above the mean)) would lead to an increase of these firms' product innovation of 6.42%; in contrast, for firms affiliated with town government, one unit increase in synchronization would lead to an increase of their product innovation of just 0.7%. Therefore, Hypothesis 3 receives support.

4.4.2. Robustness checks

We conduct several tests to confirm the robustness of our empirical results. First, considering time-related effects, we include year dummies into our models. While doing this the influence significance and directions of the studied relationships remain (Model 1-4, Table 4-3). Second, considering the influence arising from unobservable factors at the provincial

level, we control such effects by including province dummies into our model and reexamine the hypotheses. We also then obtain results (model 5-8, Table 4-3) that are consistent with Table 4-2.

Third, we construct new measures of speed and synchronization, using an alternative method. This means, we use the actual speed (Formula 1) to proxy the institutional transition speed. We recalculate synchronization building on Shi et al.'s (2017) institutional fragility measure. That is, we first measure the degree of change of each dimension of marketization between the year *t-1* and the year *t* in Chinese provinces:

$$\Delta Change_{ijt} = \left|Change_{ijt} - Change_{ijt-1}\right| \ldots.(4)$$

where *i* denotes *i*th dimension of marketization, *j* stands for *j*th province, and *t* indicates *t*th year. We then rescale the $\Delta Change_{ijt}$ by using the total change in all five dimensions of marketization, which leads to a relative measure of the degree of change in each dimension of marketization:

$$\Delta C_{ijt} = \Delta Change_{ijt} / \sum_{j=1}^{5} \Delta Change_{ijt} \ldots.(5)$$

Building on Formula 5, we calculate an overall indicator of institutional change in the province using an entropy measure:

$$Tbl_{jt} = \sum \Delta C_{ijt} * \ln\left(\frac{1}{\Delta C_{ijt}}\right) \ldots.(6)$$

Higher Tbl_{jt} indicates a higher incoordination and turbulence of the institutional changes. Finally, we reverse this measure by subtracting Tbl_{jt} from 1 and get the synchronization measure:

$$Syn_{jt} = 1 - Tbl_{jt} \ldots.(7)$$

Building on these two new variables, we rerun the models and present the results in Table 4-4.

As shown in Model 1 of Table 4-4, the interaction term of speed and GA presents a negative coefficient ($\beta = -0.807, P < .001$). In Model 2 of Table 4-4, the combination of synchronization and GA reveals a significant and positive influence on firms' product innovation ($\beta = 1.234, P < .001$). In addition, the significance and influence directions of control variables remain. All in all, the estimating results in Table 4-4 are consistent with those in Table 4-2. Therefore, our hypotheses get further support.

Table 4-3 Tobit regressions: Considering the influence of time and location

	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
GA (H1)		.858***	1.324***	.331***		1.127***	1.530***	.623***
		(.020)	(.028)	(.050)		(.020)	(.030)	(.054)
Speed × GA (H2)			-6.625***				-5.798***	
			(.294)				(.339)	
Synchronization × GA (H3)				.223***				.202***
				(.020)				(.022)
Speed			16.98***				15.30***	
			(.752)				(.901)	
Synchronization				-.201***				.125***
				(.054)				(.058)
Firm Size	2.762***	2.649***	2.638***	2.641***	2.302***	2.318***	2.264***	2.359***
	(.021)	(.021)	(.021)	(.021)	(.018)	(.018)	(.019)	(.019)
Age	.049***	.037***	.037***	.037***	.065***	.048***	.048***	.047***
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
SOE	2.444***	1.401***	1.334***	1.39***	3.683***	1.991***	1.916***	1.898***
	(.071)	(.075)	(.075)	(.075)	(.074)	(.079)	(.080)	(.080)
R&D expenditure	.938***	.943***	.932***	.944***	1.019***	1.011***	1.011***	1.013***
	(.006)	(.006)	(.006)	(.006)	(.007)	(.007)	(.007)	(.007)
R&D intensity	-3.394***	-3.337***	-3.379***	-3.336***	-3.639***	-3.599***	-3.594***	-3.613***
	(.063)	(.063)	(.063)	(.063)	(.069)	(.069)	(.069)	(.069)

	Model1	Model2	Model3	Model4	Model5	Model6	Model7	Model8
Liability ratio	-.235***	-.254***	-.266***	-.251***	-.218***	-.267***	-.262***	-.270***
	(.033)	(.033)	(.033)	(.033)	(.036)	(.036)	(.036)	(.037)
ROA	.0001+	.0001+	.0001+	.0001+	.0001	.0001	.0001	.0001
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Productivity	-2.524***	-2.377***	-2.348***	-2.360***	-1.984***	-1.999***	-1.916***	-2.04***
	(.028)	(.028)	(.028)	(.028)	(.026)	(.026)	(.027)	(.027)
Market concentration	177.82***	168.78***	163.33***	165.6***	311.73***	272.97***	274.3***	263.93***
	(6.906)	(6.905)	(6.92)	(6.94)	(6.941)	(6.985)	(7.006)	(7.037)
Year controls	Yes	Yes	Yes	Yes				
Province controls					Yes	Yes	Yes	Yes
Constant	-50.42***	-50.25***	-51.19***	-49.87***	-48.52***	-49.26***	-49.56***	-49.99***
	(.216)	(.216)	(.220)	(.257)	(.256)	(.256)	(.257)	(.305)

