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The 4th Industrial Revolution: International Relations And Policy: *Case of S. Korea and China*

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Abstract

This paper analyses expansion of the 4IR in the far East, using the case of South Korea and China. How these two nations, though late-starters in focusing on 4IR technologies are quickly closing the gap vis-à-vis the likes of the US, Germany, Japan and France – using patent application data from the European Patent Office. There is also a further enumeration of the measures being taken within Korea and China as per policy formulation, legal codification and procedural modalities; at the corporate level, investment in specific sectors of the ICT industry relevant to the growth of 4IR technologies and knowhow. For wholesomeness, mention is made of the possible security, economic and social impact of the 4IR on South Korea and China. The conclusion is that South Korea and China are significantly less prepared than pioneering nationals in 4IR technologies; although both countries are certainly headed in the right direction.

Key Words: fourth industrial revolution technologies, emerging technologies, internet of things, robotics, empowerment, breadth and depth, disruptive

The 4th Industrial Revolution: International Relations And Policy: Case of S. Korea and China

Introduction

The Fourth Industrial Revolution (4IR) also known as the second IT revolution or Industry 4.0, as posited by professor Klaus Schwab[1] (2016) is marked by disruptive ubiquitous technologies that foster the fusion of biological, physical and digital worlds – thereby influencing all economies, industries, and disciplines with the ability to challenge the idea about what it means to be human. These disruptive technologies are collectively referred to as cyber-physical systems and range from the Internet of Things (IoTs), Artificial Intelligence (AI), nanotechnology, fifth-generation wireless technologies (5G), new materials[2] etc. These technologies translate into implantation technologies, storage for all (cloud systems), driverless cars, Big Data for decisions, Bitcoin and Blockchain, 3D printing (i.e. additive manufacturing), neuro-technologies, personalized and effective healthcare, designer beings (improved newborns and humanoids) among others. This will potentially change the customer experience in business as well; by simplifying payments to the point that they become seamless, setting clear standards, reducing delays etc. (Figure 1). The beckoning questions remain how has the emergence of the 4IR affected countries in the far east such as South Korea and China, have they taken the necessary policy adjustments to adequately harness and sustain possible gains from the 4IR, and how does this affect relations between them and other countries that are leading in 4IR technologies and more importantly how it fits into main international relations theories?

[1] Professor Klaus Schwab is a the found of the World Economic Forum and has been a at the forefront of International Affairs for the past four decades.

[2] These are materials that are lighter, stronger, recyclable self-healing, self-cleaning with memory to return to their original forms.

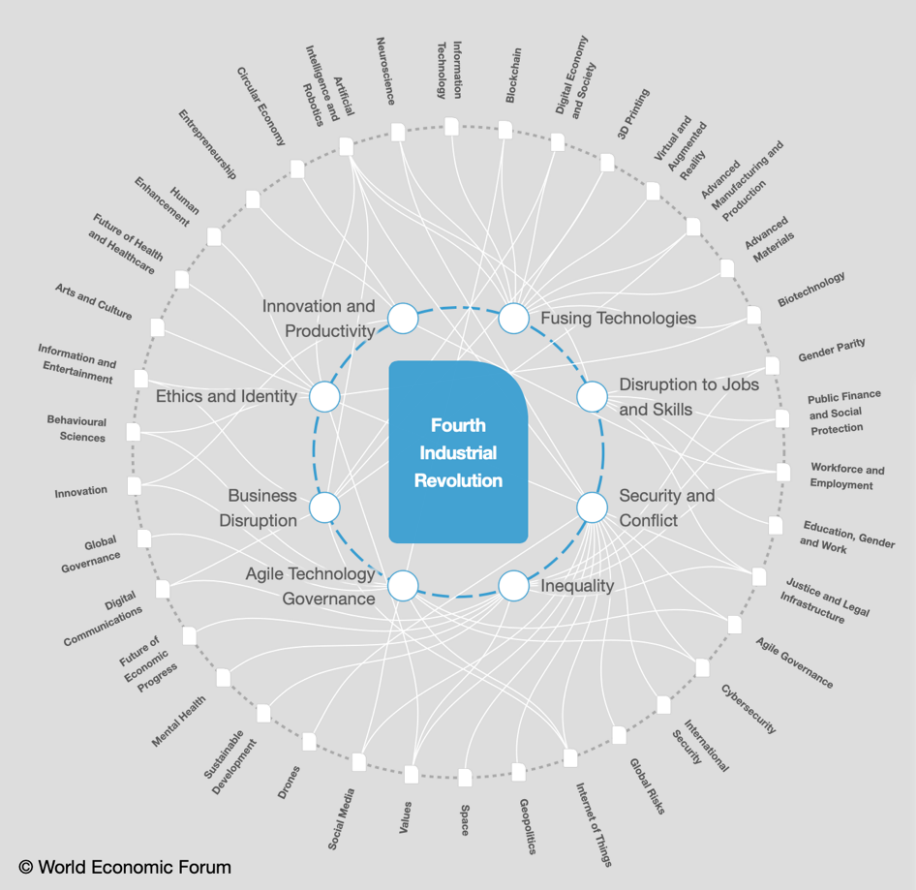

Figure 1.

