

## Editorial

### Local context and the challenges of innovation in China

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#### Introduction

In a recent joint report of China's State Council Development Research Centre and the World Bank, it is argued that China stands at a precarious and challenging position in her-its development (World Bank and DRC 2013) (~~The World Bank and DRC, 2013~~). ~~Its e~~Early years of sustained high-speed economic growth were fuelled by somewhat unusual advantages – those of 'backwardness'. ~~—~~ These advantages included: a large, young, mainly rural workforce; deep and untapped pools of technologies available for purchase or transfer on international technology markets (including ~~via-the~~ attraction of foreign businesses via FDI into joint ventures and other partnerships); buoyant and accessible international markets for trade; and, at times, protected (and therefore profitable) domestic markets allowing for the appropriation of rents to domestic firms able to harness foreign technologies and know-how. ~~—~~ Until recently, therefore, China was able to exploit the shift from low-productivity agriculture to higher-productivity manufacturing work. It did so by combining its relatively low-cost labour with modern, often imported, manufacturing know-how. High levels of savings facilitated very high levels of investment, ~~so~~ thereby fuelling sustained and high-speed-swift economic growth processes. An important feature of this growth model was the general tendency to rely upon foreign technologies. The development of domestic innovation capabilities was thus not critical to its success.

These advantages of ‘backwardness’, however, have started to diminish, as most of the ‘low-hanging fruit’ (i.e. easily-available foreign technologies coupled with cheap labour) have been exploited (World Bank, 2013). Rural surplus labour has, over time, been absorbed within urban areas, so leading to increases in wage rates. The ‘demographic dividend’ of the early years (i.e. having a large share of the population moving into productive-working-age-groups), moreover, has been replaced by a serious demographic bottleneck. The ‘one child’ policy has disproportionately shrunk incoming cohorts of the working-age population and strongly skewed future dependency ratios. This severely compounds the contraction in labour supply, making continued industrialisation based around low-cost labour unsustainable. Furthermore, several decades of international technology transfer has considerably reduced the pool of technologies available on international technology markets. Rapid productivity-based growth based on this recipe, it is argued, is no longer an option (World Bank and DRC 2013)(The World Bank and DRC, 2013).

- Indeed, according to the widely cited work by Eichengreen, Park, and Shin (2012), there may be further good reasons for believing that the current development model is unsustainable and that China may be on the brink of a growth ‘slow-down’ (i.e. a sustained fall-off in excess of 2% per cent of annual GDP growth). This is because historical experience from other fast-growing nations shows that countries with very high levels of investment, reliance upon export markets and undervalued exchange rates (creating fewer incentives to move away from export-market dependency), and high dependency ratios all tend to experience such growth slow-downs (Eichengreen, Park, and Shin 2012). China ticks all of these boxes. Seen from this perspective, the

so-called ‘middle-income trap’ appears a real threat in the Chinese case. Historically, few countries have successfully navigated this middle-income phase of development to high-income levels. From a total of over 100 countries identified in 1960, for example, only eleven broke through to upper income levels by 2008. Several of these successful countries, however, experienced quite severe setbacks after the global financial crisis (~~i.e.~~ Greece, Spain, Portugal and Ireland initially). More than ~~90~~ ninety other countries have failed to break through to high-income levels (World Bank and DRC 2013) (~~The World Bank and DRC, 2013~~). This evidence suggests it is not easy to break away from the type of late-industrialisation development model that China has engaged upon for much of ~~her~~ its development. It may require a fundamental shift in approach, one ultimately based around innovation-led growth.

As well as reasons for concern facing China’s innovation challenge, however, there may also be some grounds for optimism. Five of the successful middle-income graduates are from East Asia. This includes Japan, South Korea, Singapore, Hong Kong and Taiwan. These countries show that, with the right approach, it may be possible to reach high-income levels. A further reason for optimism is recent evidence suggesting that there may be factors that can retard growth slow-downs (and thus help countries like China continue to transition to high-income levels). This includes having above-average levels of secondary and tertiary education and exports with above-average levels of technological content (Eichengreen, Park, and Shin 2013). China also ticks ~~both~~ these boxes.

