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CHAPTER 12

Impact of Information Technology Revolution on Revolution in Military Affairs in the ROK Armed Forces

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With the revolution in information technology, we experience profound changes in the nature of our world. Indeed, we live in an information age. The information technology revolution fundamentally changed our lifestyle. For example, our homes operate automatically when no one is at home. The IT revolution made it possible to communicate with someone located on the opposite side of the globe on a real-time visualization basis. Because of the IT revolution, we also enjoy simultaneous multimedia-based communications in military operations and business practices.

Military Applications of Information Technology Revolution

The IT revolution also brought dramatic changes in modern warfare. The core of modern warfare is information. As emphasized in *Joint Vision 2010*, information superiority is the *sine qua non* of desired military capabilities. Common battlespace awareness, location certainty for friendly and enemy forces, and real-time dissemination of information create the basis for seamless operations. Information superiority is vital to the ability to employ precision strike assets in a manner most likely to create the desired results.

Communications become more important as information gathering is achieved in real time and as weapon systems acquire the ability to respond to such information. Real-time communications can tie global capabilities simultaneously to multiple sets of specific forces at a local place and time. Common battlespace awareness and assured real-time information allow for a greatly accelerated operational tempo, as well as highly accurate identification of friend and foe on the battlefield. A streamlined, highly networked information dissemination and retrieval system allows for greater latitude in tactical combat because tactical units have timely, relevant information on the battlefield.

Real-time sensor-to-shooter coupling, enabled by wideband links and intelligent databases, reduce the number of critical nodes manned by humans. The concentration of fires enabled by precision-guided munitions makes the battlespace more lethal and more dispersed. As a result, military forces and their support units should be far less concentrated than before if they are to survive.

Since the end of the Gulf War in 1991, revolutionary changes in war paradigms have occurred. Precision-guided munitions play a dominant role in striking deep targets in the enemy territory. The IT revolution makes it possible to fight against the enemy in a real-time, visualized situation. Thus, commanders can lead troops more effectively than the previous conventional situation. It is a profound change in warfare.

Most countries, including the G-8 advanced countries, exert a lot of effort and allocate significant national resources to enhance information technology capabilities. These efforts are not focused only on commercial areas but on military areas, as well. For example, visualization of the battlefield, precision engagement, real-time command and control, real-time targeting and strike, and sensor-to-shooter systems are the most important issues in contemporary military affairs.

David Alberts, a leading information technology revolution and military affairs specialist, proposed a new concept of network-centric warfare based on the IT revolution. In his co-authored book on network-centric warfare, Alberts and his two colleagues state that future warfare will be network-centric warfare. According to Alberts, NCW is an emerging military response to the information age. It focuses on the combat power that can be generated from effectively linking or networking the war-fighting enterprise. It is characterized by the ability of geographically dispersed forces to create a high level of shared battlespace awareness that can be exploited via self-synchronization and other network-centric operations to achieve commanders' intent.[87]

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[87] David S. Alberts, John J. Garstka, and Frederick P. Stein,

The information technology revolution drastically changed our lifestyle. Product life cycles roll up very rapidly due to the accelerating speed of the IT revolution. We can communicate with each other all over the world on a real-time basis.

Owing to the IT revolution, sensor technologies, information processing, communications, precision guidance, and many other areas advance rapidly and become increasingly available for the military use. Information technologies made it possible to free the source of combat power from the physical location of battlespace assets or entities and may allow for more effective force concentration in the future. This allows us to move from an approach based on the amassing of forces to an approach based on the amassing of effects.

As sensor and weapons coverage ranges significantly increase and as the ability to transfer information rapidly improves, we are no longer geographically constrained. Hence, in order to generate a concentrated effect, it is no longer necessary to concentrate forces. This allows us to reduce our battlefield footprint, which in turn reduces risk, because we can avoid presenting the enemy with easy-attack targets. In the past, forces and their supporting units tended to be geographically dispersed due to communication, transport, and power-projection limitations. As a result, a dispersed force was easy to attack, and it was unable to quickly respond to or mount a concentrated counterattack.