This so called 'I_REVOLUTION'[3] is expected to lead to a large scale automation of large groups of tasks including repetitive intellectual tasks previously performed by humans[4]. The 4IR is also mostly spearheaded by the emergence of the Internet of Things (IoT), including cloud computing and Artificial Intelligence (AI); making it feasible to fully exploit the potential of smart connected objects in nearly all sectors of the economy. Thus the pace of change is astronomical leading to the philosophy of "always in beta" i.e. always evolving – this has become prevalent as the pressure to innovate-or-perish keeps skyrocketing. Thence, to survive, larger organizations have been leveraging their scale, investing in their ecosystem of

[3] That is the disruptive potential of the latest technology.

[4] Such tasks include legal services, medical services like mental health and substance abuse social workers, occupational therapists, first-line supervisors of machines, recreational therapists etc.

startups and acquiring & partnering with smaller and more innovative companies. All these add up to the uniqueness of the 4IR compared to previous industrial revolutions.

While the First IR used water and steam power to mechanize production, the Second and Third IRs covered mass production – with the use of electricity, and electronics (IT-enhance automated production) respectively. The 4IR builds on the Third IR by way of a fusion of technologies thereby blurring the line that differentiates between physical, digital and biological processes (Figure 2). What therefore is the relevance of the verge of the 4IR to South Korea and China and the world at large?

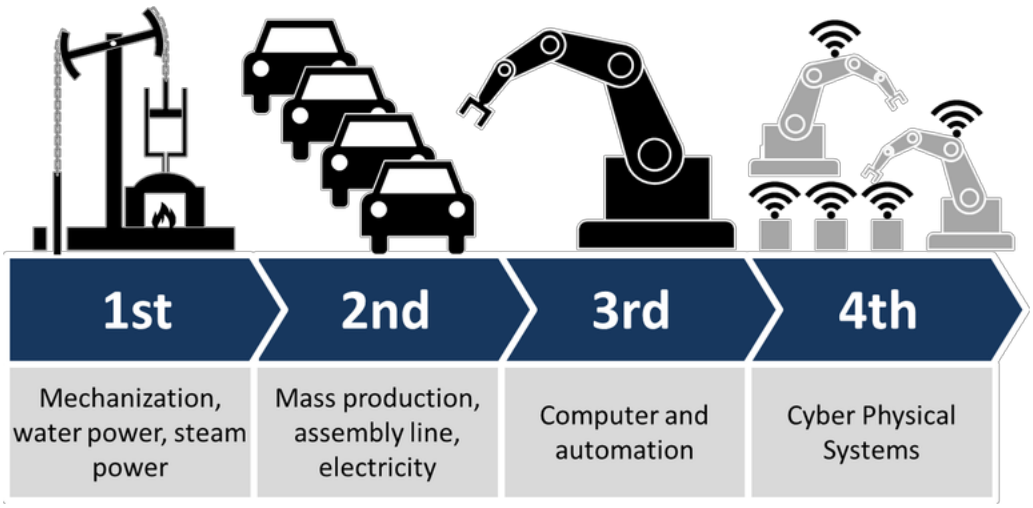

Figure 2.

(Image: Diagram by Christoph Roser at AllAboutLean.com (CC BY-SA 4.0))

The unofficial United Kingdom military maxim, stipulates that Prior Preparation and Planning Prevents Piss Poor Performance[5]. This single phrase captures the bewilderment of diplomats and policy experts when it comes to the emergence of the 4th Industrial Revolution (4IR) and its uniqueness. This perplexity emanates from the scale and breadth of the unfolding technological revolution; which will usher in economic, social and cultural changes of such phenomenal proportions that they are almost impossible to envisage. The empowerment that comes along, has the potential to impact the manner in which super powers relate to smaller

[5] This phrase was made famous on the TV series Soldier Soldier (1991 – 1997).

countries; how governments relate to their citizens; and how enterprises relate to their employees just to name a few.

The policy challenges and the crafting of the 'rules-of-the-game' required for a smooth transition from the third to the 4IR must include some kind of recodification of international laws and the laying down of a blueprint of how diplomacy would be conducted moving forward. This could entail readapting current international institutions to match current and future needs best-case scenario; Or it might entail a complete makeover, worst-case scenario. Therefore, the focus of this work will be to look into progress is being made by both South Korea and China and to a lesser extent, how such progress matches up with that being made by the pioneer nations in this sphere (pioneer nations listed above).

Main Findings

Although South Korea and China could be categorized as late-starters; compared to Advanced industrialized nations like the US, Japan, Germany and France which are considered pioneers in strides to actualize the 4IR - starting as far back as the 90s; the former are quickly closing the gap. With only approximately 10 years under their belt when it comes to 4IR technologies as proven by data, South Korea and China have been leaping forward at supersonic speeds.

Evidence coming from the European Patent Office (EPO) (2017a), states that between 2011 and 2016, the number of 4IR patent applications emanating from multinational corporations like Samsung and LG (Korean-based), and Huawei and ZTE (Chinese-based) have skyrocketed (Figure 3). A few Information Communication Technology (ICT) corporations in both these countries are at the forefront of their innovation.

