CHINA'S MILITARY-CIVIL FUSION AND LESSONS FOR INDIA

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Abstract

There is nothing novel about Military-Civil Fusion strategy adopted by the People's Republic of China. It had been followed in varied forms by all Chinese leaders, right from Chairman Mao to Xi Jinping. However, ***Xi Jinping elevated Military-Civil Fusion to the status of "national strategy",*** as he considered it vital for "***rejuvenation of the Chinese nation and in turn to strengthen its military".*** China has sought to gain dominance in technologies emerging from Fourth Industrial Revolution, such as in the fields of artificial intelligence (AI), novel materials, energy and so on, by adopting a 'Whole-of-the Nation' approach as these technologies are appreciated to provide foundation for various other technologies considered essential for enhancing its military capabilities as also providing consequent rapid gains for its down sliding economy. Further, technological development is not the sole objective of China's Military-Civil Fusion but it also encompasses talent development, logistics, as also a guiding concept for national defence mobilisation.

India's response to China's MCF endeavours should not seek to emulate China's state-driven MCF model, but rather it should take in to account the peculiarities of its own system in vogue, retain the procedures already in practice and launch new initiatives, particularly in the field of technologies, emerging from Fourth Industrial Revolution. It demands a Whole-of-the Nation approach, seeking absolute synergy between

the armed forces, scientists/ engineering institutes and public & private enterprises.

Introduction

In recent years, Chinese strategy of 'Military-Civil Fusion' has stirred the American security officials and analysts with concerns as China has sought to gain dominance in technologies emerging from Fourth Industrial Revolution, such as in the fields of artificial intelligence (AI), novel materials, energy and so on, by adopting a 'Whole-of-the Nation' approach as these technologies are appreciated to provide foundation for various other technologies considered essential for enhancing its military capabilities as also providing consequent rapid gains for its down sliding economy.

There is nothing novel about Military-Civil Fusion strategy adopted by the People's Republic of China (PRC). It had been followed in varied forms by all Chinese leaders, right from Chairman Mao to Xi Jinping. In the past, different terms were used such as, "Military-Civil Integration", "Military-Civil Fused Development", etc. until when it finally culminated in the adoption of its present name i.e., Military-Civil Fusion (MCF). However, a close scrutiny revealed that the current MCF strategy had evolved from the policy decisions taken by Jiang Zemin and later Hu Jintao.

The Americans consider China's MCF as an equivalent to their concept of 'Civil-Military Integration' (CMI), but in reality the former's scope is widely enlarged and more complicated. As regards, the United States, its CMI is "cooperation between government and commercial facilities in research and development (R&D), manufacturing, and/or maintenance operations"; whereas China's MCF strategy is a programme driven by the state, which plans to exploit all elements of state including its economic strength to support and fortify the People's Liberation Army (PLA). Presumably, that may be the reason that in all cases of China, it is the "Military" that comes first.

With a view to draw useful lessons for India, aim of this paper is to study China's MCF under the following heads: -

- Evolution of China's MCF as a Concept.
- Goals and Structure of China's MCF.
- Implementation of MCF under Xi Jinping.
- Lessons for India.

Evolution of China's MCF as a Concept

To make a pragmatic assessment of China's MCF strategy, it is extremely essential to study its historical evolution first because Xi Jinping has been preceded by four leaders, whose policies and directions provided the foundation for his MCF strategy.

Mao Zedong. Consequent to the termination of the Korean War, it became emergent that defence resources need to be utilised for economic development, hence Chairman Mao promoted the defence industries "to set up production lines with dual-use capabilities" for making the transition between defence and civilian production easier. As a result, production of civil usage items reached 60.8 percent of the defence industry's total output value between 1958 and 1965, attaining the highest proportion of 74.5 percent in 1960. However, the strained Sino-Soviet relations and withdrawal of aid to both civilian and defence development programs, forced China's leaders to redirect their efforts on defence production; and the civilian production was immediately delineated from the defence industry.

