

## Patented in China: Examining the Influence of Government Intervention on Innovation

*Rachel Yu-Ru Tan is a junior majoring in Global and International Studies and Political Science with a minor in Psychology. She is from Penang, Malaysia. This article was supervised by Dr. John Kennedy.*

### Abstract:

The body of research providing empirical support for the importance of innovation for rapid economic growth has left countries scrambling to cultivate innovative capabilities amongst their citizens. China's emergence as the top filer of domestic patent applications in 2011 has been attributed to policies enacted by the Chinese leadership aimed at increasing innovative activity within the country. This paper finds support for the argument that government intervention has a stronger influence on innovation than free markets, for patterns in domestic patent activity in China and Malaysia seem to coincide with each government's policies and incentives that explicitly target innovative activity. However, the debate on the quality of Chinese patents suggests the importance of implementing a more sustainable innovation development strategy over enforcing short-term quantitative targets. This paper discusses the role of education in serving as a more sustainable method in the development of a nation's innovation trajectory.

### 1. Introduction

In recent years, there has been no shortage of literature providing empirical support for the positive effects of innovation on economic growth (Braunerhjelm, et al.; Galindo and Méndez-Picazo). Given findings such as Galindo and Méndez-Picazo's that demonstrate a positive correlation between innovation and economic growth (507), both developed and developing countries are currently striving to emerge as innovative nations. China is a prime example of such a developing country, and its enhanced efforts to promote innovation among its population has allowed it to surpass developed economies, such as the United States and Japan, to emerge as the top filer of domestic patent applications in 2011 (Prud'homme, "China's shifting patent landscape" 619).

The recent rise of China as a top innovator and the equally fervent pursuit of innovative outcomes by other countries has led policymakers, managers, and researchers alike to debate the best methods of fostering innovation amongst citizens of a country. While some may favor the role of free markets, others champion direct government interventions as a more rapid and efficient way to stimulate innovative activity within the country.

The question this paper addresses is whether government interventions have a stronger influence on innovation than free markets. This paper approaches the question through a comparative case study of China and Malaysia, two state capitalist countries in Asia. These countries are also characterized by exam-oriented education systems that

center around the use of memorization and rote learning techniques to prepare students to sit for high-stakes national exams known as the *gaokao* and the Sijil Pelajaran Malaysia examinations, respectively (Tan and Arshad 174; Zhao 133).

Given that similar economic and education systems of systems of both countries, the governments of China and Malaysia are able to exert equally extensive amounts of control over these tools of government, which allows for greater intervention in these areas. However, these two countries differ notably in their levels of direct government involvement within the development of their respective innovation trajectories. Specifically, the Chinese leadership introduces and enforces numerous policies and ambitious goals in relation to innovation targets, while the development of the innovation trajectory in Malaysia has received little attention or direct assistance from the Malaysian government. Therefore, by examining the extent to which both governments promulgate direct policies and initiatives targeting innovation within their countries, researchers can observe whether direct government interventions have an influence on a country's degree of innovation.

After analyzing each country's policies and incentives aimed at promoting innovation alongside patterns in their domestic invention patent grants, this paper finds that government interventions have the greatest influence on innovation. However, although stringent policies and monetary incentives may help a country achieve quantitative measures of innovation, such as patent application quotas, these efforts can sometimes be detrimental to the quality of these inventions.

Thus, this paper discusses the potential of a country's education system in providing a more sustainable method of fostering innovation within a population. The existing exam-oriented education systems of both China and Malaysia, which encourage passive classroom learning and conformity, are criticized for hampering the development of students' creative thinking skills and discouraging an inquisitive attitude amongst students (Zhao 133). Researchers have voiced their doubts regarding the ability of developing countries to sustain the level of innovation needed to generate long-run economic growth without committing to a comprehensive reform of their education systems (Hanushek 204). This paper concludes with a discussion on the implications of an educational framework that champions creative and independent thinking over rigid rote learning on developing a more sustainable method of fostering innovation within a country (Abrami et al.).

## 2. Literature Review

### 2.1. Innovation

Prior to examining the role of government interventions on innovation, it is helpful to first understand what innovation is and how it can be measured. Although the bulk of literature on the topic only emerged in the 1990s, Joseph Schumpeter has been a proponent of innovation as the driving force behind economic development since the publication of his work, "The theory of economic development," in 1912 (Fagerberg and Verspagen 220). His theoretical claim that innovative individuals and their capability to overcome their "inert or resisting environment[s]" plays a pivotal role in economic led to a proliferation of scholarly works seeking to under-

stand the subject of innovation (Fagerberg and Verspagen 220; Patanakul and Pinto 98). Generally, researchers seem to agree that innovation involves the formulation of new ideas, which may constitute combinations of “existing knowledge and resources,” or a process that “challenges the present order” (Patanakul and Pinto 98). However, innovation does not merely constitute the generation of new ideas; it also encompasses the channeling of these ideas into the invention of a product that is valuable to society (Mumford 110; Van de Ven 590). Numerous researchers reinforce this notion by reiterating the importance of a “champion,” not unlike Schumpeter’s innovative individual, in ensuring the successful implementation of an innovation (Fagerberg and Verspagen 220; Van de Ven 592).