Network-Centric Warfare, Washington DC: C4ISR Cooperative Research Program, 1999, p. 88.

With new sensor, fusion, and dissemination technologies, and the advent of airborne command and control systems, the modern armed forces have significantly expanded their competencies to cover the entire C4ISR mission spectrum. Airborne warning and control systems (AWACS) and joint surveillance target attack radar systems (JSTARS) have proven themselves to be essential platforms in modern combat. Information gathering and dissemination by UAVs such as "Predator" and "Global Hawk" are successfully employed in the battlefield. All these are essential systems that facilitate information superiority on the battlefield of the future in the 21st century.

Understanding of Revolution in Military Affairs in the Republic of Korea

The revolution in military affairs has been one of the key issue-areas in the ongoing debates about defense modernization since the Second World War. It is widely known that the term RMA is a successor to an earlier notion of military technological revolutions. In most countries and in all ages, the military technological revolutions tended to drive the RMA initiatives. In recent years, the United States leads the RMA with its strong economic power and abundant specialists in this area, including Andrew Marshall, Andrew F. Krepinevich Jr., Jeffery Barnett, Martin Libicki, Richard O. Hundley, Carl Builder, Thomas Welch, and many others.

Amongst them, Hundley defines the RMA as follows:[88]

> *The RMA involves a paradigm shift in the nature and conduct of military operations,*

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[88] Richard O. Hundley, *Past Revolutions, Future Transformations*, RAND: 1999, p. viii.

> *which either renders obsolete or irrelevant*
> *one or more core competencies of a dominant*
> *player, or creates one or more new core*
> *competencies in some new dimension of*
> *warfare, or both.*

Carl Builder, an expert on the U.S. military doctrine, believes that military technical developments result in revolutions in military affairs only when they are combined and integrated with changes in concepts and doctrine.[89] Frank Watanabe, in his article "Understanding the RMA," views the RMA as "a revolutionary change in the conduct of warfare brought about by the combination of technological, doctrinal, and organizational changes."[90]

Historically, the RMA occurred when drastic changes were introduced in military doctrines, weapon systems, and organizational structures in major innovative ways. The development of airplanes, tanks, and mobile radio transceivers between the first and second world wars provides a popular example, because it demonstrates the cumulative revolutionary impact of new military technologies and hardware on military organizations and doctrines.

Many military historians cite the RMA as one of the primary reasons for successful German Blitzkrieg in 1921-1939, naval carrier warfare between the United States and Japan in 1921-1945, and the strategic bombing campaign against Germany and Japan during World War II.

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[89] Keith Thomas, *The Revolution in Military Affairs: Warfare in the Information Age*, Australian Defense Studies Center: Canberra, 1997, p. 7.

[90] Frank Watanabe, "Understanding the RMA," in *Armed Forces Journal International*, August 1995, p. 5.

It is useful to remember that during World War II, although France had as many advanced tanks as Germany did, it was defeated on the battlefield because the French military failed to adjust its organizational structures and doctrine in accordance with the demands of new military technologies. The French army tried to use tanks as a fire support force rather than as a new way of battle as the Germans did. In contrast, the German army, equipped with new tanks, fundamentally changed its military doctrine and field army organizational structure. As a result, Germany enjoyed great success against France with the Wehrmacht's newly invented Blitzkrieg attack. This illustrates dramatic changes in the use of military force in war.

The Ministry of National Defense of the Republic of Korea established the RMA group within the Defense Reform Committee in 1999. The reason why the RMA group was launched is very simple. Many countries in the Asia-Pacific region significantly increased their military capabilities by restructuring defense organizations, modernizing weapon systems, and changing their doctrinal concepts. Above all, they transformed their military organizations from the quantity-centric forces to the quality-centric forces on the basis of a revolution in military technologies, including military applications of the information technology revolution.