*** P<.001, **P<.01, *P<.05, +P<.10; standard errors in parentheses.

Table 4-4 Regressions with alternative measures of speed and synchronization

	Model1	**Model2**
GA (H1)	1.270*** (.031)	.178*** (.042)
Speed × GA (H2)	-.807*** (.073)	
Synchronization × GA (H3)		1.234*** (.052)
Speed	.309+ (.184)	
Synchronization		-1.520*** (.084)
Firm Size	2.207*** (.019)	2.153*** (.019)
Age	.041*** (.002)	.040*** (.002)
SOE	1.834*** (.080)	1.960*** (.080)
R&D expenditure	1.022*** (.007)	1.019*** (.007)
R&D intensity	-3.966*** (.069)	-3.951*** (.069)
Liability ratio	-.239*** (.037)	-.243*** (.037)
ROA	.0001 (.0000)	.0001 (.0000)
Productivity	-1.956*** (.027)	-1.879*** (.027)
Market concentration	258.55*** (7.088)	268.88*** (7.07)
Constant	-50.9*** (.216)	-49.30*** (.226)

*** P<.001, **P<.01, *P<.05, +P<.10; standard errors in parentheses.

4.5 Discussion and conclusion

4.5.1 Empirical insights from this research

Building on RDT and dynamic IBV, the purpose of this chapter is to explore when and how firms' product innovation benefits from their affiliations with the government in dynamic institutional environments. Chinese empirical data lends support to our theoretical prediction that government affiliations are positively associated with firms' product innovation, and higher-level government affiliations lead to higher output of firms' product innovation. Moreover, we theoretically hypothesize and empirically find that a high speed of institutional transition constrains the positive influence of government affiliations, while a synchronization of transitional speed of multiple institutional components enhances the positive effects of government affiliations on firms' product innovation.

Our empirical study also reveals another interesting finding, i.e., regardless of the institutional change over time, firms with higher-level government affiliations outperform their counterparts with lower-level or no government affiliations. This finding indicates the

non-negligible value of higher-level political connections for firm innovation in China, which further supports Shi et al.'s (2014) argument that the importance of political ties would continue in today's and tomorrow's dynamic and transitional context in China.

4.5.2 Theoretical insights from this research

Our findings contribute to extending extant literature in several directions. It first contributes to better grasping the drivers of firms' product innovation in China by combining RDT with dynamic IBV. In emerging markets like China, there are two factors that cannot be ignored when firms' political connections and the level of institutional transition in their environments are explored as determinants of firms' innovation propensity. Using RDT, scholars argue that political connections are instruments to control external dependencies, and that firms' innovation can benefit from these connections (Gao et al., 2017; Haunschild and Beckman, 1998; Li et al., 2018). Dynamic IBV-scholars increasingly recognize the importance of dynamic institutional environments in shaping firms' strategic innovation activities (Banalieva et al., 2015; Chen et al., 2017; Shi et al., 2017). This study attempts to integrate RDT and dynamic IBV, and aims to use the explanatory power of both theoretical approaches to focus on a specific political connection in China, i.e. firms' government affiliations and their effect on firms' product innovation (Bamberger, 2008; Hillman et al., 2009). Our empirical findings show that government affiliation has more innovation stimulating effects for firms in provinces with synchronized and more gradual institutional changes, and that unbalanced and swift institutional transitions may constrain the positive influence of firms' government affiliations on these firms' product innovation. Insights in these relationships deepen our knowledge about the conditions in which government affiliations may enhance firm innovation; insights that have not been developed in either RDT- or (dynamic) IBV-research. Thus, application of the combined 'RDT-dynamic IBV view' leads to new insights into firm innovation drivers in China.

Moreover, this study deepens RDT by examining how varying levels of government affiliation impact firms' product innovation. According to RDT, firms are often constrained by environmental factors, and managers can act to reduce uncertainties arising from this through managing environmental dependencies (Hillman et al., 2009; Boyd, 1990; Pfeffer and Salancik, 1978). Clearly, a firm is confronted with various external dependencies (Boyd, 1990; Hillman et al., 2000). Political connections can be used by managers to reduce these external dependencies. However, previous studies mainly view political connections as one solid construct (e.g., Gao et al., 2017; Yang et al., 2019), with just a few past studies also focusing on the internal structure of these political connections (e.g., Arnoldi and Villadsen,