Given the existing literature on innovation, the working definition of innovation used for this paper is the development of novel and creative ideas into useful products. The operational definition of innovation within this paper is the number of domestic invention patents granted per 1000 persons in a country. Since patent laws in both China and Malaysia stipulate that inventions must be “industrially applicable” or “of practical use” to be considered for a patent grant, the use of data on invention patents granted to domestic residents provides a relatively accurate gauge of the level of innovation within each country (“*Malaysia Patents Act*”; “*Patent Law of the People’s Republic of China*”).

Another rationale for narrowing the paper’s scope of focus to invention patents is the proliferation of “junk patents” which are largely found amongst the categories of utility model patents and design patents (Zhao 107).

Patent applications under the aforementioned categories are subject to fewer requirements and lower expectations, thus leading to patent grants for products that are unoriginal or that lack significant economic value (Zhao 107). Indeed, invention patent applications in both countries are subject to a rigorous review process known as substantive examination, thus increasing the likelihood that granted invention patents are of relatively higher quality (Dang and Motohashi 141; “*Malaysia Patents Act*”). In China, however, applications for utility model and design patents are not subject to the same stringent review process. This makes it difficult to determine whether these patents are truly novel or useful to society (Dang and Motohashi 141). In short, the decision to focus solely on granted invention patents ensures the use of a more accurate quantitative measure of innovation.

## 2.2. *Government Intervention and Innovation*

While various studies have found support for the pivotal role of government intervention in inducing and sustaining innovation, the extent of its influence remains complex and could depend on the strategic goals the government hopes to achieve. In their study, Lall and Teubal conducted an examination of firms within the newly industrializing nations of East Asia that benefited from targeted government intervention within their specific industries (1369). Their findings demonstrate that government interventions will “always promote faster development than free markets” in the presence of strategic needs (1382). In another study, Abernathy and Chakravarthy suggest that governments looking to assist “highly fragmented and technologically stagnant” industries within

their countries can do so by implementing policies aimed at fueling innovation (15).

Moreover, some studies advocate for direct government interventions in the form of stringent policies and regulations as a potential way to stimulate increased radical innovation (Abernathy and Chakravarthy 14, 16; Patanakul and Pinto 103). By establishing strict policy goals and regulatory standards, governments can propel breakthrough technological innovation and sustainable development by forcing industries to develop brand new technologies that comply with the new requirements (Ashford 2).

Based on the above findings, this paper defines government intervention as the direct, strategic efforts utilized by governments in setting their radical innovation trajectories. Additionally, the operational definition of government intervention refers to the policies, regulations, and incentives implemented by governments aimed at increasing patent activity amongst domestic residents within their countries.

### 2.3. *Free Markets and Innovation*

While there is extensive research supporting the direct involvement of governments in encouraging innovation within a country, there is also empirical evidence to suggest that innovative activity is highly responsive to demand. As a result, some scholars reason that governments should leave markets untampered to allow innovation to develop unhindered. As one of the earlier advocates of free markets as a means of stimulating innovation, Jacob Schmookler's analysis of railroad patent statistics shows a positive correlation between demand and innovation. This finding supports his argument that ex-

pected profits from inventions is the key influencer of innovative activity (Schmookler 18).

Schmookler's idea that demand influences innovation by providing economic incentives is also supported by more recent studies. Fontana and Guerzoni's 2008 study on a sample of small and medium enterprises (SMEs) in European countries finds that the presence of economic incentives as a result of demand inspires innovation within these enterprises (943). Moreover, their empirical analysis suggests that the SMEs who view customers as their most important contributors of knowledge on market demands also consider innovation to be more economically important for their firms (942). This finding seems to indicate that demand can stimulate radical innovation not only by providing economic incentives, but also by imparting valuable knowledge on market needs that allow firms to reduce uncertainty about expected profits from novel products (Fontana and Guerzoni 927).

In light of the above discussion, free markets refer to access to markets that are characterized by competition and consumer demand. However, it is important to also consider the element of risk in defining free markets. Caggase's study on the effect of uncertainty on innovation reveals that Italian entrepreneur firms who perceive innovative ventures to be risky or volatile are less likely to invest in these projects (288). Thus, the operational definition of free markets within the scope of this discussion is the absence of direct government interventions to stimulate innovation. A lack of direct efforts from governments would imply that innovative individuals and industries have to rely instead on

a free market approach to fuel innovation, focusing on consumer demand but also having to shoulder greater risk in their innovative undertakings.

The comparison of Malaysia and China address the premise that government intervention has a strong influence on innovation. This is done by comparing the countries of Malaysia and China. As state capitalist countries, both governments are indirectly involved in stimulating innovation in efforts to promote economic growth. By analyzing the influence of direct government interventions on the number of invention patents granted to domestic residents of each country, economists are able to examine if government involvement plays a larger role in inducing and sustaining innovation within a country.