Arguably, the most important cause for optimism, however, is the fact that Chinese policy-makers appear to understand and accept that a ‘business as usual’

approach towards developing their innovation capabilities is unlikely to be sustainable at this particular historical juncture. Economic-policy focus is thus increasingly pointing towards ways of trying to upgrade innovation capabilities in Chinese businesses, with a view to breaking away from the current development path towards one based more around innovation-led productivity gains (and higher value-added production). Some progress, moreover, does appear to be being made. In 2015, for example, China became the first country to ~~receive~~ have more than one million patent applications ~~filed~~ in a single year, ~~(according to the World Intellectual Property Organisation)~~ (Mitchell 24/11/2016). Even if the quality of these applications may be questioned, this landmark points towards the strong incentives that have been put in place and considerable commitment towards ~~the~~ innovation-based growth that has been developing in China.

While there is evidence of concerted policy-making efforts, however, it is also of interest to observe that current innovation policy is characterized by a curious type of dualism. It is still, therefore, not entirely clear how successful it will be, or how well innovation policy has been thought through. On the one hand, the importance of the free market, soft-market institutional infrastructure and private enterprise have been recognised: ~~"when a country reaches the technology frontier, the correct development strategy ceases to be straightforward. Direct government intervention may actually retard growth.... Instead the policy emphasis needs to shift even more toward private sector development"~~ (World Bank and DRC 2013) ~~(The World Bank and DRC, 2013: 47)~~ (emphasis added). The role of private enterprise, therefore, is to be encouraged by improvements in, for example, the legal institutional environment (i.e. the greater enforcement of intellectual property rights), investment in human capital, and the

opening-up and development of capital markets for the private sector.— Yet, on the other hand, arguably the most outstanding, defining feature of China's approach to promoting innovation capabilities is its aggressive reliance upon selective industrial policies. These appear, at least in spirit, to directly contradict the commitment to ~~wards~~ ~~the~~ reliance upon institution-building and free markets. These selective interventions seem more inspired by the successful East Asian models of development ~~espoused~~ ~~followed~~ by China's neighbours — ~~(i.e., particularly Japan and South Korea, which)~~ ~~Japan and South Korea~~ actively espoused market interventions, particularly via directed credit and financial repression, so as to pool and focus resources in promising areas. Strategic trade policies were also employed, particularly in the form of export-market contests among big business groups (World Bank 1993). At the firm-level, business groups were promoted as a suitable microeconomic unit to facilitate technological learning and firm-level catch-up (Amsden and Hikino 1994). They could undertake the necessary capital investments to develop economies of scale and scope.

— China's selective industrial policies, central to the development of innovation capabilities, are somewhat similar. They have been specifically directed at high-tech emerging sectors with the potential for rapid productivity growth, ~~and~~ export-market potential, and ~~in~~ ~~at~~ areas exhibiting high-income elasticity of demand. These selective industrial policies, moreover, incorporate crucial roles for state-owned business groups (which may crowd out the private sector) (Alon et al. 2009).— This is evidenced by huge state interventions in areas related to new, disruptive technologies, where China hopes to win first-mover advantages, predominantly via large state-directed interventions. The recent highlight of Chinese policy-making is the

articulation of the ‘China Manufacturing 2025’ industrial policy. It is loosely based on Germany’s ‘industry 4.0’ programme and targets ten specific industries, ~~including~~: new advanced information technology; automated machine tools ~~&and~~ robotics; aerospace and aeronautical equipment; maritime equipment and high-tech shipping; modern rail ~~—~~transport equipment; new-energy vehicles and equipment; power equipment; agricultural equipment; new materials; and biopharma and advanced medical products (Clover 06/03/2017) Thus, in areas such as new electric vehicles and battery technology, semiconductors, solar panels/modules and wind power, interventions have been extensive, ongoing and highly prominent. ~~—~~ Semiconductors, for example, are reported to have received over \$150 billion in government subsidies alone. According to the US President’s Council of Advisors on Science and Technology, Chinese industrial policies in this sector ~~“~~pose real threats to semiconductor innovation and US national security~~”~~ ~~—~~ (Lucas 16/01/2017). ~~—~~ New battery technologies have similarly received great support, with large state-owned groups like CATL now emerging as one of the largest players on the world stage (Sanderson, Hancock, and Lewis 05/03/2017). Similarly, support (and overcapacity) in wind and solar ~~—~~power sectors have been prominent to date.