Deng Xiaoping. Starting in August 1978**,** Deng Xiaoping reoriented civil-military integration, with priority to build up initially China's civil economy as it had been ravaged by Mao's idiosyncratic policies. Accordingly, the concept was basically evolved to reorient and reorganise defence resources towards economic development. Deng underscored the requirement to disassociate China's defence industrial base from the Soviet model that it was following, as it failed to bring out overall technological development. Later in June 1985, he pointed out, "Military equipment modernization is only possible in earnest if the national economy has established a relatively good foundation. Therefore, we (the military) must stay patient for a few years". Following Deng's

directions, national defence and consequent building up of force were relegated to a lower priority.

Jiang Zemin. In January 1993, Deng's successor Jiang Zemin established a new strategic guideline directing that PLA should "place the basis of preparations for military struggle on winning local wars under modern high-technology conditions". This entailed major military modernization but not at the cost of economic development. Hence commencing with Jiang, the scope of military-civil integration was enlarged beyond the defence industrial base to incorporate other fields like logistics, education, and others. In fact, many core components of Xi Jinping's MCF strategy can be traced back to Jiang Zemin.

Hu Jintao. Immediately after assuming office in 2003**,** Hu augmented Jiang's policy of military-civil integration (MCI) by making a shift from **integration** to **fusion** but he made the first authoritative reference to MCF as a guiding principle while presenting his report to the 17th Party Congress in 2007, wherein Hu urged the country to ***"take a path of military-civilian fusion with Chinese characteristics***"***.*** Hu wanted MCI to be extended into new areas. His aim was to achieve a deeper level integration for which he considered that defence modernization and economic & social development should be joined together across their entire length and breadth. Hu's strategy consisted of four Systems of Systems (SoS): "the weaponry research and production; the military personnel training; the military support and sustainment; and the national defence mobilisation". All of these (in original or slightly altered form) are forming part of Xi's strategy for MCF.

In fact, in 2005 itself, Hu had opened the door for the private industries to enter into the defence industrial base. Military-Civil Fusion formed an inseparable part of national strategic planning with its inclusion in the Twelfth Five Year Plan (2011-15).

Xi Jinping. On 23 December 2012, Xi Jinping, as Chairman of the CMC, in his speech at the executive meeting of the Military Commission, acknowledged Hu's contribution by stating that *"military-civil fusion-style development path with Chinese characteristics"* was one of the basic experiences of their military construction. Later, Xi gave his assessment

of ongoing work and stated that they have "initially embarked on a path of military-civilian integration". On 11 March 2014, during the 2nd Session of the Twelfth National People's Congress, ***Xi elevated MCF to the status of "national strategy",*** as he considered it vital for "***rejuvenation of the Chinese nation and in turn to strengthen its military".*** In March 2015, after assessing the existing status of MCF programme in China, Xi demanded its transition from "**early-state fusion"** to "**deep fusion"**. Though, Xi had fully appreciated the efforts of his predecessors in guiding the MCI/MCF but he was not satisfied with its slow progress and was critical of its weak operationalisation. He identified ***Integration as the crux of the problem, which was yet to be resolved.***

Goals and Structure of China's MCF

While speaking to the Central Commission for Military-Civil Fusion Development (CCMCFD) on 20 June 2017, President Xi expressed his view of the MCF strategy as under:

"We must accelerate the **formation of a full-element, multi-domain, and high-return military-civil fusion deep development pattern**, and gradually build up **China's unified military-civil system of strategies and strategic capability"**.

