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The Strategies of ROK's DEFENSE REFORM with Special Reference to the Peace Process and Arms Control

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Abstract

Purpose: *The purpose of this article is to analyze the constraints of defense reform of previous governments and to suggest alternatives in connection with future arms control and the peace process on the Korean Peninsula. This article aims to evaluate the history of previous governments' defense reforms and traditional arms building efforts, and seek alternatives to overcome constraints in connection with the peace by analyzing EU's successful cases of arms control. The key is how to build military power that conflicts with disarmament and a peace regime through the denuclearization of the Korean Peninsula, which is supported by the power, and the vision of arms control.*

Method: *For better analysis, this article reviews the previous governments' defense reform plan and pinpoints the limiting factors and suggests the policy options to overcome by taking a Mahoney's path dependence theory of four actors as utilitarian, functional, power and legitimacy. In Chapter 2 analyzes ways to enhance arms control in connection with a peace regime. In Chapter 3 describes Defense Reform 2.0 key areas and future challenges. In Chapter 4 explores ways to enhance linkage among Defense reform 2.0 and Arms control, and the peace regime. In Chapter 5 suggests policy options to overcome the restricting factors in Arms reform effort of the previous governments.*

Results: *If we pinpoint the limits of past defense reform effort are as follow. First, as an efficacy aspect, past defense reform lacks efficiency in defense reform process due to the corruption. Second, as functional aspect, past defense reform fails to provide an institutional mechanism for strengthening military space power in order to respond North Korea's threat. Third, as power aspect, the will to reform the military command has interrupted by the changing of the political leadership. Fourth, as legitimacy aspect, national defense reform has failed to win support from the private and military circle.*

Conclusion: *This article concluded that: First, as utilitarian aspect it should contribute to the national economy by minimizing inefficiency and maximizing efficiency through defense reform. Second, as functional aspect defense reform should provide an institutional mechanism for strengthening military space power at the Joint Chiefs of Staff to respond to threats from North Korea and changes in the changing operational environment. Third, as power aspect, the political will to reform the military command should be continued by the president and defense ministers. Much of Defense Reform 2.0 seeks reform in political terms, and efforts should be made to create crisis-taking shared values for national security, breaking away from the risk avoidance culture. Fourth, as legitimacy aspect, national defense reform should be carried out by due process and win support from the private and military.*

[Keywords] ***Defense Reform, Peace Process, Arms Control, Political Leadership, Space Force***

1. Introduction

Since the Moon Jae-in administration took office, the vision and goal of Defense Reform 2.0 is to become a strong army that can respond to all-round threats and a trusted army of people. The achievements of previous governments' defense reforms have had many ups and downs, but they have focused on military restructuring to counter all-round security threats, including North Korea's nuclear threats. However, there is a need for defense reform beyond existing inertia amid growing potential threats just like the recent lack of military resources due to the population cliff, uncertainty of the North Korea's complete denuclearization, and intensifying arms competition in neighboring countries. The key is how to build military power that conflicts with disarmament and a peace regime through the denuclearization of the Korean Peninsula, which is supported by the power, and the vision of arms control.

Amid the spread of transnational threats such as cyber, terrorism, disasters, the spread of infectious diseases and flood in the fourth industrial era due to the development of science and technology, there is a need to push for defense reform in order to respond quickly to the new environment. It has further increased the need for national defense reform, which has undermined people's trust in the military due to growing public demand for human rights and welfare, political involvement of military, and defense industry's corruption.

Tensions between the two Koreas have been escalating due to the North's detonation of a liaison office in the Kaesong Industrial Complex and the North's military threat to respond. Nevertheless, the 9/19 inter-Korean military agreement is maintained in a large frame work, and the resulting tension is assessed at a manageable level[1]. Amid the unstable and early stages of operational arms control through the 9/19 inter-Korean military agreement and the vision of denuclearization of the Korean Peninsula through future U.S.-North Korea denuclearization negotiations, linking the direction of defense reform with arms control and the peace process is meaningful to establish a permanent peace in the future.

The purpose of this study is to review the constraints of defense reform of previous governments and to suggest alternatives in connection with future arms control and the peace process on the Korean Peninsula by using Mahoney's Path Dependence theory of four actors as utilitarian, functional power and legitimacy[2]. Path dependence is when the decisions presented to people are rely on prior decisions or experiences made in the past.

This article aims to evaluate the history of previous governments' defense reforms and traditional arms building efforts, and seek alternatives to overcome constraints in connection with the peace by analyzing EU's successful cases of arms control. The previous governments' defense reform plans have been mainly focused on military innovation that emphasizes the strengthening of high-tech-oriented innovative military capabilities in a large framework, military restructuring that emphasizes efficiency-oriented command structure or units, and defense operation innovation that focuses on changes in defense management and operations in relation to weapons systems and materials.

2. Ways to Enhance Arms Control and Its Connectivity with a Peace Regime

According to Tomas C. Schelling & Morton Halperin's definition of the arms control, it is a strategic concept to enhance security by reducing the risk of war by confirming or restricting and reducing the ban on the construction and deployment of certain military forces through mutual consultation between countries. Hence, arms control limits the possibility of war between potential enemies and the scope and destructive power of the war, and means various forms of military cooperation to reduce the cost of political and economic opportunities for peacetime[3].

Arms control is a security strategy pursuing common security, cooperative security, and comprehensive security, which includes building political and military trust, arms restrictions, and disarmament. Negotiations on denuclearization of the Korean Peninsula between North Korea and the U.S. are at a standstill at the moment. Although the 9/19 military agreement between the two Koreas achieved a basic operational arms control through the removal of the DMZ GP to ease tensions, cold air is still flowing between the two Koreas after the North Korea' blowing up a liaison office in the Kaesong Industrial Complex due to leaflets insulting the North's supreme leader. In the meantime, there have been several violations of the 9/19 military agreement between the two Koreas, but it has generally been concluded at a manageable level.

The stance of the Moon Jae-in government toward inter-Korean peace is 'peace through strength[4].' Arms control must be preceded for the peace process of the Korean Peninsula[5]. However, in order to deal with North Korea which has a potential nuclear capabilities, it is only possible for South Korea to curb North Korea's provocations with conventional weapons alone within the South Korea-U.S. alliance framework[6]. A peace regime on the Korean Peninsula refers to organizations with control over the rules, principles, procedures and norms agreed upon by the two Koreas and related countries in order to eliminate the threat of war on the Korean Peninsula, to resolve distrust and hostility formed between the two Koreas, and to seek permanent peace and prosperity.

The reason for the need for a peace regime on the Korean Peninsula is to establish a foundation for peace settlement of the conflict between the two Koreas, induce North Korea's determination to dismantle its nuclear weapons program, and is to reduce defense reduction for economic development and peaceful unification. The reason why North Korea is obsessed with signing a peace treaty with the U.S. is to accumulate the justification for the withdrawal of U.S. troops from South Korea by ensuring regime security and converting the armistice into a peace treaty. If the situation on the Korean Peninsula shifts from an armistice to a peace treaty, the justification for the continued presence of U.S. troops stationed on the Korean Peninsula after the Korean War will be weakened. For South Korea, the desirable direction of establishing a peace regime is to push for arms control in the process of building a peace regime without damaging the South Korea-U.S. alliance after North Korea's CVID(Complete, Verifiable and Irreversible Denuclearization) is realized.

The transition to a peace regime can be considered in three stages. The first step is to prepare for a peace regime, and all of North Korea's asymmetric weapons of mass destruction must be scrapped to restore mutual trust and ease tensions. The second stage is the establishment of a peace regime, during which North Korea must build trust and ease tensions, along with a change in its regime through reform and opening of its regime, and carry out operational arms control based on it. The third stage is a peace settlement period, where structural arms control should be carried out based on confidence building between the two Koreas. At this stage, it is the basic practice of arms control for the two Koreas to shift from building military trust to operational arms control based on mutual trust. The need for arms control on the Korean Peninsula is due to its contribution to the prevention of war, reduction of war damage, economic development, and peaceful unification.

The 9/19 inter-Korean military agreement is a form of initial operational arms control by realizing arms control through inter-Korean exchanges and cooperation and forming trust through the building of a peace regime in the long term Korean unification process. If North Korea is currently regarded as a potential nuclear power state, South Korea needs to respond to the North's strengthening of its nuclear capabilities by constructing asymmetric power through military space forces within the framework of the South Korea-U.S. alliance. This is because space surveillance assets and interceptor missiles are needed to curb North Korea's nuclear/missile missiles at the launch stage.

3. Defense Reform 2.0 Key Areas and Future Challenges

The South Korean government announced its defense reform 2.0 on July 27, 2018. The major task of defense reform is scheduled to execute by 2022. The defense reform 2.0 is aimed at responding to all-round security threats, an elite team based on advanced science and technology and fostering a military suitable for advanced countries under the slogan of building a strong military and the implementation of responsible national defense that can support a peace process of the Korean Peninsula[7]. First, its focus is on strengthening asymmetric capabilities against North Korea's nuclear threats. Second, it prepares for the early return of wartime OPCON based on a strong South Korea-U.S. alliance. Third, to establish a new military culture in the era of the fourth industrial revolution through the eradication of corruption related to the acquisition of the defense industry. Defense Reform 2.0 is designed to cope with rapid changes in the security environment and especially emphasizes the construction of military space power to cope with North Korea's nuclear and missile threats <Table 1>[8].

Table 1. Change of national defense reform.