~~—~~ China’s economic policy-making and longer ~~—~~term economic prospect~~s~~ are thus increasingly intertwined with its efforts to develop science and technology. Policy-making, moreover, is characterised by a curious dualism with regards to its innovation policies (Ning 2009a, Fu 2015). It is still too early to say how this approach will play itself out. Will the private sector be ignored or simply ~~be~~ crowded out by the state sector and related selective industrial policies? ~~—~~ Will the focus on industrial policies be incompatible with the building of a strong and supportive institutional environment,

likely to be so central to continued growth of innovation, particularly in the private sector (Witt 2016)? We do not yet know. What we can say is that while China's past national-development policies have also regarded innovation as a key means of catching-up with developed countries (and sustainable economic growth), there has been a significant strengthening of this viewpoint in recent times. This is driven by the underlying belief that enhanced innovation is the only way by which developing countries may move up the economic value chain, particularly for those entering middle-income levels. Unable to compete successfully in either low-cost or high valued-added markets, they are forced to undertake significant alterations in their development models (Lewin, Kenney, and Murmann 2016, Fu, Woo, and Hou 2016).

China has thus been driven by its desire to be self-sufficient and to move beyond an imitative 'catch-up' phase in recent times, towards more fundamental advances in indigenous innovation. This process has also been accompanied by its fast-growing domestic markets and considerable state investment in physical and social infrastructure, driven partly by growing environmental concerns. Given the significant state-driven nature of China's innovation growth, it is unsurprising that an early array of research was devoted to studying the context of the national-policy environment and its impacts on China's innovation capacity (Vinig and Bossink 2015, Chen and Naughton 2016). For example, Liu et al. (2011) reviewed China's major innovation policies as well as their evolution and trajectory (Liu et al. 2011). This line of enquiry followed somewhat in the footsteps of the national innovation-system literature. It thus focused to a large extent on structures and institutions as well as their impacts on innovation. Although acknowledging that country-specific context and business systems may lead firms to pursue a great variety of innovative activities and processes,

this literature remained somewhat limited in scope at the more disaggregated level of the firm.—Firm-level research was therefore missing, to some extent.

Technological upgrading or catch-up, however, requires firms to engage in fundamental changes within their organizations and also to draw upon ideas and resources from their environment. They must do so while simultaneously adapting to global competition (Chesbrough 2013) . Specific local context has thus been argued to play a critical role, as variations in context can lead to environments that shape both the scope and scale of firm activities (Tan and Meyer 2011). More importantly, specific local contexts and business systems (Witt and Redding 2014) may shape the mechanisms of inter-organizational interactions and thus affect the extent of collective learning and localized knowledge spill-overs essential for firm innovation. Apart from the institutional and policy context, there have therefore been considerable efforts made to delineate the local contexts and their relevance for firm innovation. These can be found in various research streams. Although there is not a consensus on the exact classification, these themes can be broadly divided into three areas: national and regional contexts; technological and industrial contexts; and organisational and cultural contexts.

—With regards to the regional context, extant literature has examined inter-firm knowledge—exchange efficiency within industrial clusters (Harrison, Kelley, and Gant 1996, Arian 2009); the impact of national and regional innovation systems on firm innovation (Lundvall, 2007); the “triple helix”<sup>221</sup> model found within university-industry-government relationships (Park and Leydesdorff 2010, Sutherland 2005);

regional and geographical characteristics that affect firm innovation (Crescenzi, Rodriguez-Pose, and Storper 2012); and the role of MNEs and local industrial agglomeration (Wang et al. 2016, Ning, Wang, and Li 2016). More recently, there has been an examination of the regional environments and business systems that are favourable for firms to improve innovation performance through exports, outward foreign direct investment and overseas returnees (Ning 2009b, Ning and Sutherland 2012, Liu et al. 2015)).

\_\_\_\_ Technological and industrial contexts are arguably the most extensively studied ~~with-regardings~~ their relationship to firm innovation. Rooted in ~~the-product-life-cycle~~ theory, for example,\_\_\_\_ the literature has documented ~~the-discontinuities~~ in the technological trajectories of industries as technological and economic paradigms ~~shifts~~ (Perez and Soete 1988). Latecomers, for example, may be able to take advantage of these discontinuities as “windows of opportunity” so as to catch up with industrial leaders. Such discontinuities mean all industry players must start from similar starting points (~~i.e.-e.g. witness-electric-vehicle~~ development) (Lee and Malerba 2017). A ‘demand’ window, moreover, can shake up\_\_\_\_ ~~pre-existing consumer-demand~~ structures as well as the industrial product lifecycle, while technological windows explain the application of new technologies in advancing the products and processes of different industries (Lee, Lim, and Song 2005). Moreover, in the early stages of an industry’s life-cycle, an ‘entrepreneurial’ regime dominates its development and favours new product features and designs, as well as new entries. In the later ‘routinized’ regime stages, innovation becomes of a more incremental nature. It then favours cost reduction and large-scale production.\_\_\_\_ ~~Industrial-resource~~

munificence may therefore exert a significant contextual role in influencing firm innovation (Bos, Economidou, and Sanders 2013).