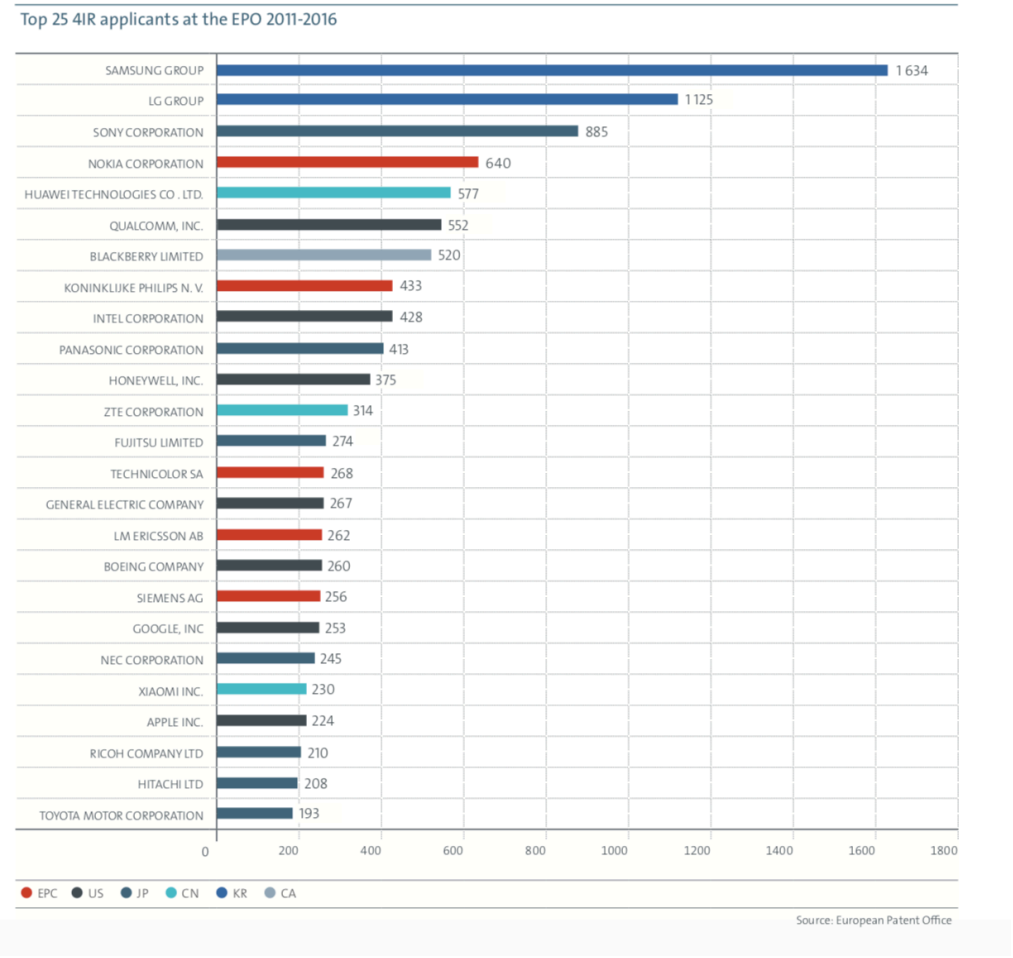

Figure 3. Twenty-five companies, most of them with a strong focus on information and communication technologies (ICT), accounted for about half of all 4IR patent applications at the EPO between 2011 and 2016

Korea is not the only one though, over 5000 patent applications for inventions relating to autonomous objects were filed in at the EPO in 2016 alone (Figure 4); with a growth rate of 54% in the last three years clouding out the overall growth in patent applications from the previous three years by 7.65% (2017b). By the end of 2016, South Korea was at 13% and China was at 6% of all 4IR patent applications at the EPO (2017c). Early movers like the US and Japan were at 25% and 18% respectively (Figure 5).

The aforementioned statistics beckons the following question:

Are proactive strides being made by the governments of Korea and China to capture, harness, promote and regulate the 4IR so as to make the most of it?