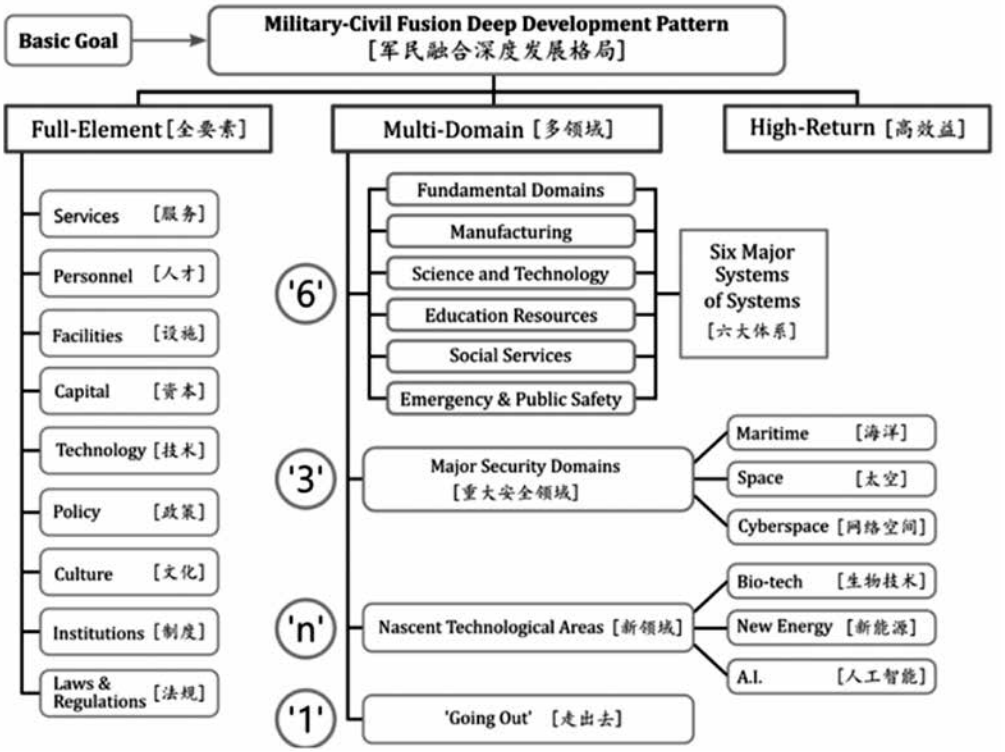
Apparently, the above was a simple statement but it was carefully framed. PLA National Defence University researchers have scrutinized Xi's statement, dividing it in to two halves and stated that "the first half reflects the basic (near-term) and the second half represents ultimate (long-term) goals of the strategy".

The Basic or Near-Term Goal is to form the "military-civil fusion deep development pattern," by including full-elements and multiple domains with a view to deliver high returns.

The "**full-element"** attribute encompasses various resources shared between the national defence and economic systems, viz., technology, personnel, services, capital, facilities, policy, culture, institutions and laws and regulations. Aim is to ensure that common resources are utilized in a coordinated manner for achieving synchronized economic and military development.

In the "**multi-domain"** attribute, the domains are clubbed in to four segments as follows: Traditional domains (6)-Fundamental, Manufacturing, Science & Technology, Education resources, Social services, Emergency & Public safety; Major security domains (3) - Maritime, Space and Cyberspace; Nascent Technological Areas ("n") - Biotechnology, New Energy, Artificial Intelligence; and "1" - "Going Out" of MCF. It is of interest to note that list of nascent technological areas is intentionally kept open-ended with symbol "n" as more new technologies are anticipated to join in future. The six traditional domains further have six Systems of Systems (SoS), which would take shape gradually as the MCF is matured in these domains.

The figure below shows the core components of the "military-civil fusion deep development pattern"



Source: Alex Stone and Peter Wood, "China's Military-Civil Fusion Strategy", p.28

The above figure displays a roadmap for MCF - outlining China plans for achieving the **deep-fusion pattern**, as envisaged by Xi Jinping. “High-Return”, the third vertical in the figure, entails the effects Chinese leaders intend to achieve through MCF.

“High-Return”. It has often been claimed by Chinese thinkers that the MCF strategy is targeted for economic as well as defence issues. A saying commonly found in writings on Military-civil fusion, is that it asks for “**one portion of investment and two portions of return”**. Currently, China is in a period of economic transformation, resulting in slowing down of the growth rate of total fiscal expenditure. Hence, China faces the challenge of declining increases to the defence budget, whereas the Chinese armed forces are still going through expensive modernization. **Brian Lafferty** in his study of **‘MCF and PLA modernization’** has conclusively brought out that Chinese *“reluctance to raise defence spending more dramatically stems in part from the belief that it would harm economic growth (and thus the foundation for long-term military strength), as well as from the common perception that one of the major causes for the fall of the Soviet Union was its ruinous attempts to match U.S. military spending.”*

The Ultimate Goal of China’s MCF strategy is to gradually build up a **“unified military-civil system of strategies and strategic capability”.** The Chinese strategists have analysed that adoption of CMI by the world’s major nations is not meant for resolving the problems of resource constraints or for up gradation of technology but it is primarily to makeup the “institutional deficit” (or what they call as ***tizhi*** barriers) in ability to unify the country’s overall security and development.