\_\_\_\_ Organisational and cultural contexts ~~discuss involve the~~ organisational, cultural, practices and routines as well as the absorptive capabilities underlying the organisational knowledge-creation process. Previous research has explored the contextual influence on firm innovation by identifying a range of antecedents, moderators and mediators; ~~f~~ For example, the characteristics of organisational leaders and firms such as size, organisational complexity, ~~and~~ market competition, sources of knowledge, and knowledge acquisition capabilities (Ning and Li 2016, Damanpour and Aravind 2012, Ganter and Hecker 2014). ~~Research~~ Research has also been conducted in examining the types of organisational structure and administrative processes on firm innovation, such as the nature of formalisation and centralisation (Damanpour and Aravind 2012).

The other prominent line of inquiry in the contextual field is ~~the open~~ innovation literature. This explores how firms use external sources of innovation through searching, enabling, filtering, and acquiring across the boundaries of the firm, as well as the conditions under which these are achievable (Enkel, Gassmann, and Chesbrough 2009, West and Bogers 2014).

\_\_\_\_ In short, there is a considerable body of research that explores the role of context and its impact on innovation. ~~It is important.~~ How contextual influences play a role in innovation is, however, not limited to the contexts discussed above. In particular, there remains a need to identify how specific local contexts shape firm innovation.

This is particularly true in the context of the Chinese market. It was with this in mind that we invited submissions for this special issue.

### **Contributions to the understanding of local innovation in China: the role of the private sector**

As noted above, there is an interesting and contradictory duality to current policy-making as regards Chinese innovation. Lip service is given to promoting free markets and market-based mechanisms for innovation. Simultaneously, however, China engages in very wide-ranging, predominantly state-led, industrial policies (~~i.e.~~e.g. to manipulate market returns by setting prices itself, be it the allocation of financial capital at low interest rates or the provision of price subsidies to promoted sectors). Whatever the strengths and weaknesses of this industrial-policy approach, it seems likely that the role of the private sector will become more important as a driver of innovation. As the head of the EU Chamber of Commerce in China recently commented, it is the private sector that arguably has provided the most successful innovators (~~i.e.~~e.g. Tencent, Alibaba, Mindray Medical International, Wuxi Pharmatech~~etc.~~). Yet research on the forces that shape innovation within the context of China's private sector is limited, particularly ~~that on~~as regards small and medium-sized enterprises (SMEs).

~~-~~ It is with this in mind that two articles in this special issue focus on this under-researched area. The third considers the related area of importance to private-sector development, namely how crowdsourcing intermediaries act as market-based

platforms to facilitate market-led research and development activities. The papers therefore engage with the specific question of how understanding local context can deepen our understanding of how China's private-sector firms innovate and compete in a rapidly-changing market environment. They consider, among other things, what is unique and 'Chinese' about business innovation and innovation-management practices in China, as well as how the Chinese business system may shape these approaches, with particular reference to this under-researched category of the SME private sector.

#### *Monetary incentives and innovation in Chinese SMEs*

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#### *Incentives, governance, and innovation in China's SMEs*

The first paper, by Shapiro (2017), explores the relatively neglected question of how firm-specific monetary incentives matter in the context of local innovation in China. They use a unique panel sample of Zhejiang-based SMEs to explore the impact of monetary incentives on innovation. They show that the impact of incentives depends on the nature of the incentives given, and the recipients' employee status, as well as the specific measures used for quantifying innovation performance. Interestingly, and contrary to predications of agency theory when applied to firms in the Western developed-market context (against which they frame their hypotheses), they show that managers respond positively to pay for performance in improving risky and uncertain patenting activities in their Chinese private-sector SMEs. They argue that one reason for this may be related to the high ownership concentration in these types of private-sector SMEs. As such, monitoring is more effective and incentives related to short-term measures may not distract managers away from longer-term goals.

They contend, however, that a more likely explanation for the reported and contradictory (at least with regards to agency-theory's predictions) behavior relates to the specific institutional context of Zhejiang province (and China more generally).

Monetary rewards and tax benefits are given to firms that file patents and innovate.

This links patenting to short-run financial performance, explaining the unusual results.