### 3. Analysis

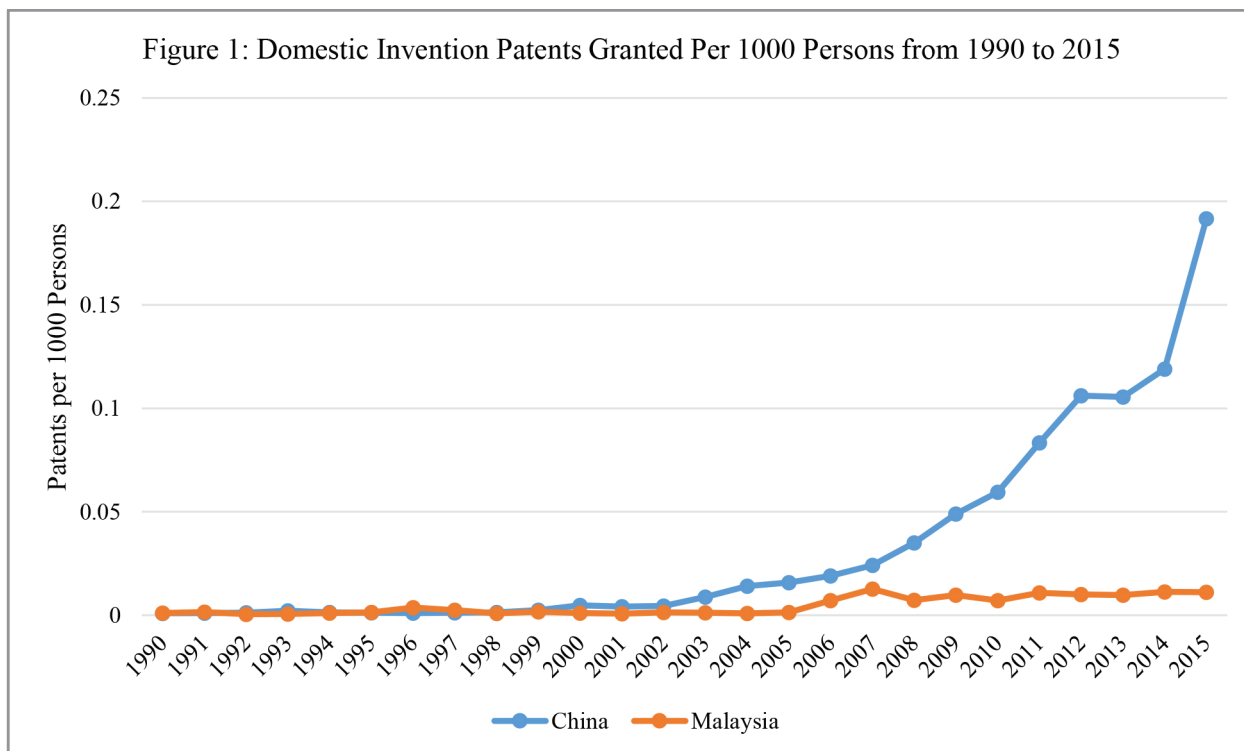
#### 3.1. *Government Intervention in China*

Although China is making headlines today as the top filer of patent applications in the world, this rise in patenting activity is a relatively new phenomenon in the country. In fact, the growth of granted domestic invention patents was relatively stagnant between 1990 and 1998, with only a meager increase from 0.001 to 0.0013 patents per 1000 persons in the span of almost a decade (see figure 1). However, the implementation of numerous policies and regulations aimed at innovation, beginning with a regional patent subsidy scheme in Shanghai in 1999, has coincided with the rapid increase of these numbers. In the span of fifteen years, China experienced an almost 190-fold increase in the number of domestic invention patents granted from 1990, culminating in just over 0.19 patents per 1000 persons in 2015 (see figure 1).

In 1999, Shanghai was the first province in China to launch a patent subsidy policy, which established a fund to subsidize the costs and fees incurred by patentees throughout the patent application and review process (Li 240). In the years that followed the launching of Shanghai's patent subsidy policy, other Chinese provinces gradually implemented similar patent subsidy programs as well. By 2007, 29 out of 30 provinces in Mainland China had such subsidy programs in place (Li 240). This gradual increase in provincial patent subsidy initiatives from 1999 to 2007 coincided with a steady increase in the number of domestic invention patents granted within that same timespan (see figure 1).

In 2005, the State Council of the People's Republic of China unveiled the National Medium- and Long-Term Program for Science and Technology Development in response to China's accession to the World Trade Organization and the provincial implementation of patent promoting policies (2006–2020), also known as S&T MLP. The program set the innovation trajectory for China and established the main framework for the concept of "indigenous innovation," which refers to domestic inventions (Prud'homme, "Dulling the Cutting Edge" 76). The development goals of the program included becoming an "innovation-oriented society," and emerging as one of the top five countries in the world in domestic invention patents granted by 2020 (State Council of the People's Republic of China). The objectives laid out by the State Council within this program provide a clear illustration of China's desire to become a world power in innovation.