Hence, the end-goal of China’s MCF is arrived at achieving a “**unified military-civil system of strategies and strategic capability”** that comprises of two co-related elements: first, “a set of well-coordinated national strategies” and second, “the strategic capability this set of strategies generates”. Chinese academics further define the “National strategic capability” as the ability to use strategic resources and means to achieve strategic ends.

Xi’s vision of MCF, as articulated in various speeches, intends to achieve

three strategic objectives: "(1) Enhance sophistication of China's military technology (particularly in informationised warfare) through transfers between the defence and civilian sectors; (2) Achieve cohesion in Chinese industry and academia working in support of military objectives, so that the entire system can be effectively mobilised to support the military in the future; (3) stimulate technological innovation and economic growth."

Implementation of MCF under Xi Jinping

It is often being said that China is mimicking the American CMI. For Example, equivalent to the United States' Defence Advanced Research Projects Agency (DARPA), China has established the new Central Military Commission Science and Technology Commission (CMCSTC). Simultaneously, in Shenzhen, CMCSTC has established a "rapid response small group," reflected in some Chinese media as "China's DIUx," for national defence innovation that is designed to enhance/ improve the PLA's capability to 'leverage commercial technologies".

But there is an important difference as the American system has a long history of public-private partnerships and its mechanisms go back to World War II, while China is endeavouring to create an equivalent system in a much shorter timeframe by evolving plans that are being implemented actively from the state down to provincial and municipal governments. Simultaneously, defence or dual-use technologies are being developed by reorienting number of universities and enterprises and that too in partnership with military-affiliated research institutes. Industrial complexes have been launched even by the local governments e.g., Zhongguancun, a high-tech zone in Beijing, created a MCF Industry Alliance in 2014 that now has 600 members. In December 2017, they organised a special contest, which covered advancements in cyber security and unmanned systems, in addition to various other fields. Similarly, in coordination with the Academy of Military Science, the Tianjin city that leads China's supercomputer development, has set up an **"AI Military-Civil Fusion Innovation Centre"** close to its National Supercomputer Centre in October 2017.China has invested tens of billions of dollars for creating production facilities, research, and support for overseas acquisitions in 2019.

Moreover, in the US, commercial companies and the military benefit each other through mutual utilization of “spin-off” and “spin-on” technologies. Whereas in China, presently it has been considered as a “one-way process” where the civilian companies are assisting the military and any commercial benefit is just an aftermath. Moreover, the scope of China’s MCF as a concept is much more elaborate than the public-private partnerships of the US. Further, technological development is not the sole objective of China’s MCF but it also encompasses talent development, logistics, as also a guiding concept for national defence mobilisation, e.g., the People’s Liberation Army Air Force (PLAAF) get direct support from China’s leading e-commerce companies by using their drones for logistics;and of late, few Chinese shipping companies also provided cross-sea transport – that would act as a force-multiplier to an amphibious landing on Taiwan.

China’s current strategy of MCF and “the powerful momentum” provided by President Xi Jinping for its speedy implementation merit serious scrutiny. The important aspects, on which China has focused, are deliberated upon in the succeeding paragraphs.