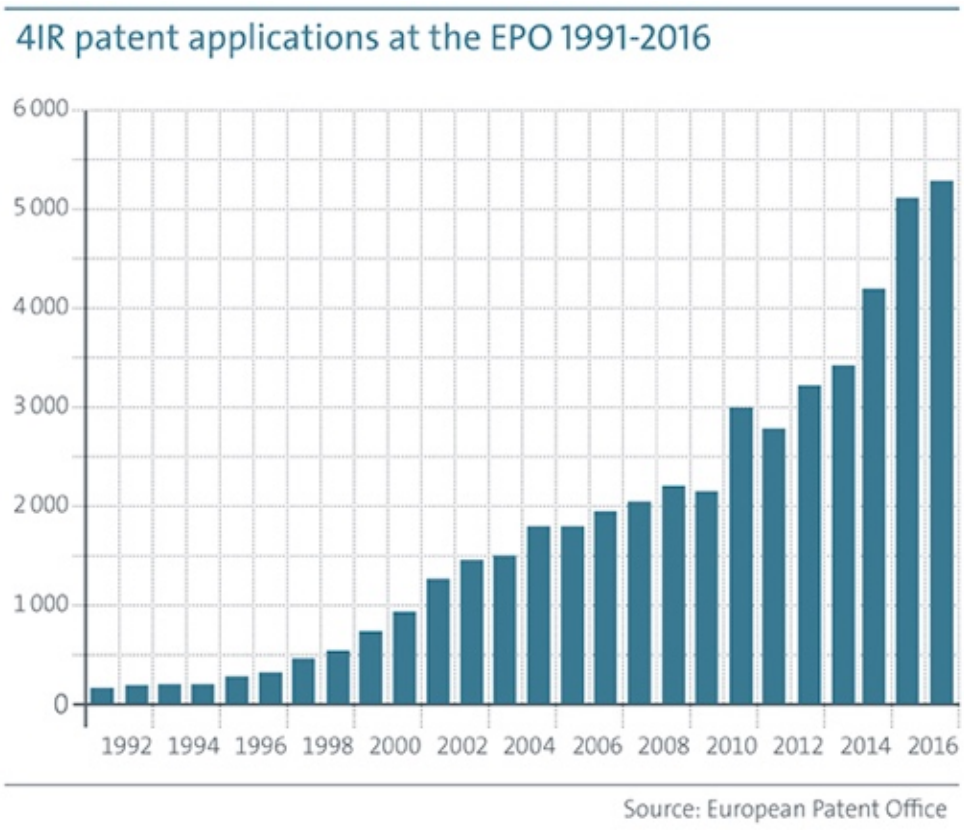

Figure 4. The 4IR is mostly driven by technical progress and thus by patented inventions.

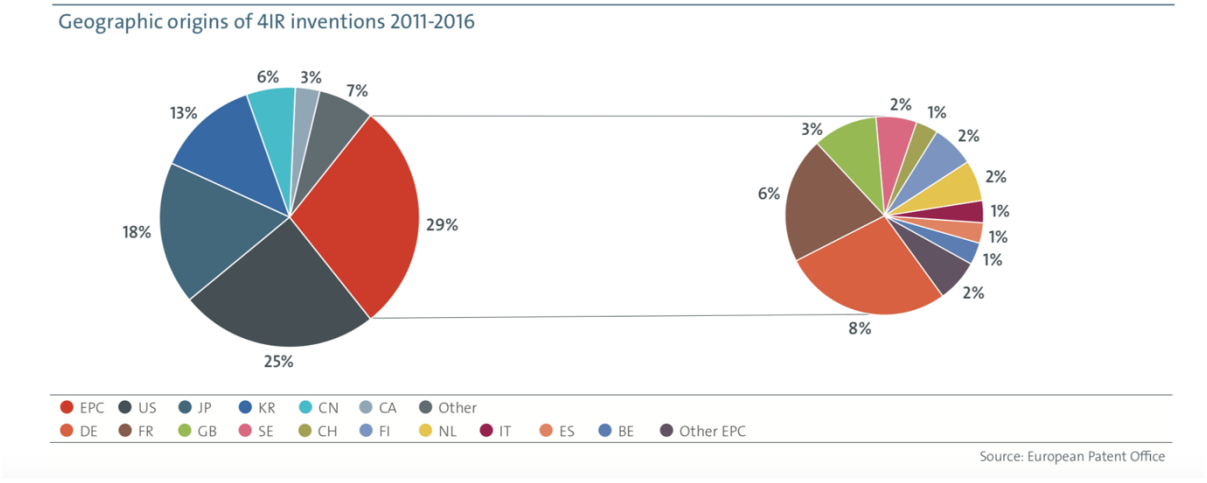

Figure 5.

As, suggested by a new study, Korea is unprepared! Ranked 25th as of August 2016 in a Swiss Investment Bank (UBS) report (2017)– capturing countries that are capable of adapting

to the 4IR in a white paper released by the World Economic Forum and corroborated by the Hyundai Research Institute (HRI). Switzerland comes in at first place, the US is fifth, Japan 12th and Germany 13th; while China held the 28th spot. The criteria used in this ranking include labor structure flexibility, skill level, educational and adaptive skill, infrastructure suitability and legal protections. All this comes in the backdrop of several strides being made at the state level, to provide an enabling environment for the growth of 4IR technologies in their countries. What are Korea and China currently doing?

The first step has been the creation of a Presidential committee on the Fourth Industrial Revolution (PCFIR) which went into effect in August of 2017; charged with coordinating important policy matters pertaining to the development and acquisition of new science and technology (all seven[6] core 4IR technologies are captured here) (Min Son, 2018). Specified duties of this committee include to:

- Deliberate and coordinate policy measures submitted by various ministries.
- Organize public campaigns related to 4IR and encourage public participation.
- Prepare the ground work for regulatory and institutional reforms in support of public-private partnerships.
- Foster ecosystems for new industries such as special committees handling Smart Cities, Special health care committees etc.

