

Innovation as a Multiplier to China's Economic Development

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Abstract

An age long ago for about 5 decades to date, China's long-term economic growth outlook has placed this giant indisputably on the global economic platform as one of the fastest geometrically growing emerging markets and the second largest economy in the world to that of USA and has gone through several sound policy reforms for addressing the needs of self sufficiency for better standard of living, sustainable human livelihood and socio-economic expansion for effective, efficient and secured global competitiveness. This has placed China in the centre stage as one of the giant in the world being the fastest growing economy, largest trading partner and one of the world's core exporter of capital with an average real GDP growth rate of about 6.7% as at the of the 1st quarter 2016¹. Academic scholars and researchers have been laying more premiums with the notion that the core stimulant of Chinese economic development includes but not limited to; technological enhancement, capital investment expansion, huge input of resources with a committed and relatively abundantly cheap labour forces. Albeit to this fact, policy makers and regulators are of the strong conviction that that innovation activity is the multiplier of the prowess of economic prosperity and empowerment double also as a pre-requisite in meeting global challenges in domains without clearly reflecting the complementary role of innovation played in transforming China's economic development. This is a Concept paper to identify the different strata of innovation patterns existing in China's economic space with a reflection to the great importance of its eminent role played in the developmental trend over the past 30 years highlighting the "reform strategies and opening-up policy" constituting; Institutional, Technological, Incremental and Integration Innovation and the list goes on. China's economic transition with the current "New Normal model and the one Belt-Road Initiative" readily needs sound, quality and tradable Innovative ideas for a sustainable and meaningful economic development. The research finding would serve as a bedrock specification as a proxy to by macroeconomic policy analyst and regulators for enforcing and enriching innovation as a multiplier to sustainable economic development in China.

Keywords: Innovation as a multiplier, economic development in China, policy reforms

1.0 Introduction

Since the start of the second quarter, 2016 in China's Socio-economic space, Innovation is becoming a preference as it's at the center stage for debate attracting regulators, academic scholars and researchers within the Chinese folks for creating the structural platform for China's thirst in becoming one of the most innovative Country in four years times by 2020, a leading innovator by 2030 and then a power house in Science and technology by 2050 which is part of President Xi's Blue print for development in the Science and technology research sector.

In one of the recently top Science Conference held at Beijing in the second quarter of 2016, which attracts the most brilliant brains across the country held together including top Science from two Chinese leading Think- tanks, namely; Chinese Academy of Sciences and the Chinese Academy of Engineering. During this most important Conference, President Xi in his speech called for a good judgment for the direction of research breakthrough in order for China to become a global leader and stated that Chinese Government will further invest in major research fields heavily related to China's development strategies and urges scientist to adopt the research theories to be of benefit to real life so that they provide people with better environment, safer food and higher standards in health care and that all levels of Government are required to promote reform and aim to encourage innovation and research in Academic institutions and Companies and also stress the significance of talent and promise to create better environment for researchers and this will involve less limitations, more resources and easier access to research firms.

Innovation is a new initiative/idea of more effective device or process as a tool to apply better solutions that meet new requirements, faltering needs, or existing market needs which can be achieve through more effective products, processes, procedures, services, technologies and quality human capital that are readily

¹ China's Chamber of Commerce, March 2016

available to markets, governments and society. Innovation economists believe that what primarily drives economic growth in today's knowledge-based economy is not capital accumulation, as claimed by neoclassicalism asserts, but innovative capacity spurred by appropriable knowledge and technological externalities. Economic growth in innovation economics is the end-product of knowledge; regimes and policies allowing for economic growth and development; technological spillovers and externalities between collaborative institutions/firms; and systems of innovation that create innovative environments.

In this modern world, innovation performance is a fundamental determinant of a rapid and sustainable national socio-economic development and competitiveness as in the case of Singapore where growth is strengthened by advances in new technologies and a greater focus on knowledge creation transforming the Country from being a third World to a first World Country. Innovation is a vital and necessary indicator to mitigate and eradicate global and national challenges and constraints, such as climate change and sustainable development etc. Innovation has not only moved to the centre-stage in making sound economic policy, but there is a realisation that a co-ordinated, coherent, "whole-of-government" approach is required. Many OECD member countries have adopted national strategic roadmaps to foster innovation and enhance its economic impact. Even countries that have generally refrained from active industrial policy in recent years now seek new ways to improve the environment for innovation in order to boost productivity and economic growth. The United States, for example, came forward with the "Innovate America" strategy in 2005. The EU's "Lisbon Agenda", initiated in 2000, has now been updated and strengthened.