	Defense Reform Basic Plan (Roh Moo-hyun Administration)	Defense Reform 2012-2030 (Lee Myung-bak Administration)	Defense Reform 2014-2030 (Park Geun-hye Administration)	Defense Reform 2.0 (Moon Jae-in Administration)
Major contents	- Succeeding defense reform 2020 - Emphasizing the increase in transnational non-military threats and the increase in North Korea's nuclear/missile threats and its ability to respond to them	-Realization of multi functional, high-efficiency advanced national defense - Transition to 'active suppression' against North Korea's threat and customized military structure suitable for the war environment on the Korean Peninsula -Revision of Defense Reform 2009-2020	-Building the elite army of innovation/creation -Focus on securing response capabilities to North Korea's threats -3 axis system, strategic target strike, Korean missile defense system, the overwhelming response	-Switch to a command structure led by ROK Army -Promotion of defense industry, enhancement of human rights protection of soldiers, -Improvement of military law system -Improvement of military law system -Troop reduction to 500,000 -Civilianization of the military and guarantee of political neutrality -Defense industry R&D investment linked to the fourth industrial revolution A.I.[9] -Building a military space power -Strengthening asymmetric capabilities against North Korea's nuclear threats

If we pinpoint the limits of past defense reform effort are as follow. First, as an efficacy aspect, past defense reform lacks efficiency in defense reform process due to the corruption. Second, as functional aspect, past defense reform fails to provide an institutional mechanism for strengthening military space power in order to respond North Korea's threat. Third, as power aspect, the will to reform the military command has interrupted by the changing of the political leadership. Fourth, as legitimacy aspect, national defense reform has failed to win support from the private and military circle.

Defense Reform 2.0 is similar to the existing defense reform in terms of military innovation, military restructuring, and defense operation innovation, which is a big framework of defense reform, but it is different from the existing defense reform in terms of the perception of North Korea's threats, the selective suggestion of the scope of reform tasks, and the guarantee of the military's civilian and political neutrality.

Defense Reform 2.0 says it is urgent to build a "strong military" against all-out threats, including threats from North Korea. The 2018 Defense White Paper states, "North Korea's weapons of mass destruction are a threat to peace and stability on the Korean Peninsula," and, "Our military will militarily support efforts to fully denuclearize the Korean Peninsula and establish permanent peace" in the Korean Peninsula[10]. In the defense industry, it suggests curbing North Korea's threats by investing in R&D linked to the fourth industrial revolution and strengthening military space forces. In the military structure sector, the goal is to transfer wartime operational control within the term of the presidential office. At the same time, the Joint Chiefs of Staff's ability to carry out operations is also linked to the transfer of wartime operational control, showing its willingness to achieve its goal within its term.

With the advent of the Fourth Industrial Revolution, the paradigm of defense and war is changing and calling for the development of a new military doctrine. Standards and principles for building and operating military forces in response to the space war era should be presented, and dedicated personnel, mission sharing, and education and training systems should be established. In the field of defense operation, it suggests reducing the number of standing troops to 500,000, achieving the civilian level of the director-general of the Ministry of National Defense, shortening the service period by 18 months, adjusting the number of generals, and expanding the number of female soldiers[11]. At a time when the population cliff is imminent, it is also urgent to come up with measures to secure and operate military personnel in the future. Due to the falling birthrate, the male population aged 20 is estimated to fall to about 220,000 after 2,035. By 2040, the number of available troops will fall to around 150,000[12].

Military Reform 2.0 aims to switch to a South Korean military-led command structure but does not present a military doctrine containing a Korean-style military strategy. It is necessary to establish a Korean-style military strategy not only in North Korea's threats, but also in the implementation of all-out war/local war, or operation of other than War(OOTW) against potential threats[13].

4. Defense Reform 2.0 and Its Enhancement of the Linkage with Arms Control and the Peace Regime

Linking the strengthening of military power through defense reform to the peace process on the Korean Peninsula has some conflicting aspects. The need to strengthen military force to deter North Korea's nuclear weapons program and arms control for the peace process on the Korean Peninsula is a structure that loses balance on one side or the other, so a balanced perspective is needed. South Korea has argued that confidence building is prerequisite for Arms Control. Meanwhile, North Korea changed from disarmament by a package settlement to "step-by-step disarmament." Successful cases of operational arms control include the 1975 Helsinki CBMs, the 1986 Trust and Security Building Measures(CSBMs), and the Vienta CSBMs[14].

In the case of European arms control, the implications for arms control on the Korean Peninsula are as follows. First, the success of European arms control was possible by building military confidence. This is possible when bilateral relations between countries shift from hostile relations to friendly relations and have a firm commitment to peaceful coexistence and elimination of the risk of war. Second, in Northeast Asia, where distrust among countries is deep, political relations must be improved first. Third, the leader's will to control arms is an important factor. Fourth, differences in views on military power reduction and method in the arms control negotiations require long-term debate and coordination. Fifth, implementation is more important than agreement. Measures are needed to verify implementation and sanctions are needed in case of violation. Sixth, military confidence-building should be continued by activating various cooperation bodies. Therefore, arms control is possible only when trust-building between the two Koreas is preceded on the Korean Peninsula. Currently, denuclearization negotiations between the U.S. and North Korea are in a deadlock. It is necessary to revitalize the joint military committee between the two Koreas through building confidence between the two Koreas. This raises the need to build trust through notification of mutual military training.

To restore political trust between the two Koreas, it is important to restore military trust through various cooperative projects between the two Koreas. Through the declaration of the end of the war between the leaders of South Korea, North Korea, and the U.S. and the Northeast Asian quarantine cooperation involving South Korea, North Korea, China, Japan, and Mongolia, we should end inherent distrust in Northeast Asia and provide a turning point for reconciliation and peace. Due to North Korea's offering to lift all economic sanctions as a precondition for denuclearization, progress in denuclearization is expected to be difficult without U.S. concessions and compromises. Unless North Korea gives up its nuclear weapons, South Korea also needs to strengthen its deterrence by strengthening conventional power to cope with North Korea's nuclear weapons and missiles and securing defense-oriented military space power assets by the defense reform 2.0 plan. If North Korea shows sincere efforts to denuclearize and international economic sanctions are lifted, the two Koreas should make efforts to operate the Plan B to build a structural arms control[15]. As long as inter-Korean tensions are maintained and denuclearization negotiations between the U.S. and North Korea are stalled, the South Korean government should continue its efforts to strengthen conventional weapons under Plan A in preparation for North Korea's EMP attacks using nuclear warheads and surprise attacks with short-range missiles. The power reinforcement sector focuses on strengthening military space power and aims to improve its ability to hit strategic targets by linking with air reconnaissance assets and satellite systems to neutralize North Korea's ballistic missiles in the early stage of its launch.

The Ministry of National Defense also included a plan to establish a plan B assuming the security situation if denuclearization of the Korean Peninsula progresses in the future. The current basic defense plan, which assumes North Korea's threat, will be maintained, but it will switch to Plan B if North Korea's threat is reduced.

5. Conclusion

This article reviews the previous governments' defense reform plan and pinpoints the limiting factors and suggests the policy options to overcome by taking a Mahoney's path dependence theory of four actors as utilitarian, functional, power and legitimacy.

Looking at the defense reform process of previous governments, Korea's defense reform strategy in connection with arms control and the peace process can be summarized as follow. First, as utilitarian aspect, defense reform should contribute to the national economy by minimizing inefficiency and maximizing efficiency through defense reform. Second, as functional aspect, defense reform should provide an institutional mechanism for strengthening military space power at the Joint Chiefs of Staff to respond to threats from North Korea and changes in the changing operational environment. An alternative plan should be prepared for the Army Navy Air Force to strengthen its C4ISR capabilities, Integrated protection System against HEMP(High-Altitude Electromagnetic Pulse), Cyber attack[16], and a response posture should be prepared so that cooperation can be exercised in all areas for space operations, such as combat tests and education and training, as well as space-related missions that can efficiently utilize military space forces such as ground control systems, link systems, and satellite assets[17]. Overall, conditions should be created for combatants to focus on training to enhance their actual capabilities.

In addition, the ROK government should strengthen its surveillance and reconnaissance capabilities to monitor North Korea's ballistic missile launches 24 hours a day and secure precise striking assets that can be neutralized at the initial stage of launch. Third, as power aspect, the political will to reform the military command should be continued by the president and defense ministers. Much of Defense Reform 2.0 seeks reform in political terms, and efforts should be made to create crisis-taking shared values for national security by breaking away from the risk avoidance culture. At the same time, the legitimacy of strengthening military space power should be promoted through public relations, and the minister should push for reforms to strengthen military space power. Fourth, as legitimacy aspect, national defense reform should be carried out by due process and win support from the private and military, referring to the fact that previous governments have experienced many difficulties in persuading the public[18]. The South Korean people may need to monitor the reform effort while providing feedback to the reform policies[19]. By continuously emphasizing the success of North Korea's sixth nuclear test and the development of ballistic missiles, it is possible to obtain justification for strengthening military space power. As denuclearization negotiations with North Korea have entered a stagnant phase, the strategies of Defense Reform 2.0 should focus on the establishment of a means of independent response to North Korea's nuclear weapons with focusing on the construction of a military space force that can proactively respond to North Korea's nuclear and missile attacks, as well as continued efforts to strengthen overall conventional power in case of denuclearization deal’s failure[20].

If North Korea genuinely moves toward denuclearization, we should also try to convert the armistice into a peace treaty by shifting from operational arms control to structural one under Plan B of building a peace regime on the Korean Peninsula. To this end, the political leadership needs to establish a civil ecosystem to strengthen military space power with a strong political will. To this end, it is important to have a mindset of security and a willingness to win.