In order to study and analyze the global trends in RMA, each service of the ROK armed forces selected fewer than ten officers to work in the MND RMA study group. They drafted a report on the RMA trends in major advanced nations. That report contained many suggestions on how to advance the revolution in military affairs in the ROK. Some of these recommendations were new and some were old.

One of the fundamental premises of the report was that the ROK should further strengthen the military security alliance with the United States even after the unification because it greatly helps peace and stability in the region and allows for rapid introduction of advanced military technologies and concepts in Korea. Another basic assumption was that South and North Koreas were likely to reunify in less than twenty years. Consequently, the report recommended that after the unification the ROK should reduce its military size to a fixed amount, and the organizational structure should be changed to strengthen service integration. In particular, it emphasizes joint service capabilities or "jointness," because future warfare will dictate greater "jointness" in all aspects. In addition, the RMA study strongly recommended a dramatic acceleration of the construction of the C4ISR infrastructure as a prerequisite for victory in future warfare.

However, the RMA efforts have a contradictory reputation within the ROK armed forces, both positive and negative. Most criticism came from the field army because the suggestions were too abstract to materialize and the ideal concept was far from the thinking of fielded army officers. Moreover, there were too many unrealistic scenarios merely imitating the U.S. *Joint Vision 2010* and the *U.S. Concepts of Future Joint Operations*. By and large, the MND RMA report contained conceptual ideas rather than a practical framework or a road map for defense modernization.

It is obvious that the IT revolution greatly influenced many RMA initiatives. As a major RMA driving force, the IT revolution significantly impacted the national security strategic environment. Information and knowledge became the most important property for individual personnel, social community, and a nation-state in the information age. For

example, the author relies on four mobile phones in his family life (himself, his wife, and two sons); and most South Korean families already take for granted the wired and wireless worlds in which they live their daily lives. Thus, the IT revolution not only has changed the lifestyle of most Koreans, but it has also changed the war paradigm most drastically.

Defense Modernization in Northeast Asia

Nowadays, many countries enthusiastically pursue RMA to enhance their military capabilities in order to strengthen their national security. First of all, the U.S. Secretary of Defense, Donald Rumsfeld, energetically leads radical transformation of the U.S. armed forces. The transformation includes doctrinal revisions, military personnel cuts, defense organization restructuring, and the development of advanced weapons systems, including the F-22 Raptor fighter project. Secretary Rumsfeld said that transformation initiatives would be funded at about $21 billion in fiscal year 2003, which would be about seventeen percent of total defense spending on procurement and research and development programs. He added that the overall investment in defense transformation initiatives should rise to twenty-two percent by fiscal 2007.[91]

Recently, Japan has constructed modern IT buildings equipped with a new central command system in Ichigaya Hill for the Self-Defense Agency. The goal is to concentrate all the higher echelons of various organizations under the Self-Defense Agency in these new facilities, including Japan's Self-Defense Intelligence Agency. JDIA, a new central intelligence organization, significantly

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[91] *The National Journal's Technology Daily*, August 16, 2002.

improves Japan's intelligence capability. In addition, Japan continues to promote various information measures such as the establishment of the integrated defense digital network, improvement of command and control capability, and utilization of satellite communications.

Through these remarkable improvements, the Self-Defense Agency is able to execute centralized control of all the self-defense forces on a real-time basis. Concerning the early warning and surveillance, Japan continues to upgrade fixed type three-dimensional radar systems and transportable warning and surveillance radar systems. Japan also promoted the research and development of guided missiles, including a new medium-range surface-to-air guided missile and a rescue flying boat (improved US-IA).

Over the past decade, the Chinese leadership boldly emphasized defense reform and modernization, significantly reduced military personnel, and increased combat capabilities by equipping the People's Liberation Army with advanced weapons systems. China has imported some 100 Su-30MKKs from Russia and launched serial production of the Su-27 jet fighters. Based on Chinese military modernization trends, many specialists expect the Chinese armed forces to overtake Taiwan in air power, which may disrupt the balance of military power in East Asia. Indeed, increasing Chinese military capability will pose a serious threat to the security and stability in Northeast Asia.