By-In contrast to the managerial findings, however, they find employees without managerial status only respond to performance-based pay in improving new-product sales. In conclusion, they argue that it is the institutional context within which Chinese SMEs function and operate that may contribute to their findings.— This is mainly, they suggest, because government incentives allow firms to overcome managerial tendencies that favour short-term gains at the expense of innovation.

*The impact of technological-innovation strategy on the export intensity of Chinese exporting SMEs: exploring the moderating role of the domestic business environment*

In the same vein as Shapiro-(2017), the second paper by Rialp-Criado and Komochkova (2017)~~Criado (2017)~~ also looks ~~also~~ at innovation in Chinese SMEs. It does so, however, by exploring the relationship between innovation strategies and the degree of internationalization (DOI). ~~Criado (2017)~~ The authors draw from the resource-based view and institutional theory to develop their hypotheses. They note that the ability to undertake technological innovation and to internationalize are two important sources of competitive advantage for SMEs.— However, results from ~~many~~ previous studies on the innovation-DOI relationship are somewhat mixed. Past research, as might be expected, generally finds a positive relationship: innovating firms increase their levels of internationalization. However, significant negative and

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insignificant relationships have also been found. As a result of these mixed findings, scholars have argued that it could be the distinctive features of the context in which firms operate that might explain them. Unique and rapidly-changing market environments, like those found in China; for example, may imply the need for the continuous adjustment of competitive advantages by means of ~~developing~~ suitable innovation strategies. Formal and informal institutional constraints, moreover, may also shape the internationalization strategies that firms follow, either directly or through ~~the~~ interaction with other export-activity antecedents, including technological innovation. To achieve higher export-intensity levels in Chinese SMEs, therefore, SMEs may potentially need to adjust to the country-specific context by adjusting their innovation strategy to account for the imperfect institutional setting. To date, however, no studies have empirically addressed the issue of which technological strategies, in terms of innovation inputs and outputs, might help increase SMEs' DOI. The main research question they therefore address is: What is the contingent effect of technological-innovation strategy on DOI with respect to possible constraints found in the Chinese context?

In contrast to previous research which has been conducted in the western context, ~~Criado (2017)~~ Rialp-Criado and Komochkova finds that the introduction of new products actually has a negative effect on DOI. They explore a range of environmental business contexts that influence this relationship. This includes the impact of local taxes and license regimes, corruption levels, business-operation conditions, infrastructure, social conditions and logistics. Their study thus contributes to the DOI and export-intensity literature by highlighting the importance of considering the local context in understanding the technology-export relationship. Again, for the purposes of this special issue they provide further insights into the particular context of the

Chinese market-place and how this leads to findings that challenge conventional wisdom.

*Inter-organizational governance and trilateral trust-building: a case study of crowdsourcing-based open innovation in China*

The final paper, by Guo (2017), investigates a novel sourcing method that has arisen within the Chinese context: internet-based crowdsourcing for innovation. Based on first-hand experience of observing the problems faced by a Chinese crowdsourcing intermediary, they find that unlike the open platforms used in the western context, Chinese crowdsourcing intermediaries rely extensively on *guanxi* (i.e. personal connections) to govern crowdsourcing processes and manage R&D projects. These practices, however, may prevent the rapid growth of crowdsourcing-based open innovation in the Chinese context, as they generally lack contractual mechanisms to safeguard transactions, and project-bidding and communication transparency between R&D funding sourcers and sources. Their paper thus suggests that *guanxi* is a specific contextual factor that needs to be considered in extending open innovation and the inter-organizational literature in the Chinese context.

An interesting-particular contribution of this paper lies in the further insights it can provide into the types of intermediaries that are emerging to provide additional market-based solutions to facilitate innovation in China. The role of the internet, for example, provides interesting opportunities for the growth of advanced financial technologies, such as peer-to-peer lending. A range of possibilities for the evolution of these new intermediaries exists. They may be capable of radically altering the

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innovation landscape in China. Similarly, they may encounter considerable hurdles as lubricants or catalysts ~~to~~ for innovation. To date, research on these market-based solutions remains limited, and ~~it~~ remains unclear as to what actual impact they may have. As the case of trilateral crowdsourcing shows, most will not be transferred seamlessly and how they may evolve to respond to the implementation challenge raises interesting questions about their long-term sustainability and impacts.