2015; Li et al., 2018; Zheng et al., 2015). These few past studies researched how, why and when firms may sustain administrative linkages with different levels of governments (Arnoldi and Villadsen, 2015; Li et al., 2018). For example, Li et al. (2018) find that firms' affiliation with higher government levels leads to higher innovation performance, while Zheng et al. (2015) suggest that lower-level government connections are more advantageous in buffering outside risks. Yet, a question that has not been asked nor answered in previous research is how different levels of external dependence, for example different levels of government affiliations, influence firm innovation. An answer to this question can substantially extend existing literature. This chapter looks inside five levels of government affiliation and reveals that higher-level governmental linkages are more advantageous to reduce external institutional uncertainties, and to improve firms' product innovation performance. Particularly, central government affiliation displays a dominant role in facilitating firm innovation, regardless of the dynamics of the institutions. This relative effect of government affiliation levels is relevant for environments where higher-level governments have substantial resources and power to design and conduct reforms. Thus, we add fresh evidence to RDT by unpacking the hierarchy of political connections that captures five levels of government affiliation, and how these affiliations differently shape firms' product innovation.

This study also contributes to extending the dynamic IBV by introducing a novel dynamic aspect of study. The IBV stresses that institutional environments can constrain or incent firms' innovation propensity by determining market efficiency and transaction costs (Peng, 2003; Peng and Luo, 2000; Yang et al., 2015). A large number of IBV-related studies concentrate on how the status quo of formal institutions shape firms' performance, and previous findings suggest a positive relationship between institutional development and firm innovation (Yang et al., 2015; Yi et al., 2017). For example, Yang et al. (2015) suggest that the progress of marketization in China is positively associated with firms' innovation output. However, this research trend mainly builds on a static assumption of institutional development (Kim et al., 2010), which cannot clearly explain the variations of firm innovation in dynamic institutional environments over time and across regions (Banalieva et al., 2015). Answers to the question of how changing institutions determine firms' innovation efforts when firms are embedded in administrative linkages mostly depend on a dynamic IBV perspective (Wang et al., 2012; Chen et al., 2017; Banalieva et al., 2015). As a contribution to a dynamic IBV framework, we add a novel dynamic aspect by introducing two constructs, that is the institutional transition speed, and the synchronization of transition speeds of institutional components. Our findings show that lower-level (e.g., town, county and municipal) government affiliation is more advantageous to facilitate firm product innovation when the institutional transition

speed is increasing. And, the higher-level (provincial and central) government affiliations are more valuable when the reforms are synchronized. Clearly, these results provide new insights to understandings developed by research adopting a static IBV, which stress a monotonic decrease of the value of local and central government ties when environments become increasingly institutionalized (Arnoldi and Villadsen, 2015). Accordingly and generally, the dynamic IBV as developed and applied in this chapter may depict a more complete picture of how and when firms' innovation performance in transitional contexts increases due to these firms' affiliations with the government.

4.5.3 Practical implications

This study can be of value to firm managers and policymakers in China. For firm managers, government affiliations may be an effective means to mitigate outside institutional uncertainties. Our findings indicate that resources and support, especially from higher-level governments are beneficial to firms' product innovation. However, firms should also monitor the changes in external environments, because such changes may enhance or constrain the benefits from these governmental linkages. On the one hand, firms may rely more on government affiliations to acquire crucial resources for innovation investments. On the other hand, firms may loosen their government affiliations to mitigate adverse shocks arising from institutional changes. This implies that which strategy is chosen depends on the level of firms' government affiliations, and depends on the speed at which the institutional environment transforms into a more market-based system. In provinces with high-speed as well as less synchronized institutional change, managers of firms with provincial- and central-government affiliations also need to develop alternative external ties, such as business-to-business ties to secure their innovation investments.

To policymakers, our findings point at the importance of combining institutional change with maintaining *lishu* relationships with firms aiming to support firms to keep up with the imposed institutional changes. For higher-level (e.g., provincial and central) governments, our findings suggest that they should conduct incremental and synchronized reforms to encourage affiliated firms to invest in new technology development that satisfies government's innovation expectations. For lower-level (e.g., town, county, and municipal) governments, our empirical results imply that they may play a more important role in buffering external risks and uncertainties arising from an increasing turbulent environment by providing firms with locally adapted subsidies and policy support.

4.5.4 Limitations and future research

This chapter's limitations may be covered in future studies. A major limitation of this study is that it just uses transition speed and synchronization to measure dynamic institutional transition. To obtain a more detailed understanding of how institutional transition enables or hinders firms' product innovation through government affiliation, we firstly welcome future studies that develop alternative measures of dynamic institutional environments, such as institutional stability, fragility, and reform reversal (Shi et al., 2017). A second limitation of this chapter is that it does not study how specific innovation strategies of firms, like for example exploratory innovation strategies or exploitative innovation strategies, perform in dynamically changing institutional contexts. Further research could focus on this by studying how firms' governmental affiliations influence these firms' product innovation performance, by integrating these firms' innovation strategies as moderators or mediators. Finally, our study uses data from a unique emerging market, China. Generalizing these findings to other countries such as Russia, Brazil, and India is problematic. Accordingly, we recognize the value of further testing this framework in other emerging markets.