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7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Author	SSL	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑ -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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NATIONAL POLICE: Differences in Leaders' Followership According to the Total Length of Service as a Police Officer and the Length of Service at the Security Department

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Abstract

Purpose: *This study aims to demonstrate the differences in leaders' followership in the Korean police organization according to the total length of service and the length of service at the security department with 91 trainees of the Police Human Resources Development Institute as the research subjects.*

Method: *For the data processing of this study, using the SPSS 23.0 program, frequency analysis was conducted to identify the general characteristics of the research subjects, and Cronbach's α coefficient was calculated to verify the reliability of the questionnaire. One-way ANOVA was conducted to find out the differences in leaders's followership according to the total length of service as a police officer and the length of service at the security department, and Chi-Square was conducted to find out the connection between the total length of service and the length of service at the security department.*

Results: *This study found that leaders' followership varies between police officers depending on their total length of service. It was also shown that leaders' followership varies between police officers depending on their length of service at the security department. In addition, there was a connection between the total length of service and the length of service at the security department.*

Conclusion: *The results confirmed through this study are believed to be fully utilized as basic data for the development of programs for improving the followership of police officers working in the security department, but since it is a verification of individual items of the followership, there will be limitations in identifying the differences in overall followership effects according to the length of service.*

[Keywords] Military Affairs, National Police, Security Department, Police Officer, Followership

1. Introduction

The recent disappearance of an official from the Ministry of Maritime Affairs and Fisheries and the shooting by the North Korean military in waters off Yeonpyeongdo Island drew keen public attention and invoked social discussion. The controversy continues as the exact story of the incident or the truth has yet to be revealed, and the South Korean government and North Korea's announcement are different from each other. Furthermore, the seriousness of the situation is growing as various problems are being revealed in the response and handling of the situation by the maritime police and military officials, who were supposed to protect the lives of the people from the time they go missing. Two months after the incident, a North Korean broke through the military border and crossed an iron fence at a frontline guard unit in Goseong, Gangwon Province. The incident reminds us of the "knock-knock defection incident" around October 2012, and both incidents occurred at locations not far from each other.

The incident has also sparked criticism of the military's lax security posture as it secured the whereabouts of the North Korean about 14 hours after the incident.

As such, workers at state agencies in charge of national security and defense, such as the military and police, will be asked to take timely action and act on the urgent situation. Moreover, in the case of Korea, which is in a situation of the divided states, the role of the security department in charge of anti-communist affairs is very important. The ability to effectively cope with a sudden crisis through close interaction between the leaders and followers at the security department is imperative[1]. In particular, the followership of subordinates who can solve the problem by thinking and acting like a leader is more important than anything else in various unpredictable situations that occur at the scene[2].

Followership is the fruit of leadership research attempted by Kelly(1988) to complement the limitations of existing leadership research focused on leaders[3][4][5][6][7][8][9]. Kelly(1988) argued that effective followers were the most important elements to leaders and organizations by making active contributions, saying that they shared several essential qualities: self-management and self-responsibility, organizational purpose, principles, immersion in people other than themselves, self-development capabilities, courage, honesty, and trust. Kelly used two characteristics of followers in distinguishing types of followership, the first being independent and critical thinking[9]. The best follower is described as self-thinking, constructively critical, individualized, innovative, and creative individuals of their own. On the contrary, the worst type of a follower must be instructed to do things and cannot do things on his or her own, and does not think proactively. Then there are typical followers in the middle; those who simply follow orders and not resist their leaders or organizations. The second is active participation. The best follower takes the initiative, has a sense of ownership, actively participates, is voluntary, and does more than what is given. The worst followers are passive and lazy, always urged and supervised, and shirk responsibilities. A typical follower, after being instructed what to do, finishes the work without supervision, makes excuses for one's own sake, and tend to jump on the bandwagon. The follower types are divided into alienated follower, conformist, pragmatic survivor, passive follower, and effective follower, depending on the degree of these characteristics. Meanwhile, Gilibert and Hyde(1988) presented eight characteristics that effective followers should have: a partnership with superiors, immersion and dedication to their duties, technical skills(work performance), sense of humor, reliability, positive working relationships with others, good expression of opinion, and conduct[10].

This variety of types of followership will appear in similar forms, as in the prior studies on followership, for mid-level managers in the security department in charge of the anti-communist tasks. Demonstrating the differences in their followership according to the length of service would be a meaningful study. In addition, it is meaningful to identify the followership that a leader should have from the perspective of a follower through leaders' followership measured by subordinates of mid-level managers. Therefore, the purpose of this study is to demonstrate the differences in leaders' followership according to the total length of service as a police officer and the length of service at the security department.

2. Research Method

2.1. Research subjects and sampling method

In this study, among police officers in the security department as of 2020 who had experience in work related North Korean defectors, 100 trainees in the Police Human Resources Development Institute were surveyed via self-administration method. Among the collected survey questionnaires, 91 were selected as valid samples, excluding those whose answers were incomplete or missing.

Table 1. The general characteristic of the research subjects.

	Description	N(%)	Total
Gender	Male	61(67.0%)	91
	Female	30(33.0%)	
Age	20s	7(7.7%)	91
	30s	28(30.8%)	
	40s	30(33.0%)	
	50s or older	26(28.6%)	
Education	High school	14(15.4%)	91
	Junior college	30(33.0%)	
	College	43(47.3%)	
	Graduate school	4(4.4%)	
Rank	Policemen/women	1(1.1%)	91
	Senior policemen/women	19(20.9%)	
	Assistant inspector	18(19.8%)	
	Inspector	29(31.9%)	
	Senior inspector	14(15.4%)	
	Superintendent	10(11.0%)	
Employment path	General recruitment	75(82.4%)	91
	Special recruitment	5(5.5%)	
	Police Academy	2(2.2%)	
	Police cadet	9(9.9%)	
	Other	0(0.0%)	
The total length of service as a police officer	5 years and less	13(14.3%)	91
	6-10 years	32(35.2%)	
	11-15 years	13(14.3%)	
	16-20 years	13(14.3%)	
	Longer than 20 years	20(22.0%)	
The length of service at the security department	2 years and less	16(17.6%)	91
	3-5 years	56(61.5%)	
	6-10 years	17(18.7%)	
	Longer than 10 years	2(2.2%)	
The number of police officers in the organization	10 or less	18(19.8%)	91
	11-15	42(46.2%)	
	16-20	24(26.4%)	
	More than 21	7(7.7%)	
Service location	Tier 1 areas(big cities)	80(87.9%)	91

	Tier 2 areas(small/medium-sized cities)	11(12.1%)	
	Tier 3 areas(rural areas)	0(0.0%)	

2.2. Measuring instrument

In this study, the measurements were made on a five-point scale using 19 items out of a total of 20 measurement tools developed by Kelly(1994)[11]. The appropriate method for each verification method was chosen to increase the content validity and verify the construct validity of the questionnaire. Content validity was validated through consultation with relevant experts to adopt survey questions suitable for the purpose of the study, and the reliability of the survey questions was shown to be Cronbach's α coefficient .930.

In addition, open-ended questions were included to obtain data that were not included in the closed questions.

Table 2. The questions.

	Questions
Q-1	My leader's work helps me achieve social goals or personal dreams.
Q-2	My leader does not wait for instructions from the police organization, but acts by firsthand determining what is most important to achieve the organization's goals.
Q-3	My leader independently creates and actively presents new ideas that can contribute to the goals of the police organization.
Q-4	My leader tries to solve difficult problems on his/her own rather than relying on others.
Q-5	My leader helps superiors and colleagues review their ideas or plans once again, even if they express opposition.
Q-6	My leader actively and frankly acknowledges his/her strengths and weaknesses rather than avoiding the assessment on him/her.
Q-7	My leader has a habit of evaluating himself how wise the judgment was made by superiors such as superintendent or senior superintendent, rather than just taking orders.
Q-8	My leader often refuses when a superior asks him/her to do something that conflicts his/her personal interests.
Q-9	My leader decides and acts according to his/her ethical standards, not by the standards imposed by superiors and others.
Q-10	My leader insists on his/her views on important issues, even if they cause conflicts with superiors or give a bad impression to the organization.
Q-11	I think my leader's personal goal is in good harmony with the police organization's top goal.
Q-12	My leader works very devotedly as well as providing the best ideas and abilities for the organization.
Q-13	My leader enlivens colleagues with enthusiasm for work.
Q-14	My leader actively exerts his/her ability to become a more valuable member in the police organization.
Q-15	My leader tries hard to do better in the work that the police organization considers important.
Q-16	My leader takes the initiative in finding and taking the lead in his/her duties to successfully complete the work that are even outside the scope of a given task.
Q-17	My leader does and contributes more than what is given when he/she is not given the role of accountability.
Q-18	My leader helps colleagues get good reviews even if he/she is not recognized.

Q-19	My leader understands the police organization's needs or goal constraints and tries hard to meet them.

2.3. Data processing and analysis method

The data processing of this study was performed by using the SPSS 23.0, a statistical package program, to perform statistical verification for the purpose of data analysis as follows:

First, frequency analysis was conducted to identify general characteristics using the SPSS/PC+23.0 program.

Second, Cronbach's α coefficient was calculated for the reliability verification of the questionnaire.

Third, One Way ANOVA was conducted to identify differences in leaders' followership according to the total length of service and the length of service at the security department.

Fourth, Chi-Square was conducted to identify connections in leaders' followership according to the total length of service and the length of service at the security department.

3. Research Results

3.1. Differences in leaders' followership according to the total length of service as a police officer

Table 3. Results of the analysis of the differences in leaders' followership according to the total length of service as a police officer.