As for the FY 2002 defense budget, the Chinese government reported to the National People's Congress that it increased its national defense spending by 25.2 billion *yuan* or by 17.6% over the previous year, although the total

amount was not announced.[92] On average, the PRC's defense budget has recorded an annual increase of more than 10% since 1989. Because the annual growth rate of the defense budget has been higher than that of the gross domestic product in recent years, and the total amount of the defense budget has also been increasing significantly as a result of the annual increases of more than 10% for the past 14 years, the defense modernization of China is expected to proceed rapidly.

China has continued its work on the development of an independent nuclear capability since the mid-1950s. In terms of delivery systems for nuclear weapons, in addition to ballistic missiles, China possesses a total of approximately 135 medium-range H-6 bombers (Tu-16).[93]

As for ballistic missiles, in addition to possessing about 20 ICBMs, China at present is reported to be pushing ahead with the development of new-type ICBMs and SLBMs. China has already conducted domestic test launches of these new-type ICBMs, the Dong Feng 31 (CSS-9, i.e., long-range surface-to-surface missiles). It is also engaged in a rapid buildup of the number of short-range ballistic missiles deployed on the shores across the Taiwan Strait.[94]

Since the 1980s, China has been modernizing its nuclear and missile forces, as well as its naval and air forces. Whether the objective of the modernization exceeds the scope necessary for China's defense should be judged separately. The new training doctrine, adopted in 2002,

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[92] See http://www.jda.go.jp/e/index_.htm. Section 3. Military Situation in the Asia-Pacific Region.
[93] See http://www.jda.go.jp/e/index_.htm. Section 3. Military Situation in the Asia-Pacific Region.
[94] See http://www.jda.go.jp/e/index_.htm. Section 3. Military Situation in the Asia-Pacific Region.

places a greater emphasis on military exercises with advanced science and technology and exercises for joint operational capabilities, with a requirement of winning a local war under high-tech conditions.[95]

Taiwan has adopted a national defense policy of "all-out defense," in which civilian capabilities are also utilized to build comprehensive national defense capabilities to maintain Taiwan's peace and stability. Taiwan advances the military strategy of "effective deterrence and a strong defense posture," the guiding principle of which is the prevention of war or military conflict on the Taiwanese territory in order to minimize the loss of life and Taiwanese property damage.

Recently, Taiwan has significantly enhanced its defense capability by modernizing its defense weapons systems and equipment. While reducing its military personnel dramatically to almost half of the peak level during the Cold War period, Taiwan increased combat capability by purchasing advanced fighter aircraft, including F-16s and Mirage-2000s. Taiwan also began to deploy the PAC-3 Patriot system, and pursues the acquisition of AWACS and combat frigate vessels.

Russia, too, is keenly interested in pursuing defense transformation under the leadership of President Vladimir Putin. Russia has exerted its utmost efforts for defense transformation with significant military personnel reductions. Russia changed its military service structure from five to three services. However, despite its strong emphasis on defense transformation, Russia has so far failed to implement any significant military reforms or to

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[95] Kukbangjungbobonbu (National Defense Intelligence Service), *China's Defense White Paper 2000,* Seoul, 2000, pp. 25-35.

purchase any advanced weapons systems because of decades of economic hardship and severe financial constraints. Nevertheless, Russia has a great potential to build up advanced military power rapidly on the basis of accumulated past experiences, competing industrial capability, and abundant strategic weapons.

The Russian military force level in the Far Eastern region has decreased dramatically since 1990, and its current force level remains far smaller than the peak level of the late 1980s. However, a notable size of military forces, including strategic nuclear capability, still remains deployed in the region. The future image of Russian forces in the Far Eastern region is not clear; and Russia's political developments, economic predicament, and prospects for military reform are difficult to predict. So, it is necessary to continue to closely monitor future developments in Russia.