## Summary

This special issue offers some new perspectives with regards to how context influences innovation in Chinese business. It does so with respect to a particular group of innovators that has arguably received less attention to date, namely ~~the~~ small and medium-sized enterprises in the private sector. Despite the strong tendency of policy-making towards state-led selective industrial policies (e.g. ~~i.e.~~ China Manufacturing 2025), as the Development Research Centre and World Bank have recently pointed out, the private sector must play a central role if China is to make its way through the 'middle-income trap': "Innovation at the technology frontier is quite different in nature from catching-up technologically. It is not something that can be achieved through government planning... *The role of the private sector is critical*"<sup>2</sup> (World Bank and DRC 2013) (~~The World Bank and DRC, 2013~~ page 103 (emphasis added)). Better understanding of the challenges it faces, as well as the ways in which local context influences ~~its~~ innovation behaviours, are therefore important topics of study.

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In recent years, scholars have suggested that innovation studies have been strongly influenced by Western-centric innovation theories (Vinig and Bossink 2015). With China's unprecedented growth and emergence as a true economic superpower, there is clearly a growing need for Western firms to understand the Chinese context. This will help them manage operations successfully with Chinese counterparts as well as understand the potential threat of Chinese competition. Moreover, research with a focus on the Chinese content is important, because it can contribute to the development of more universal theories and provide new research directions, ones that may simply be overlooked if a western-focused lens continues to dominate (Jia, You, and Du 2012).— This is especially true for the innovation literature,—as latecomer firms have the potential to leapfrog current technological trajectories when new technological paradigms emerge, bypassing older technologies and even forging novel pathways and processes (Wang et al. 2014).

China is certainly now in a development phase that requires it to move from imitation to indigenous innovation in order to achieve sustainable growth. This path is likely to be different from the development approach used in Western developed countries in the past, simply because of the range of different actors and the unique and hugely different context in which it is taking place.— The local context and specific business systems of the Chinese market will continue to lead its firms to pursue particular types of innovative activities and processes that might not typically be observed in developed economies.

— Future research needs to further explore the specificities of the Chinese context and, in doing so, look to generate conclusions about the specific nature of innovation

in China. One particular area that warrants further consideration is the way in which China is developing suitable institutions capable of fostering further economic growth via support of its innovation system (Redding and Witt 2007). Lack of appropriate institutional development may, arguably, stand as a key bottleneck at this particular historical juncture.—Successful East Asian ~~C~~countries that have made it to high-income levels, have, for the most part, managed to engage in shared growth (Zhang et al. 2013). They have been able also to develop the appropriate political institutions to create and support this shared growth (Witt 2016). As ~~Witt (2016)~~Witt —points out, there may be many different possible combinations or types of effective institutions to support future development in China (witness the differences between US and Germany, for example). Nonetheless, it is essential that China somehow works towards adopting effective ones.

Currently, there are some question—marks about China's ability to meaningfully do so. This is partly because of its inability to engage in political reforms. History (in East Asia and elsewhere) suggests successful institution—building is usually done via the creation of democratic political systems – where businesses and groups have the voice and power to shape-influence the constraints that shape their interactions. As Witt (2016) puts it, “the key question for China moving forward is how to improve its quality of governance, and in particular, how to build institutionalized trust”<sup>2</sup> (Witt 2016).

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It still remains unclear, however, whether China will be able to do this.—Its institutional development lags behind other countries at similar levels of economic development (~~i.e.~~—as measured by, say, per capita incomes). It may, therefore, not be enough to simply inject resources into targeted industrial sectors via selective

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industrial policies and to develop the capabilities to innovate in this *ad-hoc* way. It may be more important to develop the social technologies and frameworks within which businesses can innovate and grow.—While lip service is paid to institutional development, the emergence of aggressive industrial policies may potentially lead to groups of entrenched insiders. Further positive institutional development may not be in their interests.—Successful industrial policies, therefore, will require care and attention to balancing the potential benefits of such policies with the costs. This certainly remains an area of interest for future research.