The rapid advances in scientific discovery and in general-purpose technologies and the accelerating pace of innovation is being driven by globalization which enabling new forms of competition and opened new markets for the creation and delivery of innovative products and services. These pervasive trends were picked up at the summit of the G8 at Heiligendamm in June 2007 which identified research and innovation as areas requiring high-level policy dialogue between the G8 members and major emerging economies of which China is not an exception.

In last 5 years though too shabby, China's have made great achievement in the technology and innovational sectors and made a bunch of internationally recognized breakthroughs in various field such as; quantum science system and research, space exploration and medical science but more authorities said the development in integrated of manufacturing high-speed railed technology and new energy application brought about social development and improvement to peoples livelihood. China's has now built technological cooperation with over 150 Countries and regions around the world and joined over 200 inter-governmental organizations in meeting its ultimate goal of making china a world power house, scientific and technological innovation by 2050. Some of the technological in roads that has been made by china includes and not limited to; First Country to launch quantum communication satellite sending encoded information to space that can't be hacked by even the most powerful computer protecting China from future cyber threat, also building super computer which takes over 100 years to figure out just by second to improve on exploration and whether forecast etc

The early 2016 shock on the China's Capital market and the fall in the commodity prices has causes economic imbalances in the financial sector contributing greatly to weakening of the Yuan and causes capital flight of foreign reserves that causes artificial scarcity. The capital market and the money market complement each other so it also substantially affects the money market causing liquidity risk, credit risk, operational risk and has a tendency of incubating systemic risk in the economy. Though government has devalued the Yuan to boost export to compensate for the loss, the implementation was untimely because for a macroeconomic policy to impact on the economy needs a two quarter or more. Untimely implementation of the devaluation policy will affect businesses and institutions in the short-run but will impact positively in the long-run. All of these economic imbalances could be attributed to the Country's neglect of innovation which supposes to have created the enabling platform for regulators to be able to manage, supervise and controls the financial system efficiently and effectively with required, appropriate and enhanced conceptual and quality intellectual capital innovative skills to foresee the unforeseen shocks in the future to prevent such re-occurrence.

1.1 The status quo of China's economy in recent four decades

China's reform started way back in 1979 when Deng Xiaoping enacted a change model in the economy by then allowing farmers to cultivate family plots rather than communal farms, tolerating small entrepreneurs to

stimulate SMEs and migration from poor rural areas to cities with opportunities ignored though it was illegal. These reforms substantially raised the productivity of poor people in the country. Foreign investment followed, further increasing productivity. Trade with other countries increased, again tolerated by the government. In short, economic reforms allowed poor people to become more productive, and they earned rising incomes.

At present, China's economic aggregate ranks second and the biggest Industrial producer in the world, and its per capita GDP is over US\$5000. During the first quarter of 2016, China recorded a GDP of about 6.7% and economic growth is projected to decline gradually to 6.2% by 2017.² The announced infrastructure stimulus measures will help overall investment, but adjustment in several heavy industries is set to continue and this stimulus is not sustainable in the longer term. Real estate investment is bottoming out, but working off housing inventories will take some more time. Consumption is set to remain robust. Food and services prices are rising, but the absence of price pressures in other areas will keep consumer price inflation low.