		N	M	SD	F	sig	post-hoc
Q-1	5 years and less	13	3.7692	.72501	1.645	.170	
	6-10 years	32	3.6250	.49187			
	11-15 years	13	3.6923	.48038			
	16-20 years	13	3.9231	.49355			
	More than 20 years	20	4.0000	.64889			
Q-2	5 years and less	13	3.5385	.66023	2.814	.030	D>B
	6-10 years	32	3.5938	.61484			
	11-15 years	13	3.7692	.43853			
	16-20 years	13	3.9231	.27735			
	More than 20 years	20	4.0500	.60481			
Q-3	5 years and less	13	3.2308	.59914	3.072	.020	D>A, B
	6-10 years	32	3.3438	.70066			
	11-15 years	13	3.6154	.65044			

	16-20 years	13	3.5385	.51887			
	More than 20 years	20	3.9000	.64072			
Q-4	5 years and less	13	3.2308	.83205	2.756	.033	E>A
	6-10 years	32	3.5313	.76134			
	11-15 years	13	3.5385	.51887			
	16-20 years	13	3.8462	.37553			
	More than 20 years	20	3.9500	.68633			
Q-5	5 years and less	13	3.3077	.63043	.505	.732	
	6-10 years	32	3.4375	.66901			
	11-15 years	13	3.4615	.66023			
	16-20 years	13	3.4615	.51887			
	More than 20 years	20	3.6500	.93330			
Q-6	5 years and less	13	3.1538	.80064	.863	.489	
	6-10 years	32	3.4063	.79755			
	11-15 years	13	3.5385	.87706			
	16-20 years	13	3.4615	.66023			
	More than 20 years	20	3.6500	.74516			
Q-7	5 years and less	13	3.2308	.72501	2.509	.048	E>A
	6-10 years	32	3.4688	.62136			
	11-15 years	13	3.3846	.65044			
	16-20 years	13	3.5385	.87706			
	More than 20 years	20	3.9500	.75915			
Q-8	5 years and less	13	3.2308	.72501	.475	.754	
	6-10 years	32	3.5000	.71842			
	11-15 years	13	3.3846	.50637			

	16-20 years	13	3.5385	.96742			
	More than 20 years	20	3.5500	.75915			
Q-9	5 years and less	13	3.2308	.59914	1.312	.272	
	6-10 years	32	3.1875	.73780			
	11-15 years	13	3.0769	.64051			
	16-20 years	13	3.4615	.87706			
	More than 20 years	20	3.5500	.68633			
Q-10	5 years and less	13	3.2308	.72501	1.087	.368	
	6-10 years	32	3.3438	.60158			
	11-15 years	13	3.4615	.77625			
	16-20 years	13	3.6154	.65044			
	More than 20 years	20	3.6500	.81273			
Q-11	5 years and less	13	3.3077	.63043	2.861	.028	
	6-10 years	32	3.2500	.71842			
	11-15 years	13	3.2308	.59914			
	16-20 years	13	3.8462	.55470			
	More than 20 years	20	3.6500	.67082			
Q-12	5 years and less	13	3.3077	.63043	1.594	.183	
	6-10 years	32	3.3750	.65991			
	11-15 years	13	3.5385	.66023			
	16-20 years	13	3.6154	.50637			
	More than 20 years	20	3.8000	.83351			
Q-13	5 years and less	13	3.0000	.70711	2.945	.025	E>A
	6-10 years	32	3.3750	.70711			
	11-15 years	13	3.6154	.65044			
	16-20 years	13	3.6923	.48038			

	More than 20 years	20	3.7500	.78640			
Q-14	5 years and less	13	3.2308	.59914	1.415	.236	
	6-10 years	32	3.5313	.62136			
	11-15 years	13	3.3846	.50637			
	16-20 years	13	3.5385	.51887			
	More than 20 years	20	3.7500	.85070			
Q-15	5 years and less	13	3.3077	.75107	1.184	.324	
	6-10 years	32	3.5625	.56440			
	11-15 years	13	3.4615	.66023			
	16-20 years	13	3.8462	.55470			
	More than 20 years	20	3.5500	.75915			
Q-16	5 years and less	13	3.0000	.70711	2.763	.033	E>B
	6-10 years	32	3.0938	.64053			
	11-15 years	13	3.3077	.85485			
	16-20 years	13	3.4615	.51887			
	More than 20 years	20	3.6500	.74516			
Q-17	5 years and less	13	3.0769	.86232	3.489	.011	D>A
	6-10 years	32	3.3750	.55358			
	11-15 years	13	3.3077	.63043			
	16-20 years	13	3.9231	.49355			
	More than 20 years	20	3.6500	.74516			
Q-18	5 years and less	13	3.3077	.94733	.601	.663	
	6-10 years	32	3.4063	.79755			
	11-15 years	13	3.4615	.77625			
	16-20 years	13	3.6154	.65044			
	More than 20 years	20	3.6500	.58714			

Q-19	5 years and less	13	3.3846	.76795	1.340	.262	
	6-10 years	32	3.4375	.50402			
	11-15 years	13	3.4615	.51887			
	16-20 years	13	3.6923	.48038			
	More than 20 years	20	3.7500	.71635			

Note: A: 5 years and less, B: 6-10 years, C: 11-15 years, D: 16-20 years, E: More than 20 years.

<Table 3> shows the differences in leaders' followership according to the total length of service as a police officer. For Q-2, 16-20 years were higher than 6-10 years. For Q-3, 16-20 years were higher than 5 years and less and 6-10 years. For Q-4, more than 20 years were higher than 5 years and less. For Q-7, more than 20 years were higher than 5 years and less. For Q-13, more than 20 years were higher than 5 years and less. For Q-16, more than 20 years were higher than 6-10 years. For Q-17, 16-20 years were higher than 5 years and less.

3.2. Differences in leaders' followership according to the length of service at the security department

Table 4. Results of the analysis of the differences in leaders' followership according to the length of service at the security department.

		N	M	SD	F	sig	post-hoc
Q-1	2 years and less	16	3.6250	.61914	1.390	.251	
	3-5 years	56	3.7500	.54772			
	6-10 years	17	4.0000	.61237			
	More than 10 years	2	4.0000	.00000			
Q-2	2 years and less	16	3.5000	.73030	1.478	.226	
	3-5 years	56	3.7857	.56292			
	6-10 years	17	3.8824	.48507			
	More than 10 years	2	4.0000	.00000			
Q-3	2 years and less	16	3.2500	.77460	2.032	.115	
	3-5 years	56	3.5000	.63246			
	6-10 years	17	3.7647	.66421			
	More than 10 years	2	4.0000	.00000			

Q-4	2 years and less	16	3.2500	.85635	2.074	.109	
	3-5 years	56	3.6786	.66352			
	6-10 years	17	3.7647	.66421			
	More than 10 years	2	4.0000	.00000			
Q-5	2 years and less	16	3.2500	.68313	1.102	.353	
	3-5 years	56	3.5357	.65959			
	6-10 years	17	3.4118	.87026			
	More than 10 years	2	4.0000	.00000			
Q-6	2 years and less	16	3.1250	.80623	1.722	.168	
	3-5 years	56	3.5536	.82945			
	6-10 years	17	3.3529	.49259			
	More than 10 years	2	4.0000	.00000			
Q-7	2 years and less	16	3.1875	.75000	2.605	.057	
	3-5 years	56	3.5893	.70780			
	6-10 years	17	3.5882	.71229			
	More than 10 years	2	4.5000	.70711			
Q-8	2 years and less	16	3.3125	.79320	.805	.494	
	3-5 years	56	3.5179	.71328			
	6-10 years	17	3.3529	.78591			
	More than 10 years	2	4.0000	.00000			
Q-9	2 years and less	16	3.1250	.61914	.517	.672	
	3-5 years	56	3.3571	.77292			
	6-10 years	17	3.2353	.66421			
	More than 10 years	2	3.5000	.70711			
Q-10	2 years and less	16	3.1875	.54391	1.613	.192	

	3-5 years	56	3.5714	.73502			
	6-10 years	17	3.2941	.68599			
	More than 10 years	2	3.5000	.70711			
Q-11	2 years and less	16	3.1875	.54391	1.251	.296	
	3-5 years	56	3.4821	.73833			
	6-10 years	17	3.4118	.61835			
	More than 10 years	2	4.0000	.00000			
Q-12	2 years and less	16	3.1875	.65511	3.654	.016	D>A
	3-5 years	56	3.6250	.64842			
	6-10 years	17	3.3529	.70189			
	More than 10 years	2	4.5000	.70711			
Q-13	2 years and less	16	3.0000	.63246	3.426	.021	B>A
	3-5 years	56	3.5893	.73303			
	6-10 years	17	3.5294	.62426			
	More than 10 years	2	4.0000	.00000			
Q-14	2 years and less	16	3.2500	.57735	2.189	.095	
	3-5 years	56	3.6250	.64842			
	6-10 years	17	3.3529	.70189			
	More than 10 years	2	4.0000	.00000			
Q-15	2 years and less	16	3.2500	.57735	1.409	.246	
	3-5 years	56	3.6250	.64842			
	6-10 years	17	3.5882	.71229			
	More than 10 years	2	3.5000	.70711			
Q-16	2 years and less	16	2.9375	.68007	1.572	.202	
	3-5 years	56	3.3571	.74903			

	6-10 years	17	3.3529	.60634			
	More than 10 years	2	3.5000	.70711			
Q-17	2 years and less	16	3.1250	.80623	2.124	.103	
	3-5 years	56	3.5536	.65836			
	6-10 years	17	3.4118	.61835			
	More than 10 years	2	4.0000	.00000			
Q-18	2 years and less	16	3.1875	.83417	1.014	.391	
	3-5 years	56	3.5536	.78438			
	6-10 years	17	3.5294	.51450			
	More than 10 years	2	3.5000	.70711			
Q-19	2 years and less	16	3.3125	.60208	1.482	.225	
	3-5 years	56	3.6071	.59325			
	6-10 years	17	3.4706	.62426			
	More than 10 years	2	4.0000	.00000			

Note: A: 2 years and less, B: 3-5 years, C: 6-10 years, D: More than 10 years.

<Table 4> shows the differences in leaders' followership according to the length of service at the security department. For Q-12, more than 10 years were higher than 2 years and less.

3.3. The connection between the total length of service and the length of service at the security department

Table 5. Results of a cross-analysis between the total length of service and the length of service at the security department.