Talent Search and Knowledge Appropriation

Using schemes like the **“Thousand Talents Plan”** (launched in 2008 to bring back reputed Chinese scientists as also attract foreign talent), China made lucrative offers to entice foreign scientists and engineers (e.g., “a onetime starting bonus of USD 1.51 lakh and research fund ranging from USD 4.53 lakh to $7.55 lakh for reputed scientists, above 40 years of age”), and provided them with top-of-the line research facilities in China. In certain cases, foreign scientists have been allowed to retain overseas affiliations and establish laboratories that replicate their U.S. counterpart. As in September 2017, about 7,000 scientists were enrolled in this Programme,and out of these 1,180 are working in the Beijing’s Zhongguancun tech hub alone and these were arranged through a network of 10 overseas recruitment centres**.** The recruiters have been infiltrated in the U.S. institutes under the disguise of visiting academic researchers by fraudulently obtaining visas for them, who in turn would entice talent from the United States back to China. Further, China also

sent its PLA personnel to steal knowledge from foreign institutions, portraying them as civilian academics, affiliated to "cover institutions" that existed only on paper. According to the Australian Strategic Policy Institute, "Out of more than 2,500 military scientists & engineers who had gone abroad since 2007, at least dozens used fake credentials to work in sensitive areas, such as hypersonic missiles and navigation".

Inconformity with MCF plan, with support provided by government funds, Chinese firms obtained dual-use technologies through overseas acquisitions, e.g., state-owned Aviation Industry Corporation of China (AVIC) had reportedly spent at least USD 3.25 billion for acquisition of automotive, aerospace and engineering companies, in the US, Austria, Germany, the United Kingdom, and Spain. Government guidance funds with MCF investments are also funding R&D centres abroad, including Zhongguancun Capital's innovation centres in Silicon Valley and Boston in the US and Heidelberg, Germany.

Venture Capital Funds are also used to support the MCF - Zhongguancun-Stanford New Technology Venture Investment Fund (established in 2013) was first such fund, which had raised USD 91.3 million by 2017, to launch projects at Stanford and other U.S. institutions.

Artificial Intelligence (AI)

AI is the primary focus of China's MCF strategy. The State Council's (July 2017) AI Development Plan (AIDP) is the key guiding document of China's AI strategy. The plan has laid down a three-stage process for China's ambition to lead the world in AI: "One, By 2020, China's AI industry shall catch up with the most advanced countries; Two, By 2025, China aims to attain "world-leading" status in some of the AI fields; Three, By 2030, China aims to attain the status of world's "primary" AI innovation centre". Hence, China is targeting tenfold growth of AI-related industry from USD150 billion in 2020 to USD1.5 trillion by 2030.In November 2017, Chinese government hand-picked Baidu, Alibaba, and Tencent (collectively known as BAT), as also iFlytek to constitute a "National Team" entrusted with developing AI in various domains as follows: Alibaba for cloud computing and smart cities; "Baidu for autonomous driving; Tencent for AI-enabled medical diagnosis; and iFlytek, which is

a voice recognition firm, should continue working on voice intelligence". Facial recognition start-up Sense Time, which is based in Hong Kong, was chosen later to work on intelligent vision.

The United States is reportedly ahead of China in overall AI capabilities. However, China's government intervention and its unique market structure aims to undermine the U.S. lead. In AI-enabled technologies, which are heading for transformational growth, such as commercial and military strike-capable drones incorporating autonomous navigation, China is ahead of or on par with the United States. In the field of autonomous vehicle (AV) technology, China trails the United States but is now rapidly catching up. By exploiting Internet and mobile applications, Baidu, Alibaba, and Tencent, which are China's major mobile platforms have gained unparalleled and unauthorized access to consumer data.China considers "***AI as the turning point at which China could catch up to and surpass the United States in the next generation of warfare".***

New and Advanced Materials

"New materials" have been promoted as one of the core ten industries under "Made in China 2025" and these are central to advancing China's overall manufacturing capabilities. Chinese military contractors are now able to produce carbon fibres, ever since the United States subjected these materials to export controls."China now accounts for 58 percent of global patents in respect of graphene and most of these patents have been registered in the last seven years. Currently, China produces 70 percent of the world's graphite; exfoliating graphite is the primary method of synthesising graphene". Graphene is expected to become an essential component in many future applications, such as quantum computing chips. In that case, China is well poised to develop components much less expensively than the United States.

China has also secured access for its mining companies in critical materials like cobalt and lithium outside of China's borders. China may become a global price setter for processed materials, and allot the crucial segments of the supply chain to Chinese components manufacturers – a great advantage beside the cheap and abundant access to these materials. In 2017, China shared more than 50 percent of world's production for 13 of minerals critical for manufacturing.