These seven core 4IR technologies and a new technology classification system are based on a few preconditions necessary to label them as 4IR technologies.

Most importantly, such technological innovations cannot be sorted according to the existing patent classification system as they have novel characteristics such as super-intelligence, super-connectivity, convergence etc. In this regard, the Korean International

[6] These seven core 4IR technologies include AI, Big Data, IoT, 3D printing, autonomous driving, intelligent robotics and cloud computing.

Patent Office (KIPO) has come up with a new classification system for the seven core 4IR technologies – AI, Big Data, IoT, 3D printing, Autonomous Driving, Intelligence Robotics and Cloud Computing; this new classification system was deployed in January 2018. KIPO has also come up with (as of January 2018), a patent/utility model examination guideline which offers precise instances for determining the *inventiveness of inventions*.

China on her part has been facing a 'Trumping'[7] in her leadership in fourth industrial revolution technologies; thereby initiating a "New Era" in Sino-American Relations. As highlighted in a November 2018 Observer Research Foundation (ORF) piece by Akhil Deo, "in a bid to stem China's lead in the entire spectrum of future technologies such as AI and robotics under the auspices of the "Made in China 2025" initiative; the Trump administration through the Sino-American trade war has been targeting industries that are critical to the said "Made in China 2025" initiative." This represents a major hurdle to the advances China has been trying to make in her quest to get a foothold and lead in 4IR technologies. In a bid to counter such roadblocks, China has resorted to cooperating with countries like Singapore and India among others to have a broader ecosystem in fields related to 4IR technologies.

Policies Endeavors

The policy challenges emerging with the advent of the 4IR could be astronomical – policy makers and policy are already struggling to keep up as could be seen with the block-chain saga (bitcoins being at the center) – policies linked to international tax systems and other forms of regulation. Thus, policy makers and or governments need to think beyond subsidization[8] and or the acceleration of innovation. To keep up with the lightning speed at which the 4IR is moving will be the prime challenge, given that policies and regulations are

[7] American policies under the Trump administration that restrict an unregulated expansion of competing nations as an effort to push the "America First" agenda of the Trump administration.

[8] Korea, China and most newly developed countries have developed so mostly by subsidizing strategic industries and companies – such companies have become global conglomerates and are at the center of these nations' economic prowess.

already lagging far behind as novel solutions, systems and industries change at supersonic speeds. Another challenge would be general distrust for new technologies – as it is common knowledge that jobs will be lost and traditional sources of livelihood might become completely obsolete. Finally, the absence of a global regime for technological governance which highlights the absence of oversight across borders and possible impact on labor markets, activities and the environment only go to exacerbate these challenges. Transnational issues are better understood by the common man nowadays compared to the level of understanding of such issues at the onset of previous revolutions – selling the 4IR and securing public trust might be a daunting task.

Korea has seen steep progress from an IT Policy that was instituted in 1978 to an Industrial Policy in 1985 (the semi-conductor plan) and then to a Telecom Policy in the 80s all of which have led to an advancement in ICT from 2008; which have subtly prepared the nation for the 4IR from 2016 (Seong Ju Kang, 2017). Similar to South Korea, China has been implementing a five year development plan – these plans have led to ICTs contributing upwards of 20% of China's GDP growth between 1980 and 2001 (Heshmati and Yang, 2006). These policies have become outdated, but still help in supporting sub-sectors in the ICT industry that have been able to contribute 10% to China's GDP growth in 2010 (Sharam, Shawnrece and Yuwen, 2013; p. 16).

Just like the global economy's paradigm shift brought about in the 1990s by the IT revolution, the 4IR is bound to bring in even greater changes. Advanced nations and leaders in 4IR technologies like the US setup policies back in the days of the Obama administration with a milestone like the National Network for Manufacturing Innovation (NNMI) in 2012. This aims at synchronizing academia, research, institutes and industry players across the country – with a push to supplement the advancement of state-of-the-art technologies. Mention must be made of the robust enabling startup ecosystem established by the US, led by private players.

In the same light Germany has a collaborative platform for idea sharing that brings her main players in 4IR technologies, players like BITKOM, ZVEI and VDMA. This collaborative platform helps with the standardization of norms, research and innovation, network systems security, a legal framework, work education and training.

Japan in her part focused national priority on the 4IR from 2015 as a national growth strategy. With visionary initiatives like "Society 5.0", Robot Revolution Initiative (RRI) and IoT Acceleration Consortium (ITAC) launched in the same year – with clearly set goals.

To survive in this current dynamic, South Korea and China, on top of the simplistic subsidy provision modus operandi of old, must supplement with a reform of regulations and systems to better encourage business activities and cooperation across industries.

China, in an attempt to upgrade from low-skilled manufacturing to high tech-machines and solutions, has come up with solutions spearheaded by initiatives such as – the Made in China 2025 – and China has also made it smarter with the – Internet Plus – initiative; the government has supported more than 20 cities and provinces across China to make robots a central industry (Masha Borak, 2017). This is a signal of a strategic policy-driven step by the People's Government of China. Although China has been laying the groundwork, she is still lagging behind South Korea and most western countries in terms of policy readiness.