Recapping, China's GDP increased to 63.6463 trillion yuan in 2014 from 364.52 billion yuan in 1978³. At the beginning of the XXI century, China is the first global industrial superpower. It leads the world in coal, iron, manganese, lead, zinc, antimony and tungsten ores and timber. China is the world's largest producer of the absolute majority of industrial. Intensification of production in China brings side effects: the level of hidden unemployment in rural areas is about twice the official figures (4.6%). The level of poverty is nearly 128 million people (Less than \$ 1 a day). According to the IMF in the 1st half of 2014 China's GDP in PPP, according to preliminary results of the GDP at PPP surpassed the United States, 17.632 trillion dollars compared to 17.416 trillion in USA. China takes the 1st place in the world by the volume of exports. Export makes 80% of foreign exchange revenues of China. The export industries employ more than 20 million people. The range of exports has 50 thousand items. China maintains trade and economic relations with 182 Countries and regions, with 80 of them signed Inter-governmental trade agreements and protocols. Even if China's economy slows down today, innovation is still a strong driving force behind China's economic growth. Below is a Bar Chart of China's GDP trend;

Monetary and fiscal policies should accommodate the ongoing re-balancing of the economy, which will lead to more sustainable and inclusive growth. Spending should be targeted at areas that promote long-term inclusive growth, such as extending the social safety net, upgrading skills and ensuring equal access to public services. Pension reform should be stepped up to safeguard fiscal sustainability.

Meeting the commitment to increase the share of non-fossil fuels in primary energy consumption to about 20% and to have carbon emissions peak by 2030 will be aided by weakening growth and restructuring of the economy. A national cap-and-trade carbon emissions system, to be rolled out from 2017, can meaningfully reduce emissions only if it raises the cost of polluting sufficiently for the polluter to cut output, switch to new technology or reduce emissions in other ways.

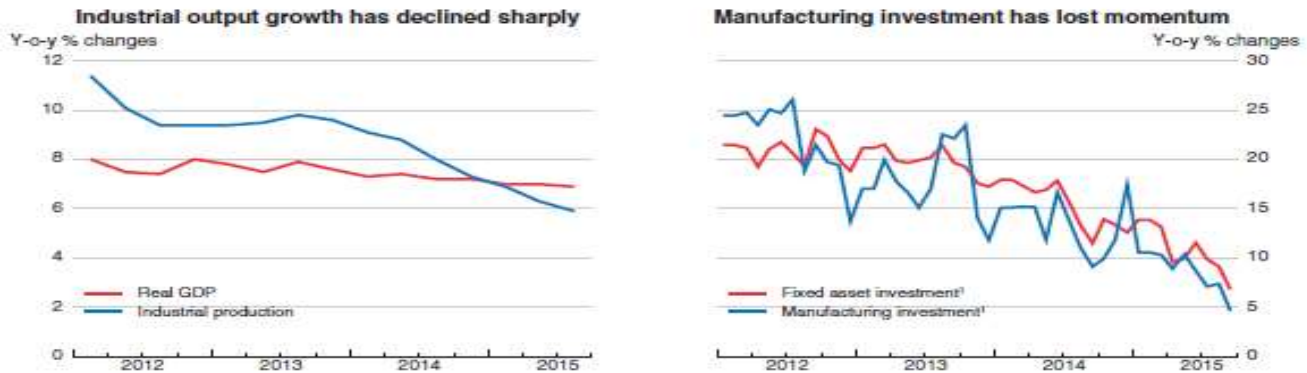
Figure 2: China Industrial output & Manufacturing Investment⁴