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## References

- Alon, Ilan, Julian Chang, Marc Fetscherin, Christoph Lattemann, John R McIntyre, and Dylan Sutherland. 2009. "Do China's "national team" business groups undertake strategic-asset-seeking OFDI?" *Chinese Management Studies* no. 3 (1):11-24.
- Amsden, Alice H, and Takashi Hikino. 1994. "Project execution capability, organizational know-how and conglomerate corporate growth in late industrialization." *Industrial and corporate change* no. 3 (1):111-147.
- Arikan, Andaç T. 2009. "Interfirm knowledge exchanges and the knowledge creation capability of clusters." *Academy of Management Review* no. 34 (4):658-676.
- Bos, Jaap W. B., Claire Economidou, and Mark W. J. L. Sanders. 2013. "Innovation over the industry life-cycle: Evidence from EU manufacturing." *Journal of Economic Behavior & Organization* no. 86:78-91. doi: <https://doi.org/10.1016/j.jebo.2012.12.025>.
- Chen, Ling, and Barry Naughton. 2016. "An institutionalized policy-making mechanism: China's return to techno-industrial policy." *Research Policy* no. 45 (10):2138-2152. doi: <https://doi.org/10.1016/j.respol.2016.09.014>.
- Chesbrough, Henry. 2013. *Open business models: How to thrive in the new innovation landscape*. Boston: Harvard Business Press.
- Clover, C. . 06/03/2017. "Europe fears Chinese tech push." *Financial Times*.
- Crescenzi, R., A. Rodriguez-Pose, and M. Storper. 2012. "The territorial dynamics of innovation in China and India." *Journal of Economic Geography* no. 12 (5):1055-1085. doi: 10.1093/jeg/lbs020.

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Criado. 2017. "Inter-Organizational Governance and Trilateral Trust Building: A Case Study of Crowdsourcing-based Open Innovation in China." *Asian Business & Management* forthcoming.

Damanpour, Fariborz, and Deepa Aravind. 2012. "Managerial innovation: Conceptions, processes, and antecedents." *Management and Organization Review* no. 8 (2):423-454.

Eichengreen, Barry, Donghyun Park, and Kwanho Shin. 2012. "When Fast-Growing Economies Slow Down: International Evidence and Implications for China\*." *Asian Economic Papers* no. 11 (1):42-87.

Eichengreen, Barry, Donghyun Park, and Kwanho Shin. 2013. Growth slowdowns redux: New evidence on the middle-income trap. Cambridge: National Bureau of Economic Research.

Enkel, Ellen, Oliver Gassmann, and Henry Chesbrough. 2009. "Open R&D and open innovation: exploring the phenomenon." *R&D Management* no. 39 (4):311-316.

Fu, Wenying. 2015. *Towards a Dynamic Regional Innovation System: Investigation Into the Electronics Industry in the Pearl River Delta, China*. Verlag Berlin Heidelberg: Springer.

Fu, Xiaolan, Wing Thye Woo, and Jun Hou. 2016. "Technological innovation policy in China: the lessons, and the necessary changes ahead." *Economic Change and Restructuring* no. 49 (2-3):139-157.

Ganter, Alois, and Achim Hecker. 2014. "Configurational paths to organizational innovation: qualitative comparative analyses of antecedents and contingencies." *Journal of Business Research* no. 67 (6):1285-1292.

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Guo. 2017. "The impact of technological innovation strategy on the export intensity of Chinese exporting SMEs: exploring the moderating role of the domestic business environment." *Asian Business & Management* forthcoming.

Harrison, Bennett, Maryellen R Kelley, and Jon Gant. 1996. "Specialization versus diversity in local economies: The implications for innovative private-sector behavior." *Cityscape* no. 2 (2):61-93.

Jia, Liangding, Shuyang You, and Yunzhou Du. 2012. "Chinese Context and Theoretical Contributions to Management and Organization Research: A Three-decade Review." *Management and Organization Review* no. 8 (1):173-209.

Lee, Keun, Chaisung Lim, and Wichin Song. 2005. "Emerging digital technology as a window of opportunity and technological leapfrogging: catch-up in digital TV by the Korean firms." *International Journal of Technology Management* no. 29 (1-2):40-63.

Lee, Keun, and Franco Malerba. 2017. "Catch-up cycles and changes in industrial leadership: Windows of opportunity and responses of firms and countries in the evolution of sectoral systems." *Research Policy* no. 46 (2):338-351. doi: <https://doi.org/10.1016/j.respol.2016.09.006>.

Lewin, Arie Y, Martin Kenney, and Johann Peter Murmann. 2016. *China's Innovation Challenge: Overcoming the Middle-Income Trap*. Cambridge: Cambridge University Press.

Liu, Feng-chao, Denis Fred Simon, Yu-tao Sun, and Cong Cao. 2011. "China's innovation policies: Evolution, institutional structure, and trajectory." *Research Policy* no. 40 (7):917-931. doi: 10.1016/j.respol.2011.05.005.