Policy Alignment

From the standpoint of liberalism, a unified policy framework with a governing international institution to centralize regulate 4IR technologies to avoid chaos is indispensable. This is why the World Economic Forum annual meeting – Switzerland, January 2019, had at the forefront discussions on a global approach to technology policies. Aiming to standardize the ethical principles governing emerging technologies. This will entail a global dialogue on cyber security to mitigate risks, a global dialogue on institutional reform so as to ensure adaptability. In support of the drive by the World Economic Forum, the International

Organization for Standardization (ISO) – as a vital player in enabling the smooth adoption of technologies - has weighed in with a quest not only to support the development of tailor-made solutions for all industries, but also to spread best practices, knowledge and innovation globally.

All these advances have not been mirrored by a measurable coordination or cooperation between Korea and China, or Korea, China and the pioneering nations of the 4IR. This is expected to happen at some point though.

On the sidelines, a June 2018 bold statement made during a press conference held in Seoul; statement by South Korea's Minister of Science and Technology (MSIT), that posits that there will be a strengthening bilateral cooperation and coordination in IT policies (bilateral cyber security and privacy of space) between Korea and the United States. This highlights the understanding and will to align 4IR polices across borders. Korea is cooperating with India one-on-one, while China is also cooperating with India one-on-one, thereby making India the possible focal point for 4IR in the region. The case of Korea, India cooperation was reported by the Korea Institute for Advancement of Technology announced in November of 2018; the signing of a MOU[9] for a joint R&D with the Global Innovation and Technology Alliance under the Indian Department of Science and Technology. These are the baby-steps in the direction of greater 4IR international policy coordination via cooperation. It can be authoritatively stated that South Korea and China are headed in the right direction.

On one hand, the absence of these alignments in policy and a properly articulated rule-of-the-game might invite new challenges to both national and international institutions and hence relations between states. Thus, the possibility of chaos setting in cannot be underestimated, if the necessary preemptive measures are not taken by the relevant authorities in question.

[9] Memorandum of Understanding (MOU)

Expected Changes that can Shake up Relations and Traditional Systems

Changes in 4IR issues are changes that are expected to influence the concentration of benefits. A widening economic gap between those who depend on their labor and those who own capital. This is so because the winners in the 4IR are those who provide physical and intellectual capital – innovators, shareholders and investors (winners will likely be early movers – individuals, organizations and nations alike). Changes are expected to occur at all levels, and to make matters worse, it is hard to know exactly where the development of new things in the 4IR will lead to; thus, if proper preparation and regulation is not put in place ahead of time, the chaos that might set in could be overwhelming.

Labor substitution by capital – the share of labor as a percentage of GDP is bound to decline even more – this is because the 4IR seems to be more on the supply-side[10] of things. This might lead states to adopt policies that encourage the reduction of taxes for the wealthy to match the weakening of regulations brought about by the network nature of the 4IR (Figure 6). At the same time, growth is seen by techno-pessimist and techno-optimists differently. Based on recent economic trend, pre-2008 (global financial recession), global GDP grew at 5%; post-recession, this number has not been reached yet. With a global aging population (due to a fall in birth-rates below replacement levels and other factors) – few people are available to purchase big-ticket products like homes and cars (there will be a need to work smarter and not harder to ramp up productivity and thus growth).

This labor substitution growth strategy is not new – mechanical repetitive and manual work have already been automated en masse. It is expected that previously non-substitutable jobs like lawyers, financial analysts, doctors, journalists, accountants, insurance underwriters and librarians will be partly or completely substituted with the maturation of the 4IR.

[10] Supply-side economics is a macro-economic perspective that argues that sustainable and greater economic growth can be better achieved by a hands-off government policy. Lower taxes and few regulations is the mantra here.

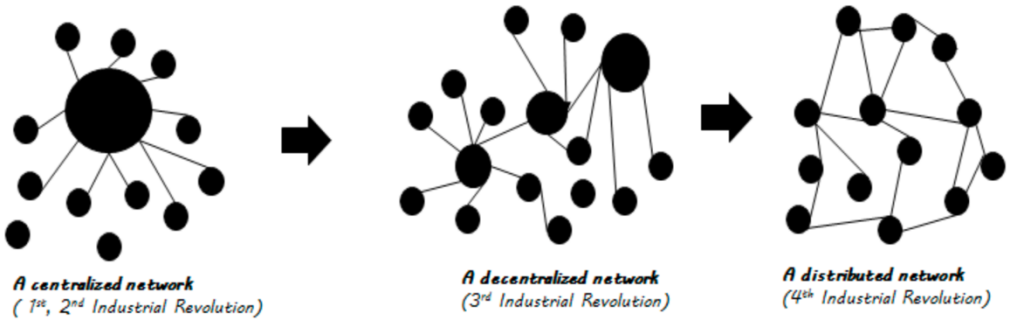

Figure 2. Industrial revolutions and network relationships.