Under its guiding principles, the program underscored the strengthening of indigenous



Source: *China Statistical Yearbook 2011*; *WIPO IP Statistics Data Center*; *World Bank Open Data*; calculations

innovation as the “core of its undertakings” (State Council of the People’s Republic of China). Although not specifically defined in the program’s outline, Prud’homme believes that there is solid evidence within other policy documents that define indigenous intellectual property rights as “intellectual property legally owned by Chinese citizens, legal persons, or other organizations through their leading research or creative design” (“Dulling the Cutting Edge” 81). Moreover, numerous policy decisions within the S&T MLP outline favor domestic patentees over their foreign counterparts. For instance, the “Government Procurement Favoring Indigenous Innovation” section within the outline details the government’s first-buy policy for “domestically made... products that possess proprietary intellectual property rights,” thus favoring domestic inventions over foreign in-

ventions in their purchasing decisions (State Council of the People’s Republic of China). The government also pledged to support enterprises seeking to acquire domestic high-tech equipment (State Council of the People’s Republic of China).

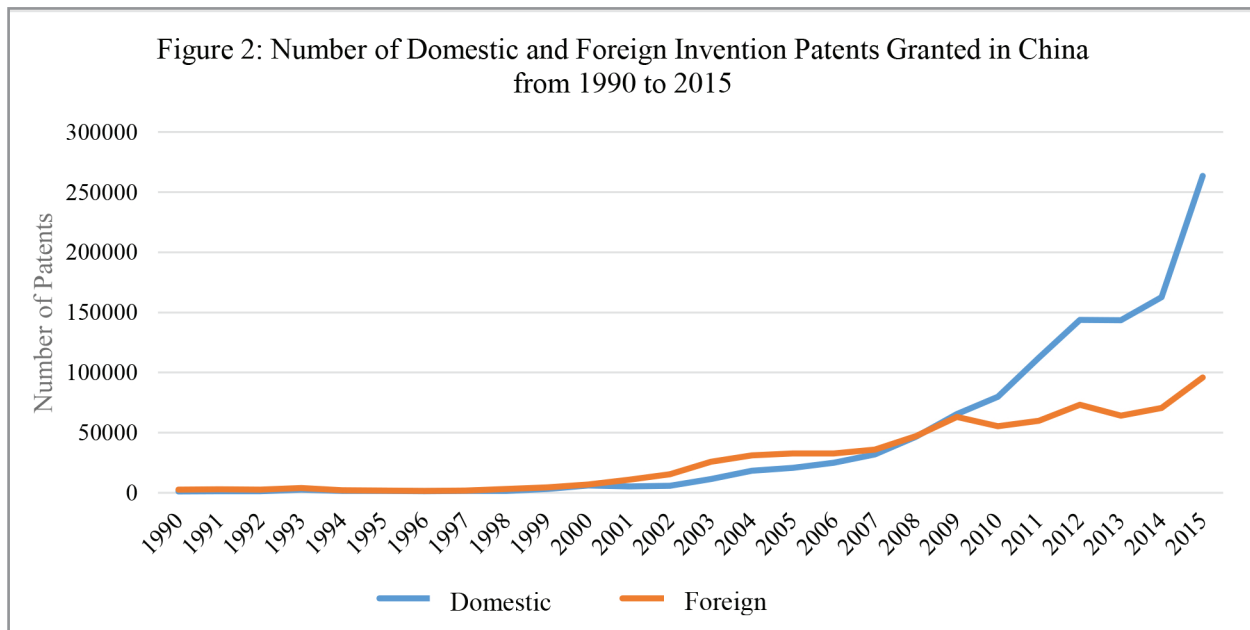
Given the implementation of a highly ambitious national development plan that favored domestic patentees, it is reasonable to believe that the S&T MLP contributed at least partly to the steeper increase in domestic invention patents granted per 1000 persons from 2007 onwards (see figure 1). In addition, we also see the impact of this direct, biased government intervention on the number of foreign invention patents granted. The preferential policies favoring domestic patentees over their foreign counterparts is at least partially responsible for the fact that the number of domestic invention patents grant-



ed surpassed that of foreign invention patents granted in 2008—a trend that has prevailed until 2015 (see figure 2).

Perhaps the strongest evidence that demonstrates the influence of direct government interventions on innovation is the sharp increase in the number of domestic invention patents granted per 1000 persons in 2015. This abrupt spike in patents can be attributed to the numerous patent targets, set by different government agencies, that were scheduled to be realized by 2015. In 2011, the Chinese government channeled their strategic efforts to stimulate domestic innovation into generating increased patenting activity among domestic residents. This renewed focus on patents is enshrined in the nationwide Twelfth Five-Year Plan, which sets the target goal that invention patents granted should be increased to 3.3 patents per 10,000 people by 2015 (Prud’homme, “Dulling the Cutting Edge” 62). In 2012, the State Council of the People’s Republic of China issued a notice calling for the number of invention patents

granted within the country to be tripled compared to the 2010 figures by 2015 (Prud’homme, “Dulling the Cutting Edge” 62). In addition to the aforementioned national efforts to influence innovative activity, China’s State Intellectual Property Office’s (SIPO) also launched the National Patent Development Strategy (2011-2020). To achieve the strategy’s central goal of enhancing China’s capacity to create patents, SIPO has stipulated several goals—all to be met by 2015—to improve the capacity of domestic patentees significantly. For instance, the strategy aims for China to have 2 million domestic patent applications filed annually by 2015 (State Intellectual Property Office). Apart from its specific focus on patents, the National Patent Development Strategy is also one of the first government initiatives to provide greater emphasis on its invention patents, deemed to be of higher quality than its utility model and design patents (Prud’homme, “China’s shifting patent landscape” 260). SIPO stipulated that by 2015, China will rank “among the top



Source: *China Statistical Yearbook 2011*; *WIPO IP Statistics Data Center*

two in the world” in terms of the number of domestic invention patents granted annually. This signals a gradual shift away from China’s initial innovation trajectory, which prioritized quantity over quality.