Description		Frequency (%)				Total
		The length of service at the security department				
		2 years and less	3-5 years	6-10 years	More than 10 years	
The total length of service as a police officer	5 years and less	11 (84.6)	2 (15.4)	0 (0.0)	0 (0.0)	13 (100.0)
	6-10 years	6 (15.6)	27 (84.4)	0 (0.0)	0 (0.0)	32 (100.0)
	11-15 years	0 (0.0)	11 (84.6)	2 (15.4)	0 (0.0)	13 (100.0)

	16-20 years	0 (0.0)	10 (76.9)	3 (23.1)	0 (0.0)	13 (100.0)
	More than 20 years	0 (0.0)	6 (30.0)	12 (60.0)	2 (10.0)	20 (100.0)
χ^2(p)		87.445 (0.000)***				

Note: p* <0.05, p** <0.01, p*** <0.001.

As shown in <Table 5>, an analysis on the connection between the total length of service and the length of service at the security department showed x2=87.445, p=0.000, indicating that there was a connection between them at the significance level of <0.001. The highest frequency data are as follows: 11(84.6%) of 2 years and less of the length of service at the security department for 5 years and less of the total length of service, 27(84.4%) of 3-5 years of the length of service at the security department for 6-10 years of the total length of service. 11(84.6%) of 3-5 years the length of service at the security department for 11-15 years of the total length of service, 10(76.9%) of 3-5 years of the length of service at the security department for 16-20 years of the total length of service, and 12(60.0%) of 6-10 years of the length of service at the security department for more than 20 years of the total length of service.

4. Conclusion and Discussion

For leaders' followership according to the total length of service as a police officer, those with 16 years and more showed a statistically significant difference from those with shorter length of service, which indicated that the more experience and work knowledge he or she had as a police officer, the more sound followership he or she would display including independent critical thinking and active participation as a subordinate. For leaders' followership according to the length of service at the security department, those with 3 years and more and more than 10 years showed a statistically significant difference from those with 2 years or shorter. This means that due to the characteristics of the security department, the more experience and related work knowledge they have in working on anti-communist affairs, the more followership they will demonstrate as subordinates, showing the characteristics of independent critical thinking and active participation. Therefore, it is desirable for the security department in charge of anti-communist affairs, which needs to respond quickly and appropriately to a sudden turn of events, to organize more experienced workers for a smooth demonstration of followership. In addition, the total length of service as a police officer and the length of service at the security department were found to be connected, which indicates that the longer the length of service, the more opportunities there are to work at the security department in charge of anti-communist affairs. As discussed earlier, the effect of followership according to the length of service varies, so it will be necessary to ensure the conditions to demonstrate followership suitable for the characteristics of the department by actively giving them the opportunity to work at the security department in charge of anti-communist affairs through proper personnel management during the duration of service [12][13][14][15][16][17].

The limitations of this study and further suggestions are as follows. The group-to-group analysis of individual questions regarding followership was conducted, which is too limited to check the overall effectiveness of followership. Therefore, it would be meaningful in further studies to compare the mean value of the total value of the individual items put together to determine the effectiveness of the followership. Further research will also need to determine the causal relationship of whether the length of service affects the effectiveness of the followership, as simply identifying differences in followership between groups according to the length of service is also limited to check the effectiveness of the followership.

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6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	HYY	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑
Corresponding Author*	YSI	-Corresponding ☑ -Play a decisive role in modification ☑
Co-Author	SGJ	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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MILITARY Application through Innovative Case Study of FinTech Company

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Abstract

Purpose: *This study aims to explore a new market called fintech, a combination of finance and technology; analyze Toss Corporation's innovation strategy, which secured high innovation performance and market share; and present ideas that can be applied to the military based on a simple remittance technology.*

Method: *To analyze Toss's management strategy, we examined its profit-making model that helped maintain a competitive advantage and analyzed the market. In addition, the new innovative technologies for the promotion of fintech enterprises and security of the remittance technology were analyzed, along with applicable improvements.*

Results: *Toss maximized user convenience with its innovative "remittance technology" and achieved low-cost, high-efficiency promotion through Social Network Services. It has also proven to be a very safe system through its innovative security features that can also be applied to military organizations. On the system side, a user-centered security regulation and system construction method that combines security enhancement and convenience through the need for a more convenient working environment, the applicability of bio-certification systems, and security accountability were proposed.*

Conclusion: *The analysis of Toss's innovation strategy shows that in order to succeed, a company must either explore new markets through idea development and innovation or provide customized services in a fully specialized user-friendly manner. The military also needs to take immediate and flexible action, such as continuing to find ways to reduce inefficiency due to various security regulations and corresponding materials through such case studies.*

[Keywords] ***Fintech, Toss, Biometrics, Innovation, Security Responsibility***

1. Introduction

As many things around us have been digitized by the 4th industrial revolution , various technologies are emerging to ensure that going cashless does not cause inconvenience in daily life. With the aim of realizing such new technology, the government is searching for tasks that require innovation in society and life through Information and Communications Technology(ICT), and as part of its efforts, various policies such as "Realization of a paperless society," "3D printing life," and "Ransomware responsiveness" have been reviewed and confirmed. The Bank of Korea launched phase 1 of its pilot project "Society without Coins" in April 2017, and it has been implementing phase 2 of the project from 2018 to 2020.

In June 2018, various efforts have been initiated, such as the exploration of methods to create a coin-free society, at the debate organized by the Democratic Party Yoon Ho-Jung and the Consumer Rights Forum. Companies and public institutions are recognizing the needs of consumers and are changing to survive in the market. The Toss Corporation discussed in this paper, is one of the leading companies in pursuing digital innovation while providing convenience to consumers through new ideas. The cumulative downloads of Toss exceeded 6 million in the Google Play Store, and it was selected as the 2016 App of the Year. In addition, it set an incredible record by exceeding 3 trillion won in total remittances. Toss is an application service from Viva Republica, led by Lee, Seung-gun. It entered the smartphone banking market as a simple money transfer service in February 2015. By then, the market was already saturated by big banks such as Kookmin, Shinhan, Woori, Nonghyup, Industrial Bank, and Hana Bank. However, Toss pioneered a new market called fintech(financial + technology) by offering financial services on IT based technology platforms. It provided easy remittance via smartphones when the banking market required public certificates, account numbers, and passwords. Toss has grown to be the number one company in the simple money transfer market by rapidly gaining market share before the big banks turned to these markets, sending 230,000 remittances in the second quarter of 2015, 53 million remittances in the fourth quarter of 2017, and 3.2 trillion remittances from 53 companies. However, despite successful attempts to innovate, Toss faced a management crisis followed by the launch of NaverPay, which started its service four months after Toss, launch of KakaoPay in March 2017, the introduction of simple remittance service by other major banks, and the abolition of Active by the new government in markets where security was a barrier to entry. These changes intensify competition in the market.

Therefore, this study intends to examine changes that the military needs to adopt and suggest methods to overcome Toss's crisis by changing its innovative growth.

2. Toss Management Innovation Strategy

2.1. Innovation in remittance technology

In February 2015, Toss entered the market with an innovative remittance technology called "simple remittance technology," which was different from other smartphone banking applications. The remittance process that was used in applications that already existed in the smartphone banking market is shown in <Figure 1>.

Figure 1. Original smartphone banking transfer method.

If users missed any of these three steps, they would be unable to transfer money. For example, if they did not have an OTP card, they would not be able to transfer money until they have one. The certificate is authenticated using a 13-character password consisting of alpha-numeric and symbols. Hence, it was forgotten easily and the process of obtaining a password again was more complicated because it required the input of personal information and a bank ID that is seldom used after registration. However, Toss's remittance process was relatively easy and increased customer convenience and satisfaction.

Users signed up with Toss after entering the ID and password of the public certificate. Toss accepted input of the recipient information either by entering the account number or the contact store din the phonebook. If the recipient was also a Toss member, the user was able to transfer money with in seconds. In addition, normally a corresponding fee is charged when a bank transfers money to another bank, but Toss cooperates with 18 bank sand does not charge a fee for money transfer between Toss accounts, and for the first five times in a month in case of transactions between other banks. After five times, the fee charged is as low as 500 to attract the attention of consumers and differentiate itself from other smart banking applications. Toss was able to grow rapidly in the smart banking market based on consumer expectations from this innovative remittance method. However, at the same time, many consumers expressed concern about the security of the simplified remittance method, which omitted two authentication steps: a public certificate and an OTP card.

The Toss transfer process is as follows: First, when A remits to B, the bank automatically withdraws the amount from A's account through the bank's automatic withdrawal from Toss's operating company, Viva Republica. This service allows for withdrawals without a certificate and OTP card, and allows users to access it with a simple password. In order to withdraw money this way, the company must be a registered with the approval of the Financial Supervisory Service and the Financial Services Commission, have an official business partnership with the bank, and the owner of the account must agree to the automatic withdrawal. In other words, there is no difference between Toss’s remittance system and the existing smart banking systems in terms of security because, the user performs the security authentication procedure in Toss. In addition, Toss further strengthened its information security posture by acquiring PCI DSS Level 1 certification, which is mandatory for institutions handling credit card information, after achieving ISO 27001 international information security certification in May 2017. As a result of aggressively addressing consumer concerns about security, Toss achieved 0 security incidents and attained the number one position in hacking defense levels among 25 banking apps as of March 2018. This proved the stability of Toss’s services to consumers and increased its market share.

2.2. Innovation in publicity and security

In 2015, Toss’s remittances amounted to 5.6 billion won, which was a mere 1/571 of the remittances in the fourth quarter of 2017. The number of remittances was 230,000 in that year, and was only 1/234 of those in the fourth quarter of 2017. With these numbers it can be identified that Toss has achieved remarkable growth in a short period. Toss’s growth was not merely because of the innovative transfer technology. Toss, which had a market share of nearly 0% in 2015, was able to rapidly gain an edge in the market share due to aggressive promotion strategies. Toss was first released as a small money transfer application and gained popularity among young office workers and college students who had frequent small transfers. Toss began to promote itself on Facebook by targeting the Social Network Service’s(SNSs) main customers— young people in their 20s and 30s. Through SNSs, Toss actively appealed to the target customers as a simple and easy to understand application, thus gaining an advantage in the simple money transfer app market.