² China Chamber of Commerce, March 2016

³ National Bureau of Statistics, 2014

⁴ CEIC

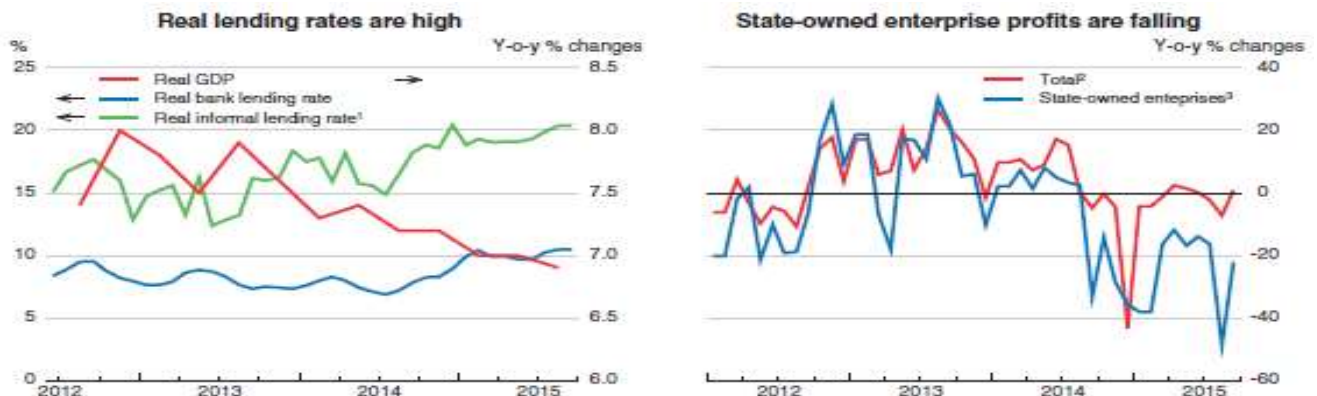
China



1. Fixed asset investment and manufacturing investment refer to nominal values and do not include investment by rural households.
Source: CEIC.

StatLink <http://dx.doi.org/10.1787/888933296102>

Figure 3: Real Lending Rate & State Owned Enterprise⁵



1. The informal lending rate refers to lending by private informal institutions in Wenzhou. The interest rates are deflated with the producer price index.
2. Total refers to industrial enterprises.
3. State-owned enterprises only include industrial enterprises.
Source: CEIC.

StatLink <http://dx.doi.org/10.1787/888933296119>

Source: CEIC

2.0 Theoretical Literature Review

Qiu et al. summed up the role of different factors in economic growth in *Analysis of China's momentum and prospect of economic growth*. The driving force of China's continuous high-speed economic growth since the beginning of reform and opening up in 1978 stems from the increase in factors input, of which increase in capital input is the major force, while labor input has a weak influence. (A) In 1980-2004, the contribution of capital to economic growth reached 59.2 %; the contribution of labor to economic growth is only 5.1%. (B) Technical progress has played an important role in promoting China's economic growth. In 1980-2004, the contribution of technological progress on economic growth reached 35.7%. (C) Since the reform and opening up, China's industrial restructuring and achieved remarkable results, mainly embodying the continuous decline in the proportion of the added value of primary industry. (D) As the state continued to increase investment in education, labor force quality continues to improve, the cumulative effects of human capital continues to strength, continuous spillover effect arises in the production process, greatly improving the technological level has been greatly improved, which contributes directly to economic growth.

Antonelli, C. (2003) in its Article-The Economics of Innovation, New Technologies, and Structural Change enlarges the Schumpeterian analyses of new technological system by incorporating new ideas of information

⁵ CEIC

and communication technology in the global economy”.

Peilei, F. (2011) also proved that NIS through heavy investment of R&D expenditures and personnel, patents, and high-tech/service exports strengthened innovation capacity linking the science & the business sector, establishing incentives for innovative activities, and balancing the import of technology and indigenous R&D effort in both China and India as they experienced rapid economic growth in recent decades.

The Council of Foreign Relations asserted that since the end of 1970s, the U.S. has gained a disproportionate share of the world's wealth through their aggressive pursuit of technological change, demonstrating that technological innovation is a central catalyst of steady economic performance (Steil, B.; Victor, D. G.; Nelson, R. R-2002).

Ahlstrom, D. (2010). "Innovation and Growth: How Business Contributes to Society". With the notion that "the main goal of business is to develop new and innovative goods and services that generate economic growth while delivering benefits to society.

Johnson, Bjorn (2008) revealed that Economic growth in innovation economics is the end-product of knowledge (tacit vs. codified); regimes and policies allowing for entrepreneurship and innovation, technological spillovers and externalities between collaborative firms; and systems of innovation that create innovative environments.

3.0 Different kinds of innovation in existence in China and the roles of them

This research will be limited to five (5) types of Innovations. Namely; Institutional, Technological, Incremental, Intellectual capital and the Cultural & Traditional Innovations.

3.1 Institutional Innovation

After Chinese economic reform, its economic growth expanded very fast. The innovation of market economy with Chinese characteristics has brought vitality to the society and realized the rapid growth of GDP. A large number of literature analyses consider many factors as the direct power of economic development. But they have ignored one point, that is, the **system's change** which is the basis of the direct power playing a role. **System reform** is the driving factor of stimulating economic growth, which is driven by reforming property, adjusting inventively and reducing transaction costs. **Institutional innovation** promotes and enhanced economic growth drivers, thus contributing to economic growth. The technical progress is guaranteed by the system through effective incentives and constraints. By adaptive changes, System improved and promoted the transformation of the original economic structure. And by tax and other means of re-distribution, it expanded the effective demand and enhanced economic growth.