2.10. Manufacturing Innovation 3.0

Figure 6. Network Relations in the 4IR

Fact-check: *According to an estimate from the Oxford Martin Program on Technology and Employment (2017), only 0.5% of the US workforce is employed in industries that did not exist at the turn of the century, a far lower percentage than the approximately 8% of new jobs created in new industries during the 1980s and the 4.5% of new jobs created during the 1990s. This is corroborated by a recent US Economic Census, which sheds some interesting light on the relationship between technology and unemployment. It shows that innovations in information and other disruptive technologies tend to raise productivity by replacing existing workers, rather than creating new products that need more labor to produce them.*

The fact-check above does not consider the pace (speed) at which things are moving today, it is expected that the impact of this revolution (4IR) could be much stronger than previous ones when it comes to employment/unemployment figures. Breadth and depth (a lot of radical changes happening simultaneously), plus a complete transformation of the entire system (Figure 6 above – a complete decentralization) need to be factored in. There are still past challenges that have not been captured by the 4IR revolution such as the gender-gap.

With respect to how feminism is coping with the 4IR compared to previous industrial revolutions, future doesn't look any more promising than the past. The 10th edition of the

World Economic Forum's Global Gender Gap Report 2018 revealed two worrying trends. First, at the current pace of progress, it will take another 118 years before economic gender parity is achieved around the world. Second, progress towards parity is remarkably slow, and possibly stalling. There is little indication that the 4IR will address this social conundrum given the fact that growth in this sphere is concentrated among a few countries thereby leaving the rest of the world on the sidelines. Global gender 68% with the Nordic countries like Iceland, Norway and Sweden performing better. South Korea and China both fall below the global average. No visible measure has been taken by both countries to incorporate the female plight in their strides to harness 4IR technologies. When it comes to policies framing and implementation, major players can influence them, but states have a central role to materialize them.

These policy responsibilities must rest mostly on the shoulders of major players like governments, local and international institutions. The main goal will be to come up with dexterous responsible legislative and regulatory ecosystems that give room for innovation while minimizing possible risks to society. At the center of this new age is the shift from a linear model of take-make-dispose which relies on an abundance of natural resources; to a system that focuses on the effective interaction of materials, labor, energy and information (restorative and regenerative, thus more productive systems).

Four main parts of 4IR technologies to integrate are:

1. IoT
2. Transparency and the democratization of information as a result of digitization.
3. New information flows and increase transparency with the power to change the population's behavior on a large scale.
4. Fourth Industrial Revolution technologies that are expected to ease the use-cycle extension of assets and resources.

As to what Korea and China are doing to integrated the aforementioned parts, there is no clarity, this could be partly because everything is still very new and knowledge in 4IR technologies is still weak. Corporations leading in technology within China and Korea are taking the lead to influence government policies. These corporations become more important players highlight a constructivist standpoint. As based on constructivism, not only nations' beliefs (i.e. history and culture) but also the acceptance that international institutions and other non-state actors' behavior influence international affairs (the prime non-state actor in this case being MNCs in China and Korea that are ICT-related).

Customer expectations are shifting, expectations being ramped up by flag-bearing companies like apple both at how customers feel – at B2C or B2B[11]. Products are being enhanced by data which improves asset productivity. Operating models are also being transformed into new digital ones. New partnerships are being formed as companies understand new forms of collaboration. Yet, academia is not engaged in these changes in a wholesome and meaningful manner.

Academic institutions are often regarded as one of the foremost places to pursue forward-thinking ideas. Alas, new evidence, indicates that the career incentives and funding conditions in universities today favor incremental, conservative research over bold and innovative programs (worth noting that education policy change is inevitable). There is need to encourage more commercial forms of research. To foster both ground-breaking fundamental research and innovative technical adaptations across academia and business alike, governments should allocate more aggressive funding for ambitious research programs. Equally, public-private research collaborations should increasingly be structured towards building knowledge and human capital to the benefit of all. While South Korea and China have not done much in adapting their education policies to the 4IR's future needs, they have instead opted to using

[11] B2C and B2B are Business to Consumer and Business to Business.

4IR technologies to aid learning and knowledge acquisition – they are both deeply in need of a long game.

National Security Challenges and International Relations

Cyber threats cannot be left out in this discussion. Increased connectivity with a low capacity to regulate increases vulnerability. Information security is now a subclass of cyber-security. Airplanes and airports, medical devices and military technology are some of the hot-spots, now fall under the IT umbrella unlike in the past according to market researcher Garner (2017). Even with the absence of legal obligations, the South Korean government through her Ministry of Science and ICT, in 2017 released broad guidelines and recommendations on how companies should handle IoT security threats (Seo Ji-eun, 2017). In a bid to curb cyber-terrorism, mindful of nations' capability of jamming systems can determine who emerges victorious in modern-warfare, thus, Korea is looking at possibilities to upgrade her cyber defense systems. Based on the analysis above and through a western-centric lens, it is safe to theorize that South Korea is instituting a policy of defensive realism – as championed by Kenneth Waltz. Therefore, a neorealist would describe South Korea as a nation trying to protect herself from possible cyber-attacks – especially from North Korea – without getting powerful enough to be a security concern to other nations. Defensive realism could work for South Korea because she is already under the nuclear umbrella of the United States in Asia – which is further strengthened by boots-on-the-ground[12] that ensure a credible trip-wire[13] system. Hence, South Korea is soundly protected from traditional threats, by her own capabilities bolstered by her alliance with the US. Unfortunately, even the US is not adequately protected when it comes to

