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Research on North Korean Science and Technology: Observation
by Key Technology Area

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[Abstract]

Cooperation between the South and the North initiated with the exchange of commodity products in late 1980s culminated in the inter-Korean summit in 2000. However, the hard-line stance on the North of the Bush administration has resulted in the estranged inter-Korean relations. In fact, the inter-Korean relations have progressed going through the periods of estrangement and reconciliation. Whatever the current situation is, it is important to prepare ourselves for the expanded inter-Korean cooperation from a long-term perspective.

Though science and technology has not been a major area of concern in the inter-Korean exchanges so far, cooperation in science and technology between two Koreas has a high potential for mutual benefits as it allows them to share complementary elements and strengthen their international competitiveness. In that regard, science and technology has a potential to be a major area of bilateral cooperation, possibly leading the inter-Korean exchanges. However, a successful cooperation requires accurate information and data on the cooperation partners. When cooperation efforts progress without these prerequisites being met, difficulties will add up. In this context, this

report is aimed at understanding the overall picture of North Korean science and technology by observing its key technology areas. In addition, this kind of efforts should be continued.

This report analyzes North Korean technology in the following high-level categories; high-tech area, strategic area for survival, and traditional industry area. High-tech area includes software, telecommunication, and electronics. Agriculture, energy, nuclear energy are the sub-categories of the strategic area for survival. Lastly, the traditional industry area includes machinery.

North Korea's computer industry is very much underdeveloped in hardware. However, in software, programs excellent enough to draw the attention of the internal community are being developed and its development area is also being expanded. Given North Korea's special interest in industrializing its competence in software, software is expected to be the country's major export item in the future. North Korean software technology is world class in such technologies as recognition of voice, text and finger prints, control system, automation system and medical systems. In addition, North Korea is strong in oriental medicine information system, natural language processing, aerospace(e.g. satellite system), multimedia, game, animation, and simulation as well as in basic technologies like word processing. One of the key characteristics of softwares developed in North Korea is the heavy use of advance information technologies including artificial intelligence, fuzzy theory, visual processing, text recognition, finger prints recognition, and mechanical translation. With the advancement in defense technology and basic science, North Korea is also very strong in numerical analysis and statistics programs. Though North Korea has an excellent competence in manufacturing softwares, their performance is limited to certain areas. This implies that North Korea does not respond to the market needs effectively due to the constraints stemming from its political system. In order for the North Korean technologies to be competitive, it is necessary for the North to

adopt education and human resource development conducive to diffusing a mind-set of market economy.

For North Korea, food and energy are strategic issues that should be solved for its survival. In this respect, agriculture and energy technologies are very important for the North. North Korea suffers from the shattered agricultural infrastructure, for example, shortage of agricultural water and equipment supply. Especially the shortage of fertilizers and agricultural chemicals prevented the country from achieving the production targets of rice, corn, and potato, resulting in the chronic food shortage. For efficient agricultural production, quality seeds, fertilizers, agricultural chemicals, and modern equipments are essential components. Among these components, North Korea is doing research to improve only the seed. Even this seed research can not be done independently.

North Korean energy crisis causes the shortage of electricity, the very source of industrial activities. To alleviate the energy problem, it is necessary to increase coal production and to improve overall energy efficiency by introducing foreign capital and technology. However, no dramatic solution can not be expected without the support of open-door policy and foreign aids. As temporary measures, North Korean authority focuses its efforts on increasing water capacity for power generation by removing sediment accumulated by the floods, increasing capacity utilization of existing power plants, maintaining power distribution network, and utilizing natural energies such as hydraulic power and wind power. Recently the North shows interest in alternative energy sources. Small- and medium-sized power plants do not contribute to resolving the chronic energy shortage. In some cases, these small- and medium-sized power plants even use generators of used cars or motorbikes due to the poor financial situations of the local authorities. Only in wind power generation technologies, active research is being carried out in such area as power generator design. It is expected that the North Korean wind power

generation technology will reach some advanced level if research funding is available from the economics points of view.

Among the traditional industrial technologies, North Korea has paid attention to the mechanical engineering as a core technology from the very early stage. As result, the technology level of North Korean mechanical engineering is more advanced than other areas. Despite its better condition, North Korean mechanical engineering is faced with following issues; lack of investments, outdated facility, delayed introduction of advanced technologies, lack of motivation for internal technology development, lack of systematic industrialization and technology development stemming from the imbalance between sub-technology areas, lack of standardization, poor quality products, weak front-line industries due to the focus on defense industry, and low production elasticity. These issues found in other traditional industrial technologies of the North are the main culprit of the gap with the South. For example, North Korean technology in machine tool and non-metal remains at the level of the South in mid 1980s', and that in precision machinery, automation, steel-making, and textile stands at the level of the South in early 1980'. North Korea lags behind South Korea further more in such areas as chemicals, paper, food and beverage processing, remaining at the level of the South in mid 1970s'. The technological gap with the South become widened when it comes to automobile and ship building.