Since December 1978-September 1984, the system reform of rural areas was the main system. Collective production change into individual contract land and reducing taxes on agricultural production. In Justin Yifu Lin's analysis of the source of output growth in China's rural areas, he pointed out that the contribution of improving investment to agricultural growth was 45.79%, while the contribution of changes in the productivity caused by the reform to the output growth was 48.64% with institutional Innovation making an output growth of about 46.89%. Secondly, Institutional innovation promotes the development of enterprises. System reform has brought vitality to the development of enterprises. With the deepening of reform, the enterprise system and Industrial sector has been optimized and the economic efficiency has continued to grow. Chen et al in the study found that the average annual growth rate of total factor productivity of state-owned enterprises during 1957-1978 was only 0.4%, and 4.8% during 1978-1985.

Also, China's reform has made the non - state ownership economy develop fast from an average growth rate of 7.8% in 1980 to 40% in 1992 and is helpful to establish property right clear efficient economy. The share of the non state-owned economic components in China's industrial output increased from 18% in 1978 to 67.5% in 1992. Market reform was beneficial to improving the efficiency of the resource allocation. Opening to the outside world is beneficial to optimizing the allocation of resources on a global scale, which can make China obtain knowledge of technology, capital, institution and other resources from abroad.

3.2 Technological Innovation

Integrated Innovation - High-speed Rail, for Example-Integrated innovation theory originated in 1998, from Marco Iansiti's theory of technology innovation. It is a dynamic innovation process with the use of management, IT, technology and other tools to choose, integrate and optimize various innovative elements and content and form a complementary organic whole in the end. High-speed Railway is a complex system and the embodiment of the integrated innovation obtained is obvious. In China's, High-speed Railway construction not only seized the core technology innovation systematization but also effectively

integrated and optimized the allocation of resources to various sectors, such as manufacturers resources of motorcycles and related parts and components, national railway market resources, industry-wide technological innovation resources and other resources that can be mobilized. That effectively promoted the technology progress of the whole railway sector, and got great economic and social benefits.

Breakthrough Technology Innovation- Sany Heavy Industry for Example- Breakthrough technology innovation is a long-term high risk technological business process, which is based on a set of scientific or engineering principle in which the main driving force completely different from current mainstream ones, but it can greatly enhance the product performance or create new products, may deep impact on existing market or industry, or create a fresh market or industry that will better meet customer demand. The Sany Heavy Industry in China founded in 1994 is an exemplary to this initiative. At the very start, the company's main product was concrete conveying equipment like trailer pump and concrete pump. Then it quickly became a large construction machinery corporation as its continuous technological innovation with a lot of attention paid to R&D since the beginning as the core competitiveness of enterprises. At the beginning of technology R&D, there was no related technical basis and support. However, they followed with different path of the existing technology has developed to breakthrough the core technology and finally quickly catch up with the world's most advanced technology and succeed to lead the global industry development. The trailer pump of the Industry appeared on the market in the year 1996. In 1998 its sales revenue exceeds 200 million Yuan. Concrete pump appeared on the market in 1999. From 2000 to 2011 the average year-on-year growth rate of concrete machinery of Sany Heavy Industry was 25%.

3.3 Incremental Innovation -Before China's started its reforms in the late 70s, the Country socio-economic status was unfavorable and not encouraging that promoted the authorities to embark on the model of incremental innovation as one of the initiative of development drive by going to other Countries abroad especially the USA, Europe and UK learning and adopting their skills, techniques and strategies on socio-economic activities in various sectors and come to implement in the Chinese socio-economic space as in the case of Rails, Airplanes and other products and services etc. A series of small improvements to an existing product or product line and services in China has improved considerably that helps to maintain or improve its competitive position over time.

Incremental Innovation is regularly used within the technology businesses by companies that need to continue to improve their products to include new features increasingly desired by consumers though there are some mishaps in its adaptation in China.