Furthermore, when factoring the near 150 other provincial and municipal quantitative patent targets slated to be met by 2015, the collective targets of policies and strategies set by various levels of government could be one reason for the sharp increase in the number of domestic invention patents granted per 1000 people in 2015 (see figure 1). With 0.1917 patents per 1000 people that year, 2015 saw a 61.2% increase in domestic invention patents compared to figures in 2014, and the aforementioned quantitative patent-related targets appear to be responsible for this staggering growth rate.

Another case that exhibits the magnitude of the influence of government interventions on innovation can be seen through the aftermath of a notice issued by the State Council in late 2011 banning measures linking indigenous innovation policies and government procurement incentive measures within documents from all levels of local governments beginning December 1<sup>st</sup> 2011 (Prud’homme, “Dulling the Cutting Edge” 77). This notice outlawing the provision of preferential financial support to domestic patentees is perhaps an explanation as to why the growth in domestic invention patents granted, which had been increasing steadily since 1999, plateaued in 2012 and 2013 (see figure 1). This trend suggests that direct government intervention could work both ways; not only is it capable of influencing the forward development of innovation, but certain policies may also contribute to a drop in innovative activity.

The relationship between the Chinese government’s policies and incentives aimed at promoting innovation and the patterns in its domestic invention patent grants over the years provides empirical support for the argument that government interventions have a strong influence on innovation. The next section of this paper examines the development of the innovation trajectory in Malaysia, which has received little direct help from its government, and can thus be said to rely heavily on a free market approach to fuel innovation.

### *3.2. Government Intervention and Free Markets in Malaysia*

Perhaps the only significant instance of government intervention in stimulating innovation that can be found in Malaysia was the implementation of the National Intellectual Property Policy (NIPP) in 2007. With a 5 billion ringgit (approximately \$1.47 billion) fund dedicated to the successful enactment of the NIPP, the Malaysian government was able to reserve a specific allocation of that money for the creation of an intellectual property (IP) fund to assist individuals and companies finance their IP application (World Intellectual Property Organization Secretariat, 47). A significant portion of the RM5 billion endowments also went to the setting up of an Intellectual Property court, which would facilitate more efficient hearings on cases of infringement (Habib 1).

It is important to note that the NIPP was not formulated solely to stimulate patenting activity, but to generate a wide range of IP-related activities. These activities include applying for copyrights, trademarks, and other forms of intellectual property (World In-



lectual Property Organization Secretariat, 47). Although then Prime Minister Abdullah Ahmad Badawi announced his hopes that the policy would spur innovative ideas among Malaysians (Habib 1), the NIPP does not explicitly champion indigenous innovation over foreign innovation.

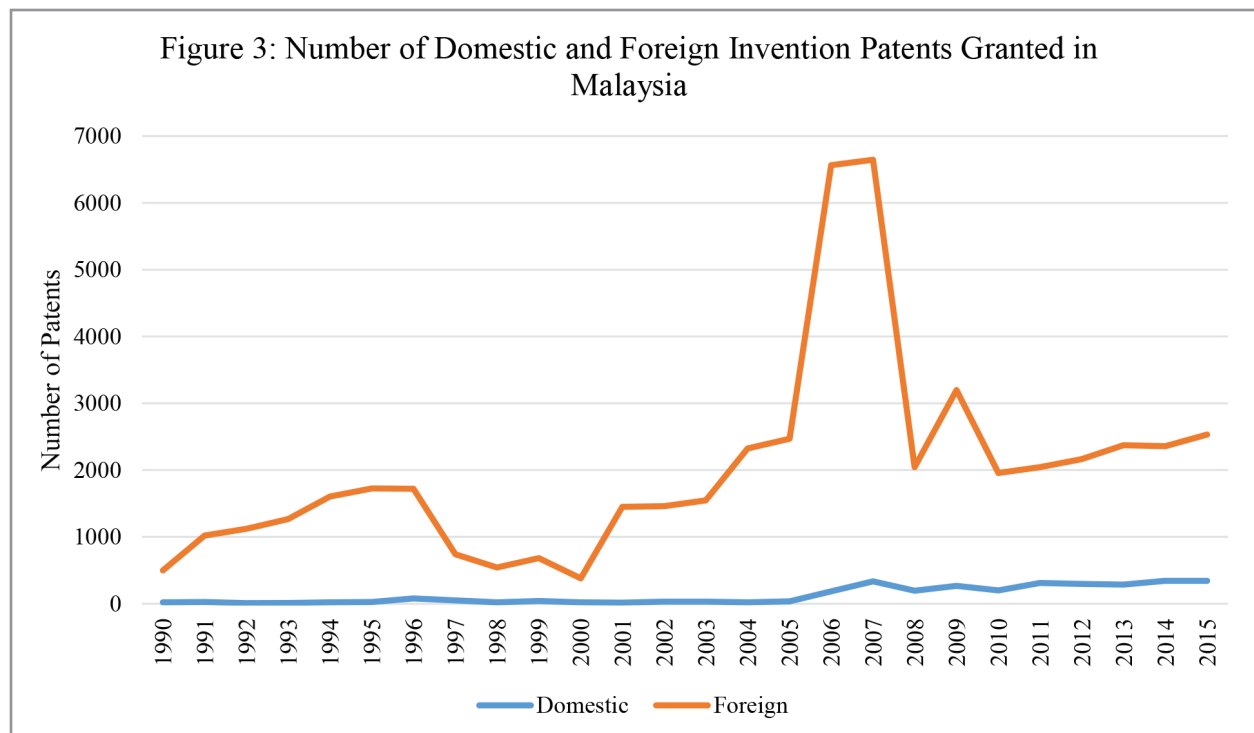
Given the information above, the NIPP could have been the primary cause of the number of domestic invention patents granted in Malaysia peaking at 0.0127 patents per 1000 persons in 2007 (see figure 2 source). Additionally, given that foreign individuals and enterprises in Malaysia were also able to benefit from the NIPP, the number of foreign invention patents granted in Malaysia also peaked in 2007 (see figure 3 source).