Toss raised many doubts about security by simplifying the authentication process in the remittance system, but achieved top security among 25 domestic smart banking applications. Toss had no security incidents in 16 trillion won worth transfers in May 2018. It significantly surpassed the Financial Supervisory Services’ IT Supervision 557 Regulation, which recommends investing at least 5% of the total IT staff and at least 7% of the IT budget to information security.

3. Toss's Monetization Model

3.1. Profit generation through financial data analysis

Toss’s annual sales have not been disclosed to date, but net profit declared in 2015 was less than 9,900 million won. The reason was that when Toss was first launched, as a promotion strategy, up to 30 remittances per month were free of charge, and 500 won per transaction was charged thereafter. However, from April 2017, the number of free remittances was reduced to five times a month to generate revenue, and the scope of free services was changed.

Toss is an innovative financial services company that allowed customers to transfer money in

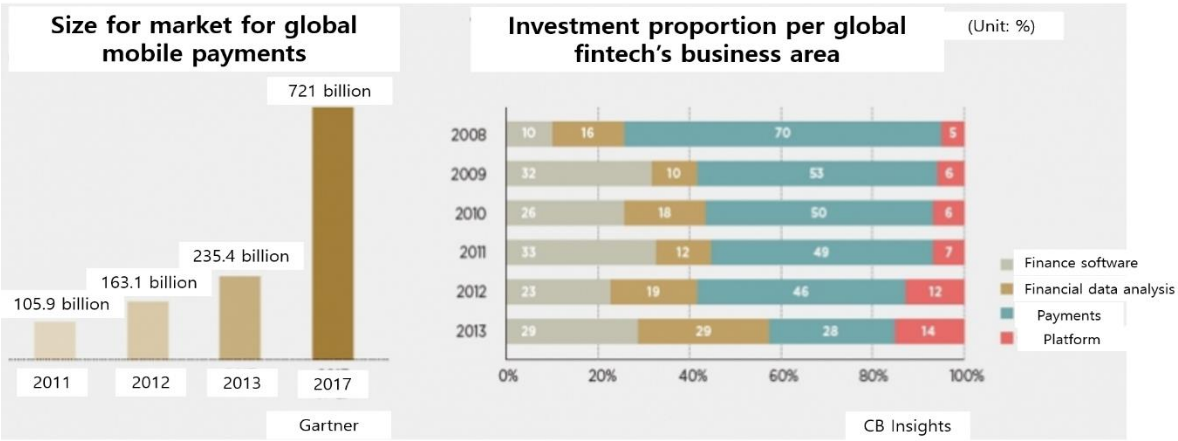
10 seconds without the need for an accredited certificate and security card. This has helped the company secure a large number of customers in a short time, and its efforts have enabled the company to continue to grow. Toss, whose cumulative remittance is more than 3 trillion won, analyzed users' financial data patterns and found that they mainly used its services to quickly borrow and repay small amounts to acquaintances. Based on the demand pattern analysis, Toss launched a 'small loan' service to lend money up to 500,000 won to customers with a loan period of 30 days. The interest rate is lower than that of commercial banks. Small loans can be reimbursed for up to 20 days in advance, in which case an additional fee will be incurred. Despite seeming expensive, it is a very useful service for customers in urgent need of small amounts of money. Toss strives to expand its profit structure by launching this new business with the help of financial data analysis beyond simple payment and settlement systems. This development potential of the company has attracted an additional investment of 55 billion won.

3.2. Profit generation through expansion of payment service

Toss provided a free remittance service and secured a large number of customers in two years after the start of the business. The absence of a proper profit structure, stressed the need for a new revenue generation structure. Hence, the company sought a new profit structure to further increase its revenues based on analysis of financial data of more than 1.5 million users. It earned good profits in the payment market because of its largest market size in fintech business areas.

The growth trend of the mobile payment market is shown in <Figure 2>. The penetration rate of smartphones increased from 2010, and hence the mobile payment settlement service market began to grow rapidly. The payment service area reached a market size of approximately 7 trillion won in 2015 and continued to grow to over 8 trillion won in 2017. Additionally, it can be seen that the portion of investment in financial data analysis and finances of software, by 2013 remained approximately 50% but has grown substantially in the following years. The payment service sector is still the largest fintech market and to generate revenue, Toss diversified in to the sector.

Figure 2. Mobile payment market growth.



3.3. Global spread of mobile payments

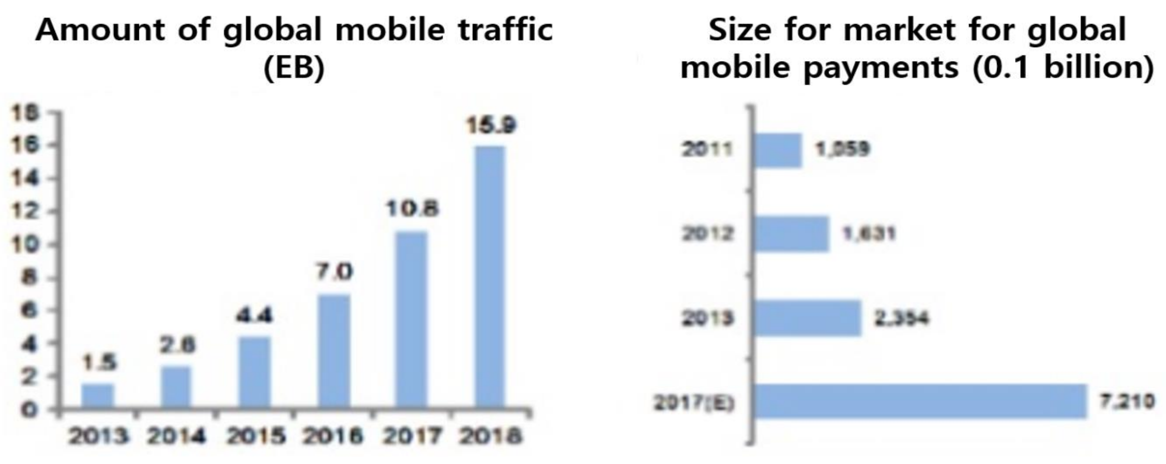
Mobile payment service is the most used service in payments business area. As the penetration rate of smartphones has risen above that of personal computers, many companies are now competing to enter the mobile payments business. The Near-Field-Communication(NFC) payment method, which makes automatic payments when a card is placed at the back of a mobile phone has been in the spotlight, especially in payments for public transportation. In addition, various mobile payments using Bluetooth technology are gaining popularity. Environmental factors also play a major role in expanding the mobile payment service market. Unlike Korea, where credit card penetration exceeds 90 %, China's credit card penetration rate is only 10 %. Therefore, the demand for mobile payment methods is high. The United States, which accounts for about 47 % of global financial fraud, is also witnessing a growing demand for secure and reliable mobile payment systems. Alipay, Weirbao, and ApplePay provide additional services thereby increasing the attractiveness of mobile payment systems. Alipay and Weirbao users are able to pay for public transportation like taxis or buses and other utility bills using their smartphones. Apple Pay is growing in conjunction with various services by adding biometrics authentication such as fingerprint recognition.

4. Toss Risk Factor Analysis

4.1. Regulation of domestic fintech business

As Internet-based services are increasing worldwide and as work is becoming dependent on mobile devices, fintech is integrating more into people's daily lives. Currently, there is a spike in the demand for investment in the fintech business as “fintech” becomes one of the keywords in the financial industry[1][2][3][4]. <Figure 3> shows the amount of the global mobile traffic and the size of the global mobile payment market provided by Cisco and Gartner, respectively. It is observed that global mobile traffic is increasing by 61% every year. The amountof mobile traffic—15.9 Exabyte in 2018 (1 Exabyte equals the storage capacity of 250 billion DVDs)—shows that the fintech business can grow further. The size of the world's mobile payment market in 2018 also increased more than three times compared to 2013 and can be seen growing rapidly.

Figure 3. Global mobile traffic volume, global mobile payment market size.



Cisco Gartner

With rapid growth in the fintech industry, investments in related industries in the global market continue to rise. Despite the boom, Korea is still in early stages of development with respect to the fintech business. This is the result of existing laws and regulations. For example, the Prohibition of Similar deposit-taking Act prohibits companies that are not authorized by financial institutions from raising money from an unspecified majority. This law was enacted to counter financial fraud. Such regulations are so strong that they prevent the growth of companies that are likely to have a positive effect in fintech markets. Only if formally authorized by the government, a company can be recognized under the Similar deposit-taking Act, and can expand its business. Even small and medium-sized enterprises that are formally licensed have significant barriers. The evaluation of the government's ability to recover from disasters, i.e., assessing whether damages can be compensated in case of security problems, is an important criterion in recognizing companies. Hence, companies are faced with the need to increase capital and build additional personnel and systems to pass e-financial registration and security screenings[5][6][7][8]. In addition, the mandatory use of programs such as Active X inconveniences individuals who use payment services and makes it difficult for the fintech business to develop in the Korean market.

4.2. The emergence of competitors

Naver Pay was launched in May, shortly after Toss in February 2015, but did not significantly affect Toss's expansion in market share. However, in February 2016, the launch of Kakao Pay by Kakao Corp, a stronger competitor than Naver Pay, threatened the expansion of Toss despite the latter being a market leader. Kakao Pay which was an easy money transfer technology similar to Toss was an additional service to KakaoTalk. Thus, nearly 100 million KakaoTalk users became potential customers of Kakao Pay at its launch. Kakao Pay acquired an equal number of app users as Toss in July 2017 and overtook it in the following month.