3.4 Intellectual Capital Innovation -Higher education drives growth and innovation in cities and regions. Universities and other higher education institutions (HEIs) can play a key role in human capital development and innovation systems. Growth and innovation cluster in regions with concentration of skilled and creative workforce, research and infrastructure for innovation. The competitive advantage of the cities and regions that create the best conditions for growth and development is increasing. HEIs can help regions become more innovative and globally competitive. China has gone far in trying to enhance and expand on this model though there are still challenges and constraints in the educational sector. It also enhance the value of your community's traditional skills and knowledge by training refined skills and by modernizing production to make the products marketable locally, nationally and internationally.

3.5 Cultural and Traditional Innovation-Cultural heritage and Tradition is important because it helps people connect with others who have similar backgrounds and provides a sense of unity and belonging with a link to traditions that might otherwise be lost. Ideas and knowledge gain through cultural skills and traditions goes a long way to transform Communities by creating jobs, improve household livelihood and contribute to sustainable development. China has been doing so well in this aspect which boost up its Tourism industry in the case of Public parks, mountains, museums and beaches. The attitude and the behavior of people goes a long way to influence socio-economic activities like in the case of Markets which constantly seek originality and innovative products that are unique that's Taking advantage of forms of cultural expressions in your community to develop unique business ideas.

4.0 China Attaches great importance to the Innovation and will do better

Innovation plays a role through the spillover effect of knowledge. Only using the innovation of enterprises to enhance the level of national innovation is not enough but also need to build a national innovation system as the basis and platform being a multiplier indicator for socio-economic growth and development in China. The 18th National Congress of the Communist Party of China clearly pointed out that "In response to changes in both domestic and international economic developments; we should speed up the creation of a new growth model and ensure that development is based on improved quality and performance. We should fire all types of market participants with new vigor for development, increase motivation for pursuing innovation-driven development, establish a new system for developing modern industries, and create new favorable conditions for developing the open economy. This will make economic development driven more by domestic demand, especially consumer demand by; a modern service industry and strategic emerging industries, scientific and technological progress, workforce of higher quality and innovation in management, resource conservation and a circular economy and coordinated & mutually reinforcing urban-rural development and development between regions and so on. Taking these steps will enable China to sustain long-term development." Innovation plays a very important role in the development of China's economy, the Chinese government will pay more attention to it in the future.

5.0 Conclusion

Innovation is indeed a multiplier that catalyses and boost sustainable economic growth and development prowess in Countries with positive trajectory ultimately enhancing and transforming human livelihood to a better standard of living meeting consumption demand and enable firms/enterprises/businesses to maximize profit and minimize cost keeping risk at a lower ebb. It's of great significance for the Chinese Government to effect sound policies that can support innovation by continually reforming and updating the regulatory and institutional framework within which innovative activity takes place. In this context, reforms are needed to make public policy and regulatory framework more conducive to innovation in a range of policy areas from the general business environment especially in the services, particularly in the network industries to international trade and international investment, financial markets, labour markets, and education. Governments can also play a more direct role in fostering innovation. Public investment in science and basic research can play an important role in developing ICT and other general-purpose technologies and, hence, in enabling further innovation. Though in previous years, China's innovative developmental trend was shabby, China's have made great achievement in the technology and innovational sectors and made a bunch of internationally recognized breakthroughs in various field such as; quantum science system and research, space exploration and medical science but more authorities said the development in integrated of manufacturing high-speed railed technology and new energy application brought about social development and improvement to peoples livelihood. China's has now built technological cooperation with over 150 Countries and regions around the world and joined over 200 inter-governmental organizations in meeting its ultimate goal of making china a world power house, scientific and technological innovation by 2050 This highlights the importance of reforming the management and funding of public investment in science and research, as well as public support to innovative activity in the private sector. The later calls for an appropriate mix of direct and indirect instruments such as tax credits, direct support and well-designed public-private partnerships, support for innovative clusters and rigorous evaluation of such public support. In view of the aforementioned changing environment for innovation with the Chinese Government support by prioritizing this drive will considerably mitigate and eradicate the socio-economic imbalances that's currently affecting the Chinese economy like in the case of the recent shock on the stock Exchange market which has caused a negative impact in the financial system to be specific and the economy as a whole.

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