Apart from the NIPP, there has not been other similarly direct and significant efforts on the part of the Malaysian government in promoting innovative activity within the country. In fact, in 2008, the number of do-

mestic invention patents granted dropped by 41.4% to 0.0073 patents per 1000 persons, which is almost identical to the figure in 2006. The finding that patenting activity peaked around the time of the launching of the NIPP in Malaysia draws greater support for the hypothesis that government intervention plays a pivotal role in stimulating creative and innovative capabilities amongst citizens of a country.

### 3.3. Other explanations

Although direct government interventions in China seem to have succeeded in spurring innovation, as evidenced by its steady surge in invention patents granted to local patentees, Long and Wang have argued that the ability to surpass quantitative targets of innovation does not speak to the quality of these domestic invention patents (1). While it is true that China has long prioritized the quantity of its innovative outputs



Source: WIPO IP Statistics Data Center

over their quality in its frenzy to emerge as one of the most innovative countries in the world, some researchers contend that this fixation on numbers is merely the first step in China's evolving innovation development strategy (Prud'homme, "China's shifting patent landscape" 622). This claim seems to be supported by recent efforts by the Chinese government to shift toward a greater emphasis on patent quality. An example of this is the country's National Patent Development Strategy (2011-2020), which one of the first government initiatives with a stronger emphasis on relatively high-quality invention patents.

Despite more recent policies and strategies recognizing the importance of ensuring quality when setting patent-related targets, scholars argue that this form of top-down spending and regulation to stimulate innovation is unsustainable (Abrami, et al.). Indeed, true innovation must be nurtured, and existing literature indicates that this can be accomplished through an education system aimed at fostering innovation amongst its students (Hanushek 204). The Chinese education system, which centers on high-stakes testing, has long been criticized for producing the world's highest test scores at the expense of "diverse, creative, and innovative talents" (Zhao 9). By rewarding students' ability to provide the correct answers in examinations, the education system encourages conformity and homogenized thinking, while discouraging the act of questioning authority (Zhao 130, 133, 177). Such reliance on memorization and rote learning is antithetical to innovation, which requires the ability to synthesize new solutions and pose questions that have not been asked before (Zhao 133).

Furthermore, when it comes to government interventions in education, policies and reforms aimed at improving the Chinese education system have not proven to be as successful as similar efforts in innovation. As early as 1997, the Chinese Ministry of Education has denounced its "exam-oriented education," and has issued a series of drastic reforms over the past 30 years in efforts to promote "quality education" (*suzhi jiaoyu*) that fosters motivation and creativity amongst students (Zhao 139). Examples of such reforms include outlawing the use of exams for middle school admission and banning intensive Math Olympiad classes (Zhao 148, 149). However, most of these reforms have fallen short of expectations, largely due to the lack of compliance and uneven implementation by local governments (Zhao 149). Today, many scholars argue that the Chinese education system and its participants remain fixated with test scores, providing little room for freedom to pursue ideas—a necessary precondition for innovation (Abrami et al.).

Conversely, the Malaysian government's commitment to reforming its education system, which has also been criticized in the past for its heavy emphasis on test scores, has been met with notable success (Tan and Arshad 174). Instead of issuing policies and regulations outlawing certain age-old practices and expecting instant compliance, the Ministry of Education in Malaysia has opted for a more incremental approach in transforming its exam-oriented education system. This provides students, teachers, and government officials with more time to better adapt to these new improvements, which in turn results in greater compliance and better outcomes.