To reduce the radar signature of its military aircraft, China has reportedly succeeded in using metamaterials. Moreover, China's patent in this field are "highly concentrated in materials with dual-use potential, like antennas".

Energy Storage

China has become a leading exporter for renewables technology. China has displaced market leaders like Vestas (Danish turbine manufacturer) and General Electric in solar panels and wind energy.China has achieved success because of dumping this excess capacity at rates much lower than the incumbent countries, bringing down prices to the extent that higher quality and more innovative products developed by those countries were no longer competitive. China has circumvented the tariff and non-tariff measures adopted by the host country by locating production in other countries. Presently, China is replicating the same process for advancing ***"its lithium-ion battery production capacity to fulfill its ambition of becoming the leading new energy vehicle manufacturer"***.

In 2010, Chinese state planners had selected "new energy vehicles" as one of the seven Strategic Emerging Industries, leading to quick setting up of battery production facilities by provincial and local governments. "China's global lithium-ion battery exports increased from USD 4.8 billion in 2013 to USD 7.98 billion in 2017".China has been concentrating for consolidation of this industry since 2016.As a result "Shenzhen-based BYD, the world's largest manufacturer of cellphone batteries, and Contemporary Amperex Technology Co., Ltd. (CATL), have now emerged as the world's largest manufacturer of lithium-ion batteries". In 2018, China accounted for 61 percent of world's lithium-ion battery production capacity."While Panasonic and LG Chem are still the leading manufacturers of rechargeable batteries, it is assessed that China's planned mega factories may propel it ahead of competitors, further increasing global dependency on China. In addition, China also has substantial control over the supply chains for materials used in lithium-ion battery production".

Presently, China is focusing on development of lithium-ion batteries to power its air-independent propulsion submarines that could stay underwater for much longer duration compared to conventional diesel-powered submarines. Advanced batteries are also known to be used for powering unmanned aerial vehicles (UAVs) with strike and / or reconnaissance capabilities.

Domination of International Standards-Setting Bodies

Establishing influence in global standards-setting organizations to gain favours for Chinese companies and institutions is a key focus of China's technology strategy. Chinese researchers are dominating the Institute of Electrical and Electronics Engineers (IEEE) and International Standards Organization so as to exercise influence in developing standards that favour Chinese technologies. China is cleverly and proactively placing Chinese nationals or companies in dominating positions within the International Telecommunication Union and other bodies, which are working on AI applications, such as the Internet of Things and 5G.

Lessons for India

Xi Jinping's MCF strategy is aimed to not only counter the United States' current military, economic, and technological superiority but also to overtake it in the long-term. Consequently, it can enhance the vulnerabilities of India as also of other Western powers.

India's response to China's MCF endeavours should not seek to emulate China's state-driven MCF model, but rather it should take in to account the peculiarities of its own system in vogue, retain the procedures already in practice and launch new initiatives. India is not new to the concept of CMI. For instance, in the past Indian armed forces have been extensively using civil hired transport (CHT) for mobilisation of troops to the border, for their inter-theatre movement and even to meet their logistics requirements. Civil Flatbed trailers have been used for ferrying armoured vehicles to the operational areas. It forms part of the standard operating procedure (SOP) of units & formations that is rehearsed during exercises and enacted during mobilisation. There are contingency plans to even use civil aircraft for mobilisation of troops. Indian Army has also

been contemplating the concept of employing private firms for repair and maintenance of its weapons & equipments by replacing the Army Base Workshops (ABWs). Twenty expressways have been identified with the specifications of airstrips and on one of these, the Indian Air Force has done trial landing of its fighter aircraft thus keeping the option of using highways as emergency air bases.

To counter China's Dual Use Infrastructure, particularly the construction of 628 Xiakong (well-off) border defence villages along the LAC,India has launched its own "Vibrant Village Programme". A total of 27 districts in the states of Arunachal Pradesh, Uttrakhand, Sikkim, Himachal Pradesh and Union Territory of Ladakh bordering China have been identified as part of the Border Area Development Plan 2020-21 by the Ministry of Home Affairs and Rs. 190 crore has been earmarked for these. Infrastructure for better connectivity to LAC with China is being speeded up and that will reduce the induction time for troops.