With the increasing competition from Kakao Pay, Toss was hit by a crisis and envisioned the need for change in the service provided. Toss began providing free credit rating inquiry/management services in February 2017[9][10]. By successfully diversifying into the small funds service, Toss increased the credibility of its e-commerce with customers who were switching to Kakao Pay. Hence many potential customers who were interested in real estate or fund investment, but hesitated due to complicated procedures, were attracted and as of November 2017 the number of users increased. In January 2018, it outperformed Kakao Pay and ranked first in terms of its market share.

4.3. ACTIVE X abolished

In 2017, President Moon Jae-in made a pledge to abolish the accredited certification system and ACTIVE X in financial transactions when he was a presidential candidate. Keeping the promise, his government introduced a restriction on the mandatory use of accredited certificates in electronic financial transactions to improve the stability and reliability of e-commerce. However, ACTIVE X is a security software plug-in that is automatically installed with Microsoft Internet Explorer which many use when making financial transactions. Even Microsoft stopped using ACTIVE X because of its security flaws. Despite these problems, according to Article 9 of the existing Electronic Financial Transactions Act, major banks have been exempted from having to indemnify the ir customers if they suffer damages while having security measures, like accredited certificate, or if they suffer damages due to security problems arising from the use of technology which is not as advanced as the accredited certificates. This led to the continued use of accredited certificates in remittances. However, the Moon Jae-in government attempted to improve the simplicity and security of e-commerce by abolishing irresponsible security policies that blame corporate customers and abolish ACTIVE X, the foundation of accredited certificates that complicate e-commerce. As a result of the government's policy, companies that adopted the accredited certificate and OTP card authentication system in the existing smart banking market are expected to provide services comparable to Toss's simple yet highly secure system. It is expected that major banks with large capitals will enter the easy remittance market and pose a threat to Toss. However, Toss not only used a highly secure automatic bank withdrawal system, but also established a security system based on biometric information, such as fingerprints, in June 2016, and was prepared to combat such threats. In particular, by extending the amount of remittances per day from 500,000 won to 2 million won, it was able to solidify its market share by attracting customers who were prone to make remittances above 500,000 won and used applications of major banks to do so.

5. Exploring Military Applications

5.1. User-oriented security regulation and system establishment

Security in the military is a key factor capable of changing the flow of victory in war. Secrets exist in individuals as well as in society and nations, but the concept of information security is of paramount importance to corporations and the military, especially in times of competition or war. In Article 2, Paragraph 1 of the Military Confidentiality Protection Act, secret is defined as “military documents, drawings, electronic records, special media records or items that is not made known to the public and if leaked may pose a clear threat to national security and are marked or notified as military secrets, and are protected with necessary measures." Exposing allies to opponents may result in the destruction of all units. Historically, military security is crucial and there is ample information that can control a battle.. Hence, it should also be noted that a system forcing users, who handle security data as part of their work, to take full responsibility for any security failures, can trigger excessive work stress and hamper users’ efficiency. For example, in the military, the security regulations require that passwords for PCs and various systems be changed every month, and this password includes letters, numbers, and special characters. Noting down the password for reference can also pose a security threat to the user. In case of the usage of public computers, an increasing number of security vulnerabilities will be exposed, trapping itself rather than safeguarding the security of the unit. To address these concerns, we will look at some possible alternatives from Toss's case that can be implemented in the military.

5.2. Use of bio certification

The number of Samsung-Pay users surpassed 88.6 million in July 18 and continues to increase, with the majority of users replacing identity verification with security measures, such as passwords, fingerprints, and iris verification. Among them, in terms of user convenience, fingerprint or iris verification are the most preferred, because it is possible to authenticate oneself by touching or looking at the mobile phone, and is not as vulnerable as a password that needs to be changed every month. Because of such convenience, many customers switch to simple payment services. According to the data released by the Bank of Korea in August 18, the average amount of simple payment service usage in the second quarter of 2007 was 3.63 million per day and the cumulative amount of transaction was 177.7 billion KRW. Introducing biometrics in electronic devices used by the military can eliminate various security regulations, such as the need to change the password every month that burdens users with continuous management of passwords in addition to their duties. Damages, such as punishment for security violations, will be eliminated. Alternatively, instead of biometrics, authentication can be performed by inserting an ID card into the device, like the system that is adopted in the US military. It is important to note that a user-centered security method is required to ensure that the users do not suffer any additional burden or inconvenience[11][12].

5.3. Security responsibility is on the system, not the user

Toss only requires a 5-digit password to be entered by the user. There are no compulsory monthly password changes or requirements to mix and match special characters. Users believe their money is in a safe system and Toss’s internal system protection ensures this. For example, when an unusual access is perceived, the Toss protection system identifies these anomalies and notifies the users to undertake necessary actions. In other words, the system assumes the responsibility of security for the user[13][14][15].

The military strongly prohibits the insertion of smartphones or unauthorized USB into computers as this act is a violation of security regulations. Although the occasional use of unauthorized storage media in the military and punishment for it is a matter of personal error, making security the personal responsibility of users will not prevent these accidents. If such mistakes persist, it can be covered by blocking the system from automatically recognizing media contained in an unauthorized USB or smartphone inserted into the laptop or military computer system. Therefore, efforts should be made to have a user-oriented system that does not sacrifice user convenience while enhancing security.

6. Conclusion

Although Korea is a challenging market for fintech companies, Tos8 continues to grow by incorporating brilliant ideas and a unique corporate culture. Toss is considered to have grown more dominant through technological and promotional innovations. Simple remittance technology based on a highly secure technology provides convenience and reliability to consumers and at the same time has become a decisive factor in competition for market share. In particular, Toss was ranked high in various security indices and recorded a monumental figure of zero security incidents as of March 2018. Further, the advantages of using Toss were highlighted through SNS by targeting those in their twenties and thirties—the majority of information technology users. Toss was able to quickly win the competition by impressing consumers with its merits and strong image. In addition, when consumers recognized the need for a credit rating service with the emergence of Kakao Pay, Toss added this service and provided other services that users did not earlier have access to, such as real estate micro-investments and micro-fund services. Through this diversification, Toss was able to persuade consumers who were in conflict between Toss and Kakao Pay, and attracted potential consumers who did not participate in the simple money transfer app market, maximizing the number of app users. In addition, the Moon Jae-in government abolished ACTIVE X and restrictions on the use of accredited certificates by major banks who were the big plyers of the smart banking market. Additionally, by using latest security policies ahead of these major banks and by increasing the amount of remittances allowed from 500,000 won to 2 million won, Toss secured a high growth trend as it was able to attract customers who made big remittances.

For a company to grow, it must not only predict future market changes but also build a sustainable and profitable business model. Therefore, Toss should improve its current profit structure and become more competitive. Though Toss has a relatively stable reputation with 6 million downloads in the Play Store, the current business structure cannot ensure sustainable profits, especially with the advent of competitors and the emergence of new technologies. As a countermeasure, Toss entered the financial data analysis sector. Toss, whose cumulative remittance amount exceeded 3 trillion won, generated profits by providing “small loan service” so that users can easily borrow money when needed. The company should start a full-fledged competition in the “Payment Service” the largest area in fintech sector, with a market size of about 8 trillion won to stay profitable. Currently, many companies are making profits by providing mobile payment services such as the NFC method, and Toss will be able to build long-term and steady profit structures by developing and providing this service.

By examining Toss’s growth process and its business analysis, it can be learnt that new companies should avoid intense competition, by opening new markets with new ideas and innovations, or provide customized services to customers in a completely specialized way. In addition, any external competitive threats must be addressed promptly and flexibly through diversification of services.

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8. Appendix

8.1. Authors contribution

	Initial name	Contribution
Author	WSK	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑ -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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A Study on the Operation KEY of Field Action Manual(FAM) that works in Disaster Sites

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Abstract

Purpose: *The purpose of the research in this paper is to derive the operating key of the manual that must be included in the preparation of the manual in order to prepare the field action manual that works at the disaster site. We want to contribute to preparing a manual of on-site action that can operate at disaster sites through critical reflection on the fact that many human casualties were caused by the failure of the prepared manual in each national disaster. The study will contribute to preparing manuals for disaster sites.*

Methods: *Research on the field action manual is insufficient. In particular, there has been no research on the key to the field action manual to operate at the disaster site. Nevertheless, the need for this research is due to the urgent need to make manuals that do not work at disaster sites into manuals that can be operated. To this end, in addition to theoretical research, we would like to study based on the insights gained from our experience in the disaster scene and military experience as a professional career soldier.*

Results: *Disaster relief agencies and various related agencies, including disaster relief agencies, will respond to disasters, and in order for them to properly respond to disasters, they must prepare manuals that can operate at disaster sites. In order for the manual to function properly at the disaster site, it must have a key to operate the manual. According to the research, the key to making the manual work at the disaster site is mission and golden time, decision making requirements, a resolution table, and various field information that affects decision making.*

Conclusion: *The reason why the manual did not work at the disaster site was that there was no key for the manual to work. It is expected that the manual will be operated on the spot if the key for operation of the manual derived from this study is prepared by including the on-site action manual during peacetime, and regular training is conducted with the decision maker taking the initiative. It will also give insight to officials preparing and training manuals. We look forward to expanding further research on the working keys of the manual.*

[Keywords] ***Field Action Manual(FAM), Manual Operation Key, Mission, Decision, Disaster Site Information***

1. Introduction

In accordance with Article 34-5 of the Framework Act on the Management of Disasters and Safety, the manual is prepared and trained during peacetime to respond based on the manual in case of a crisis. Nevertheless, in the event of a crisis in the real world, manuals would become nominal and disasters would develop into national disasters[1]. This paper began with a reflection on these problems and studied them to contribute to preparing manuals that operate in the disaster scene in crisis situations.

The scope of research for research on manuals that do not work at disaster sites was focused on the Field Action Manuals(FAM from next time on) used at actual disaster sites in the manual(standard manual, working manual, and on-site action manual). In order to re-recognise the problems of the manual that did not work, the preparation status of the on-site action manual was analyzed and further the recent disaster cases were studied.