A prime example of the Malaysian government's slow, but steady, approach to education reform is the incorporation of higher-order thinking skills (HOTS) into the education system. HOTS nurture the ability of students to find innovative solutions to problems, thus fostering their ability to pursue creative and innovative ventures in their future careers. Since 1990, efforts have been made to introduce teachers to HOTS through a series of training programs and workshops (*Rakyat Post*). Although HOTS have been taught in classrooms long before 2013, it was not until 2013 that the Ministry of Education began requiring that the Sijil Pelajaran Malaysia (SPM) examinations, a national examination taken by final-year secondary school students in Malaysia, include HOTS questions ("*Malaysia Education Blueprint 2013-2025*" E-28). In 2013, 20% of all questions on the exam were comprised of HOTS questions, and this proportion was gradually increased to 50% in 2016 ("*Malaysia Education Blueprint 2013-2025*" E-11). This more gradual approach to reforming the education system has resulted in greater compliance amongst government agencies and teachers ("*Malaysia Education Blueprint 2013-2025*" E-28).

Although these efforts to improve the education system are relatively new in Malaysia, the existing research on the importance of quality education in fostering innovation suggests that there is reason to remain optimistic about the country's innovative future (Hanushek 2004). These slow, but comparably more effective, changes could eventually result in an education system that is capable of instilling an innovation-oriented mindset amongst the new generation of Malaysian

citizens, which may lead to a steady rise in high-quality patents as well as other innovative outcomes.

#### 4. Conclusion

It is clear that innovation remains an essential condition for economic growth. Due to its importance, multiple countries are scrambling to improve the innovative capabilities of their citizens. This paper set out to examine whether government interventions has the biggest influence on innovation within a country. After analyzing patterns in patent activity in both China and Malaysia, which seem to coincide with government efforts targeting innovative activity, this paper determines that government intervention has a strong influence on innovation. The relatively stagnant growth of invention patents in the absence of greater government intervention in Malaysia provides further support that governments play an important role in stimulating innovative activity within a country. Moreover, government influence could work both ways, as evidenced by the decline in domestic invention patents in China after the 2011 State Council notice banned the linkage of government procurement initiatives and indigenous innovation policies.

However, it is important to note that top-down government policies and regulations are not sustainable methods of promoting innovation. Given the debate over patent quality in China, it can be said that government interventions that are too stringent and too focused on ambitious quantitative targets may compromise the quality of innovative output. When patents are filed for the sake of filling quotas or becoming eligible for certain financial rewards, it is difficult to guarantee

the innovative quality of these patents, or even their ability to meet consumer demand. Consequently, education could nurture true innovation amongst citizens of a country.

Future research would benefit from a closer examination of the influence of education systems on fostering innovative capabilities amongst citizens. For instance, an in-depth analysis of classroom learning techniques and teaching methods that are most effective

at instilling critical thinking, creativity, and other skills conducive to innovative thinking would offer practical suggestions to improving a country's education system. Additional comparative case studies between nations with differing education structures might also provide valuable insight into the feasibility of relying on education to ensure sustainable development of a nation's innovation trajectory.

## Works Cited

### Primary Sources

- China Data Online. "20-58 Three Kinds of Patents Granted." *China Statistical Yearbook 2011*, 2011, chinadataonline.org/. Accessed 29 Oct. 2017.
- Malaysia Education Blueprint 2013-2025*. Malaysia: Ministry of Education Malaysia, 2013.
- Malaysia Patents Act*. 2006. www.wipo.int/wipolex/en/text.jsp?file\_id=304546. Accessed 18 Nov. 2017.
- Patent Law of the People's Republic of China*. 2008. www.wipo.int/wipolex/en/text.jsp?file\_id=178664. Accessed 18 Nov. 2017.
- State Council of The People's Republic of China. *The National Medium- and Long-Term Program for Science and Technology Development (2006-2020)*. International Telecommunication Union, 2006. www.itu.int/. Accessed 19 Nov. 2017.
- State Intellectual Property Office. *National Patent Development Strategy (2011-2020)*. The New York Times, 2011. graphics8.nytimes.com/packages/pdf/business/SIPONatPatentDevStrategy.pdf.
- World Bank. *World Bank Open Data*, data.worldbank.org/. Accessed 2 Nov. 2017.
- World Intellectual Property Organization Secretariat. "Information Meeting on Intellectual Property Financing." 10 Oct. 2009, *World Intellectual Property Organization*. Geneva, Switzerland.
- World Intellectual Property Organization. *WIPO IP Statistics Data Center*, Feb. 2017, www3.wipo.int/ipstats/index.htm. Accessed 1 Nov. 2017.

### Secondary Sources

- Abernathy, William J., and Balaji S. Chakravarthy. "Government Intervention and Innovation: A Policy Framework." *Sloan Management Review (pre-1986)*, vol. 20, no. 3, Spring 1979, pp. 3-18, *ProQuest*.
- Abrami, Regina M., et al. "Why China Can't Innovate." *Harvard Business Review*, vol. 92, no. 3, Mar. 2014, pp. 107-111, *KU Libraries*.
- Ashford, Nicholas A. "An Innovation-Based Strategy for a Sustainable Environment." *Innovation-Oriented Environmental Regulation*, vol. 10, 2000, pp. 67-107, doi:10.1007/978-3-662-12069-9\_5.
- Baumol, William J. "Entrepreneurship, innovation and growth: The David-Goliath symbiosis." *The Journal of Entrepreneurial Finance & Business Ventures*, vol. 7, no. 2, 2002, pp. 1-10.
- Braunerhjelm, Pontus, et al. "The missing link: knowledge diffusion and entrepreneurship in endogenous growth." *Small Business Economics*, vol. 34, no. 2, Feb. 2010, pp. 105-125, *KU Libraries*. doi:10.1007/s11187-009-9235-1.
- Caggese, Andrea. "Entrepreneurial risk, investment, and innovation." *Journal of Financial Economics*, vol. 106, no. 2, Nov. 2012, pp. 287-307, *KU Libraries*. doi:10.1287/mnsc.2015.2249.
- Dang, Jianwei, and Kazuyuki Motohashi. "Patent statistics: A good indicator for innovation in China? Patent subsidy program impacts on patent quality." *China Economic Review*,