[12] About 28,000 US soldiers stationed in Southern border of the Korean peninsula (Tom V. Brook, 2018) as a credible deterrent to North Korean aggression and to a less obvious extent a containment of China and Russia.
[13] A trip-wire force a.k.a. a glass plate is a small military presence whose aim is to signal a commitment to an arms struggle without sparking a security spiral (The Economist, 2016).

cyber-threats especially because of the novelty of the security challenges the 4IR comes along with.

China's adoption and use of 4IR technologies for security purposes has been everything but timid. Implementing a long-game that can easily be captured under offensive realism – as the neorealist John Mearsheimer puts it. China has found success in incorporating AI in autonomous unmanned aerial systems, thereby giving her the capability of denying the US access to the south China Sea (Cung Vu, 2018). At a micro-level, China is implementing which she terms – "Golden Shield"[14], thereby avoiding challenges against the government's narrative (this, at some level, could be classified as being defensive). Major legislations have also been enacted, laws that require corporations to store their data within China. China has also developed the capacity to destroy US headquarters, runways, ships etc. It is clear that compared to South Korea, China has been more proactive and more offensive in the sphere of security pertaining to the 4IR.

The Good and Ugly

The possible benefits of the 4IR are still unfathomable, with a possible leapfrog in institutional improvement – hopefully the acquisition of 'obsolete tech' by poorer nations in the neighborhood (e.g. Vietnam) would become more cost effective. Also, the lowering of production costs has the potential to directly and or indirectly increase the quality of life and thus the wellbeing of more citizens.

The Fourth Industrial Revolution technology is, however not all rosy. Undesirable outcomes are still vastly unpredictable, and might range from the collapse in the labor market as more workers are replaced by machines at a speed that adjustment might be more

[14] A giant mechanism for censorship that blocks tens of thousands of websites thereby controlling what the Chinese can access within China – notable websites are facebook, youtube and twitter.

challenging. Also, there is a possibility of the middleclass shrinking as the divide between high-tech high-income and low-tech low-income countries and or citizens widens.

Modality limitations

Alternatively, there are some specialists who postulate that there is no revolution currently emanating worth calling the 4IR. In a March 2017 release on Higher Education Strategy Association (HESA) website, arguments in support of 4IR as a revolution in its own right are strongly dismissed as no different from pass IT boom catch phrases. Further pointing out that the main champion of the 4IR – Klaus Schwab – is excited over a seaming forthcoming revolution, but lacks evidence to show that this is not just an extension of the IT revolution of the late twentieth century. Earlier on in 2016, on the INDEPENDENT website, Economist Professor Robert Gordon described the previous revolutions and claimed that the impact of innovation on economic activity depends on – the quantum of change, the effect on productivity, longevity, dispersion and long-term evolution. With these statements, Professor Gordon claims that the 4IR as it is, is not proven yet and might end up as a mere extension of the IT revolution. While a critique is welcome, criticizing does not quite contribute to the literature of this work in a meaningful manner.

Another hurdle with this study is the newness of the phenomenon and its buzzword '4IR'. This novelty directly translates into the lack of previous robust studies on the 4IR and thus, very little literature to review.

Conclusion and Future Study

The scale and breadth of the unfolding technological revolution will usher in economic, social and cultural changes of such phenomenal proportions that they are almost impossible to envisage. Much impact on countries, the society, the economy business and individuals. Empowerment will impact the most – how governments relate to their citizens; how enterprises relate to their employees, shareholders and customers; or how superpowers relate to smaller

countries. This, if and when it happens will have a major shift in the way international affairs are conducted.

While new technologies and platforms are increasingly enabling citizens to engage with governments, governments are facing a surge in pressure to adjust their systems of public engagement and policymaking so as to stay relevant; this necessary adjustment opens a whole new possibility for theoretical adjustments. New technologies make the redistribution and decentralization of power easier and more feasible leading to major shakeups that will introduce a new set of players capable of undermining traditional powerbrokers – this should invoke new literature. Technological developments also affect aspects of our individual lives, such as our sense of privacy, consumption patterns, career developments, work and leisure time, social networks, and relationships. Although the impacts could be bounded by our imagination, disruptive applications are also very plausible.

As to South Korea and China, their policy makers and MNCs headquartered within their national territories have shown beyond reasonable doubt that they understand what it means to be on top of things before such things become mainstream. Measuring their level of preparedness could be done in two ways; they are obviously less prepared compared to advanced nations or pioneers in 4IR technology; on the other hand, they are better prepared if you compare their policy strides, patent applications and investments in 4IR technologies from 2010 till day. Of course, more has to be done in the direction of public participation, issue linkage, education reform, preemptive regulations and a wholistic approach to view and handle the challenges that the 4IR comes along with.

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