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- Liu, Xiaohui, Lan Gao, Jiangyong Lu, and Yingqi Wei. 2015. "The role of highly skilled migrants in the process of inter-firm knowledge transfer across borders." *Journal of World Business* no. 50 (1):56-68.
- Lucas, L. 16/01/2017. " US shows heavy resistance to China chip plans." *Financial Times*.
- Mitchell, T. . 24/11/2016. "China sets world record for patents." *Financial Times*.
- Ning, Lutao. 2009a. "China's Leadership in the World ICT Industry: A Successful Story of Its." *Pacific Affairs* no. 82 (1):67-91.
- Ning, Lutao. 2009b. "China's Leadership in the World ICT Industry: A Successful Story of Its" Attracting-in" and" Walking-out" Strategy for the Development of High-Tech Industries?" *Pacific Affairs* no. 82 (1):67-91.
- Ning, Lutao, and Jian Li. 2016. "Joint problem solving and organizational learning capacity in new product innovation." *R&D Management* no. 1 (12):211-226.
- Ning, Lutao, and Dylan Sutherland. 2012. "Internationalization of China's private- sector MNEs: An analysis of the motivations for foreign affiliate formation." *Thunderbird International Business Review* no. 54 (2):169-182.
- Ning, Lutao, Fan Wang, and Jian Li. 2016. "Urban innovation, regional externalities of foreign direct investment and industrial agglomeration: Evidence from Chinese cities." *Research Policy* no. 45 (4):830-843.
- Park, Han Woo, and Loet Leydesdorff. 2010. "Longitudinal trends in networks of university–industry–government relations in South Korea: The role of programmatic incentives." *Research policy* no. 39 (5):640-649.
- Perez, C. , and L. Soete, eds. 1988. *Catching-up in technology: entry barriers and windows of opportunity*. Edited by G. Dosi, C. Freeman, R. Nelson, G.

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- Silverberg and L. Soete, *Technical Change and Economic Theory*. London: Pinter Publishers 458-479.
- Redding, S Gordon, and Michael A Witt. 2007. *The future of Chinese capitalism: Choices and chances*. Oxford, UK: Oxford University Press.
- Sanderson, H., T. Hancock, and L. Lewis. 05/03/2017. "Electric Cars." *Financial Times*.
- Shapiro. 2017. "Incentives, governance, and innovation in China's SMEs." *Asian Business & Management forthcoming*.
- Sutherland, Dylan. 2005. "China's science parks: Production bases or a tool for institutional reform?" *Asia Pacific Business Review* no. 11 (1):83-104.
- Tan, Danchi, and Klaus E Meyer. 2011. "Country-of-origin and industry FDI agglomeration of foreign investors in an emerging economy." *Journal of International Business Studies* no. 42 (4):504-520.
- Vinig, Tsvi, and Bart Bossink. 2015. China's indigenous innovation approach: the emergence of Chinese innovation theory? Abingdon: Taylor & Francis.
- Wang, Fangrui, Jin Chen, Yuandi Wang, Ning Lutao, and Wim Vanhaverbeke. 2014. "The effect of R&D novelty and openness decision on firms' catch-up performance: Empirical evidence from China." *Technovation* no. 34 (1):21-30.
- Wang, Yuandi, Lutao Ning, Jian Li, and Martha Prevezer. 2016. "Foreign Direct Investment Spillovers and the Geography of Innovation in Chinese Regions: The Role of Regional Industrial Specialization and Diversity." *Regional Studies* no. 50 (5):805-822.
- West, Joel, and Marcel Bogers. 2014. "Leveraging external sources of innovation: a review of research on open innovation." *Journal of Product Innovation Management* no. 31 (4):814-831.

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Witt, Michael A, and Gordon Redding. 2014. *The Oxford handbook of Asian business systems*: OUP Oxford.

Witt, Michael A. 2016. *The Road ahead for China: Implications from South Korea's Experience*. In Arie Y. Lewin, Martin Kenney, & Johann Peter Murmann (Eds.), *China's Innovation Challenge: Overcoming the Middle-Income Trap*.

Cambridge UK: Cambridge Publishing Press: 87-107.

World\_Bank. 1993. "The East Asian miracle : economic growth and public policy." *Economic Record* no. 70 (211):469.

World\_Bank, and DRC. 2013. "China 2030 Building a Modern, Harmonious, and Creative Society." *Banco Mundial* no. 15. doi:

<http://www.bis.org/list/bispapers/index.htm>.

Zhang, Linxiu, Hongmei Yi, Renfu Luo, Changfang Liu, and Scott Rozelle. 2013.

"The human capital roots of the middle income trap: the case of China." *Agricultural Economics* no. 44 (s1):151-162.

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