One positive note is that in July 2001, Russia and China signed the Treaty for Good Neighborliness, Friendship and Cooperation and agreed to continue negotiations to resolve the remaining border issues and to maintain the *status quo* until resolution occurs. The growing Russian-Chinese strategic rapprochement may become a positive factor of regional peace and stability in Northeast Asia.

Impact of IT Revolution on the ROK RMA

The ROK armed forces are actively involved in applying the IT revolution to military doctrines and future visions. These efforts began with the drafting of a pioneering Air Force vision, *Daehankongkun (ROK Air Force Vision) 2030* in 1998. It emphasized the importance of strategic planning for future force structure in order to produce a

smaller-but-more-capable, leaner armed forces based on the effects of IT revolution.

In December 2000, the ROK Air Force published a new vision, *Air Force Vision 2025*. It contains five chapters: *Introduction, Future Security Environment, Air Force Vision, Materialization of the Vision, and Conclusion*. It concludes that doctrine, organizations, personnel, weapon systems, logistics, and leadership should be changed from conventional, industrial age ideas to newly emerging, innovative ways of the information age. For example, organizations should be changed from a multiple hierarchical structure to network organizations.

In 1998, the ROK Army published *Army Vision 2010 (II)*, which replaced the Air-Land Battle Concept with a new emphasis on Air-Land Operations, including force projection, joint operations, operations other than war, and expanded battlespace. Although there is still a considerable amount of conventional, ground campaign wisdom, we can witness many efforts of the ROK army to apply new concepts to its vision based on the IT revolution, including battlefield visualization and strong emphasis on the enhancement of the C4ISR capability.

The ROK Navy published *Navy Vision 2020* in 1999. It describes conceptually the direction and scope of the Navy's development in the 21st century. In May 2001, the ROK Navy published the *RMA Concept and Direction of the ROK Navy*. It discussed RMA trends in the advanced Western countries and emphasized the importance of the ROK Navy's RMA initiatives. In its vision documents, the ROK Navy emphasized the importance of network-centric warfare. During the two engagements against the North Korean navy invaders, namely the Yon-pyong Battle in June 2000 and the Western Sea Battle on June 29, 2002, the

ROK Navy was able to defeat successfully the North
Korean navy, using the network system, i.e., the Korean
naval tactical data system.

The ROK Joint Chiefs of Staff also published *Joint Vision
2015* in 1999. It emphasized the development of combat
capability through six basic functions on the battlefield --
command and control, information, maneuver, strike,
logistics, and force protection. It was reminiscent of the
concept-based requirement system, which emerged in the
U.S. armed forces in the early 1980s and faded away in the
early 1990s. *Joint Vision 2015* also stressed the importance
of "jointness" in future warfare. It stated that military
combat power could be maximized when all three services
(the air force, army and navy) exerted their utmost efforts
for one goal, and in particular, when they were integrated
under a unified commander.

Likewise, the Joint Chiefs of Staff and each ROK service
exert their utmost efforts exploring the RMA. So far, they
have made great progress in developing conceptual
approaches but failed have to achieve much in practical
fields.

Conclusion

The IT revolution is one of the main driving forces in the
ROK's RMA, although the Korean military community
began intensive RMA considerations only a few years ago.
However, most people are well aware of how the IT
revolution influences the environment of future warfare.

The ROK RMA is not ready to take off towards the future
yet due to its short history. The ROK is still at the initial
stage of studying the RMA experiences of the advanced
countries. What is obvious is that the IT revolution

tremendously impacts the development of the RMA concepts in the advanced countries, and it will also affect the direction and scope of the ROK's RMA in defense modernization and military buildup in the future.

On a personal note, though, it is worth noting most Koreans, who suffered enormous personal losses and property damages in the unforgettable war in 1950-53, ardently desire peace and stability in the Asia-Pacific region, instead of arms races and security competitions among the strongest military powers in the region. Consequently, many Koreans prefer to reduce the ROK armed forces gradually under the common confidence building measures with the surrounding countries on the Korean Peninsula.

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