Best example of CMI in India is its space programme in which a number of satellites have been developed with dual-use capability, meeting the requirements of both civil as well as military, such as in the fields of imagery and communications. Nuclear programme is another example, where civil and military have worked in unison.

The government has spelled out its policy of Aatma nirbhar Bharat (Self-reliant India) for promoting indigenous manufacturing and particularly for defence; it has issued three 'Negative Lists', containing 310 defence items banning their imports. India has also adopted a joint venture (JV) approach with foreign manufacturers and private industries. For example, JV model between ordnance factory and Kalashnikov for manufacture of rifles; consortium led by **Tata Group and Airbus** for manufacturing the C-295 transport aircraft for the IAF in Vadodaraand BrahMos cruise missile is manufactured by a JV between the India's DRDO and Military Industrial Consortium NPO Mashinostroyenia of Russia,and it has got orders for export. But these are only incremental approaches for indigenous manufacturing.

Indian Armed Forces are fully aware about cutting-edge technologies emerging from the Fourth Industrial Revolution and have included

some of these in its 2013 (updated in 2018) Technology Perspective and Capability Roadmap (TPCR) viz., AI, Robotics, EMP weapons and unmanned systems.

India's 2020 budget has given a fillip to Quantum technology by allocating US$1.12 billion to be spent over five years as part of a new "national quantum mission", which will encompass the development of quantum technologies for communications, computing, cryptography and new materials. This investment is comparable to the one made by the US ($1.2 billion over five years – bill signed by President Donald Trump in December 2018 for national quantum initiative) and similarly Europe had also allocated US$1.13 billion for quantum technologies in 2016.The Indian government is well aware about the role of AI technology in transforming the economy as well as national security. On 25 Aug 2017, the Ministry of Commerce and Industry constituted the 18 member Task Force on "AI for India's Economic Transformation", led by Professor V Kamakoti of IIT (Madras). On 02 February 2018, the Department of Defence Production formed a Task Force for studying the future employment of AI in defence. The Task Force is headed by Tata Sons Chairman N Chandrasekaran and is christened as "Task Force for Strategic Implementation of AI for National Security and Defence". At the same time, Niti Aayog and the Ministry of Electronics and IT are guiding the national effort for use of "AI in social sectors and industry". A Model International Centre for Transformative AI (ICTAI) has been set up in Bangalore with the collaborative efforts of Niti Aayog, Intel and Tata Institute of Fundamental Research (TIFR).

There is awareness at the highest level to develop the emerging and disruptive technologies but there appears to be no synergy between various branches of the government. CMF needs a 'Whole-of-the Nation' approach to be directed from the Apex level by the Prime Minister, with all the concerned ministries participating and thereby ensuring synergy between the armed forces, universities/engineering institutes, scientists, DPSUs and private industries.

Conclusion

Since long, Chinese leaders have promoted the integration of its military and civil industries but Xi Jinping has given a new dimension to this concept by making MCF as an inseparable element of China's all future industrial plans. As opposed to traditional sectors, advances in emerging and cutting-edge technologies will have two-fold implications - militarily, provide China's armed forces with force-multiplier advantages over its adversaries' conventional weaponry and economically, disrupt the current economic system by creating new class of job opportunities in fields hitherto unknown and in turn making the existing jobs redundant.

The MCF strategy is designed to enhance China's comprehensive national power by synchronising China's manufacturing strategies in all domains - land, maritime, space, electromagnetic spectrum and cyberspace - to provide high-quality products for defence of the country. Though, China may have been over-hyped as a technology superpower poised to overtake the United States but the ways and means adopted by China in implementing its MCF strategy definitely pose competitive challenge to the United States in particular and world at large.

China, being the next-door neighbour, its efforts to gain a decisive advantage in emerging and cutting-edge technologies present a serious threat to India. India should adopt a 'Whole of the Nation' approach by investing suitably in these technologies and coordinating between the armed forces, research institutes, and public and private enterprises.

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