- vol. 35, Sept. 2015, pp. 137-155, *KU Libraries*. doi.org/10.1016/j.chieco.2015.03.012.
- Fagerberg, Jan, and Bart Verspagen. "Innovation studies—The emerging structure of a new scientific field." *Research Policy*, vol. 38, no. 2, 2009, pp. 218-233, *KU Libraries*. doi:10.1016/j.respol.2008.12.006.
- Fontana, R., and M. Guerzoni. "Incentives and uncertainty: an empirical analysis of the impact of demand on innovation." *Cambridge Journal of Economics*, vol. 32, no. 6, 2008, pp. 927-946, *KU Libraries*. doi:10.1093/cje/ben021.
- Galindo, Miguel-Ángel, and María-Teresa Méndez-Picazo. "Innovation, entrepreneurship and economic growth." *Management Decision*, vol. 51, no. 3, pp. 501-514, *KU Libraries*. doi:10.1108/00251741311309625. Accessed 18 Nov. 2017.
- Habib, Shahanaaz. "Policy to promote Intellectual Property." *The Star*, 28 Apr. 2017, www.the-star.com.my/news/nation/2007/04/28/policy-to-promote-intellectual-property/. Accessed 19 Nov. 2017.
- Hanushek, Eric A. "Economic growth in developing countries: The role of human capital." *Economics of Education Review*, vol. 37, Dec. 2013, pp. 204-212, *KU Libraries*. doi:10.1016/j.econedurev.2013.04.005.
- Lall, Sanjaya, and Morris Teubal. "'Market-stimulating' technology policies in developing countries: A framework with examples from East Asia." *World Development*, vol. 26, no. 8, 1998, pp. 1369-1385, *KU Libraries*. doi:10.1016/S0305-750X(98)00071-0.
- Li, Xibao. "Behind the recent surge of Chinese patenting: An institutional view." *Research Policy*, vol. 41, no. 1, 2012, pp. 236-249, *KU Libraries*. doi:10.1016/j.respol.2011.07.003.
- Long, Cheryl, and Jun Wang. *China's Patent Promotion Policies and Its Quality Implications*. Harvard University Department of Economics, 2017. economics.harvard.edu/files/economics/files/long-cheryl\_quality\_implications\_of\_patent\_promotion\_policies\_in\_china\_ec2342\_seminar\_1-25-17.pdf.
- Mumford, Michael D. "Where Have We Been, Where Are We Going? Taking Stock in Creativity Research." *Creativity Research Journal*, vol. 15, no. 2-3, 2003, pp. 107-120, *EBSCOhost*.
- Patanakul, Peerasit, and Jeffrey K. Pinto. "Examining the roles of government policy on innovation." *The Journal of High Technology Management Research*, vol. 25, no. 2, 2014, pp. 97-107, *KU Libraries*. doi:10.1016/j.hitech.2014.07.003.
- Prud'homme, Dan. "China's shifting patent landscape and State-led patenting strategy." *Journal of Intellectual Property Law & Practice*, vol. 10, no. 8, 2015, pp. 619-625, *KU Libraries*. doi:10.1093/jiplp/jpv097.
- . *Dulling the Cutting Edge: How Patent-Related Policies and Practices Hamper Innovation in China*. European Union Chamber of Commerce in China Publications, 2012. ssrn.com/abstract=219029.
- "The HOTS syllabus is still hot." *The Rakyat Post*, 8 Sept. 2015, www.therakyatpost.com/life/education-life/2015/09/08/the-hots-syllabus-is-still-hot/.
- Schmookler, Jacob. "Economic Sources of Inventive Activity." *The Journal of Economic History*, vol. 22, no. 01, Mar. 1962, pp. 1-20, *JSTOR*. doi:10.1017/S0022050700102311.



- Tan, Yin Peen, and Mohammad Yusof Arshad. "Teacher and Student Questions: A Case Study in Malaysian Secondary School Problem-Based Learning." *Asian Social Science*, vol. 10, no. 4, 2014, pp. 174-182, doi:10.5539/ass.v10n4p174.
- Van de Ven, Andrew H. "Central Problems in the Management of Innovation." *Management Science*, vol. 32, no. 5, 1986, pp. 590-607, *KU Libraries*. doi:10.1287/mnsc.32.5.590.
- Zhao, Yong. *Who's Afraid of the Big Bad Dragon?: Why China Has the Best (and Worst) Education System in the World*. EPUB file, Jossey-Bass, 2014.

Like what you see?

Submit to future issues of  
*The Undergraduate Research Journal for the Humanities*

For more information:

[www.urjh.org](http://www.urjh.org)

Facebook

Twitter