For manuals that operate at disaster sites, manuals should be prepared so that they can be operated, and the so-called 'Manual Operation Key' was studied and presented in this paper so that it can be used at disaster sites by identifying and presenting key elements to be included in the preparation of manuals. Since there is no prior study that separately studied the "Manual Operation Key," this study used my experience in disaster scene activities, experience in commander and staff activities, and experience in auxiliary training when serving in the military.

2. The FAM Preparation Status

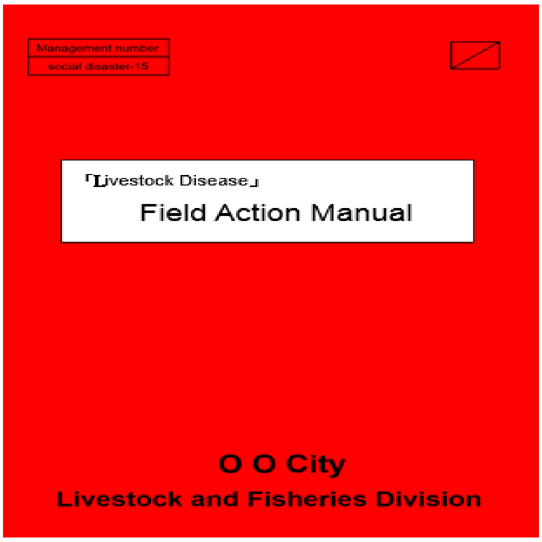
Everyone thinks of a manual that works at a disaster site, and hopes it will. Nevertheless, the manual only works at disaster sites as long as it is honestly prepared. Taking this into account, it is important to analyze and reflect on why the manual does not work at the disaster site, and through this analysis and reflection, the manual that operates at the disaster site should be prepared to prepare for a disaster.

2.1. The FAM preparation

The preparation and operation of the crisis management manual in the disaster area shall be linked in the order of the crisis management standard manual, the disaster response working manual, and the FAM[2].

The crisis management standard manual is a document that defines the duties and roles of the disaster management system and related agencies at the national level and is prepared by the head of the disaster management agency. The working manual for disaster response shall be prepared by the head of the agency in charge of disaster management and the head of the relevant agency and the head of the agency in charge of disaster management in accordance with the functions and roles prescribed in the standard manual for crisis management.

Figure 1. Cover of the FAM(e.g. livestock disease).



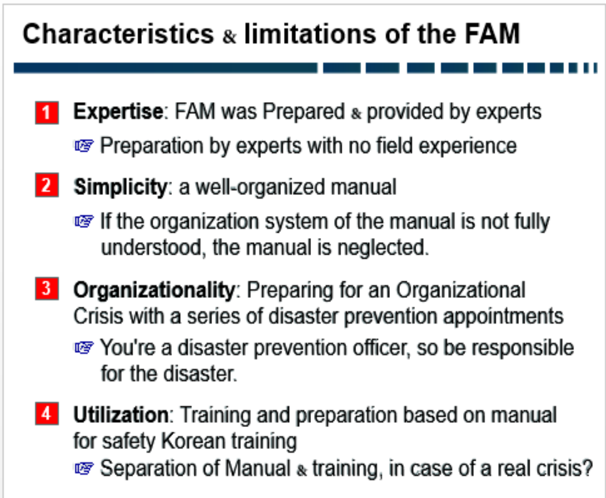
The FAM is a document containing the action procedures of the agency that performs its duties directly at the disaster site and is prepared by the head of the agency designated by the head of the agency that has prepared the crisis response working manual. The Republic of Korea has enacted the Framework Act on Disaster Management and pushed for disaster preparedness under the manual amid heightened public interest since the Daegu subway fire in 2003[3], and has completed the maintenance of the manual as of 2020. <Figure 1> is a manual cover for livestock diseases during the field action manual, and all on-site action manuals are red in consideration of their urgency[4].

2.2. The FAM preparation

Under the leadership of the Ministry of Public Administration and Security, the crisis management manual in the disaster sector has been well-organized and prepared, but in the process of organizing and preparing the manual, we would like to present problems such as <Figure 2> with some characteristics and limitations.

First, it is a matter of expertise. In preparing the manual, the Ministry of Public Administration and Security led by experts in related fields prepared and provided it to local governments, and the manual was prepared by a theory-based expert who had no field work experience. Theoretically, it is elaborately written, but the question remains whether it will work at the disaster site. In particular, the on-site action manual must be prepared by the relevant officials participating in the disaster response at the site to ensure its effectiveness, but the reality is that the manual produced by a third party expert has to have another limitation because the relevant officials have limitations in making manuals while performing their current duties.

Figure 2. Characteristics and limitations of the FAM.



Second, it is a matter of simplicity in the manual. A simplified manual was created so that it can be easily understood when looking at the manual[5]. Therefore, a manual with a well-established overall system is made, but if a person who lacks expertise in the manual structure reads the manual, it is difficult to understand, and furthermore, there are problems of storing the manual in a separate storage box but not using it.

Third, it is an organizational problem for the manual. The Ministry of Public Administration and Security tried to prepare for a crisis by appointing disaster prevention lines to improve the expertise of public officials in charge of disaster areas, but the organization of disaster management agencies, such as local governments, was in charge of disaster prevention.

Finally, it is a question of the usability of the manual. During disaster preparedness training, such as safety Korea training, the training is based on manuals, but the phenomenon of "manuals separately, years apart" has occurred, leaving questions about whether the manual will work properly in a crisis situation.

3. Recent Disaster Cases and Causes of Unoperating Manuals

Recently, the prepared FAM did not work properly at the disaster site, resulting in many casualties. There may be many causes and reasons, but I would like to analyze them at the manual level.

3.1. Recent disaster cases

On December 21, 2017, a fire broke out at the Jecheon Sports Center, killing 29 people and injuring 37 others[6]. There are many causes and reasons for the occurrence of many victims, but in terms of preparation and response to the manual, the report of delays in the occurrence of fire, the spread of damage caused by the opening of fire doors in case of evacuation using emergency stairs, the failure to maintain the status of firemen, and the failure to share information on disaster sites remain regrettable[7].

On January 26, 2018, a fire broke out at Sejong Hospital in Miryang, killing 50 people and injuring 142 others[8]. Most of the victims were elderly patients, but the evacuation plans for elderly patients who were unable to move were insufficient[9], and many mid-term disaster agency officials, including Cheong Wa Dae, showed interest in the site to the on-site commander, which also affected the on-site command.

On April 29, 2020, a fire broke out at the construction site of the Icheon Logistics Center, killing 38 people and injuring 10 others. The scene in which the CEO of the construction company fainted while coming out of the press conference due to the accident clearly showed that the priority task should be to prepare for the crisis[10].

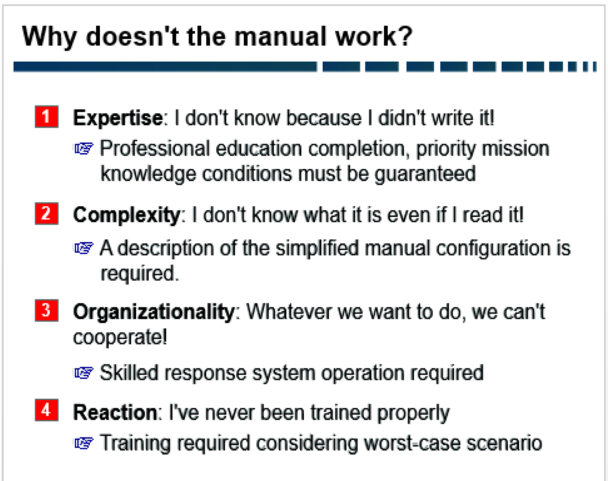
What the above-mentioned accidents have in common is the accident that has developed into a major disaster because it did not work properly at the disaster site, although it had a manual on the crisis situation.

3.2. Why doesn't the manual work at the disaster site?

Even if the manual is well prepared and well trained, the disaster site is initially confused by the limitations of human cognitive abilities. In particular, due to the uncertainty, friction, danger, dynamics, etc. of a disaster site, it takes time to be familiar with the situation in order to play a proper role in a disaster environment in which disaster officials are not familiar[11]. There are various related agencies at the disaster site, so more time is needed for the entire organization to adapt to the disaster site.

The reasons why the manual did not work properly at the disaster site without considering the specificity of the disaster site are summarized in <Figure 3>.

Figure 3. Why isn't the manual working?.



The first reason why the manual does not work at the disaster site is because of the disaster officer's expertise. It is not easy to respond to a disaster by using a manual created by a third party expert, even if it is written by a disaster official himself. Considering his experience of consulting manuals at multi-use facilities after being commissioned by the Ministry of Public Administration and Security, the safety officer at the branch of 00 companies at large companies did not read the manual for a year while on duty, even though he had a certificate of industrial safety engineer. Disaster officials should first ensure that they have professional training related to manuals and conditions for familiarization[12].

Second, it is a matter of complexity due to the simplification of the manual. It was simplified and written to enhance awareness of the manual, but in the view of disaster officials who did not write it themselves, the simplicity rather comes as an incomprehensible complexity. Only when a simplified manual has a specific description of its composition and composition, will the practitioner be able to read and understand it.

Third, it is a disaster preparedness problem at an organizational level. Disaster preparedness by disaster prevention series is expected to guarantee expertise, but local governments, in contrast, are operated mainly on civil service welfare, so even if disaster prevention officials want to do anything to prepare for disasters, cooperation from neighboring departments is often poor. The government should be prepared to ensure that the system for responding to disasters is in operation throughout local disasters can be put into operation.

Finally, training considering the worst scenario is required to increase responsiveness to disaster situations[13]. Without manual training, the manual will not work properly in a disaster situation.

4. What are the Keys for Manuals that Operate in Disaster Situations?

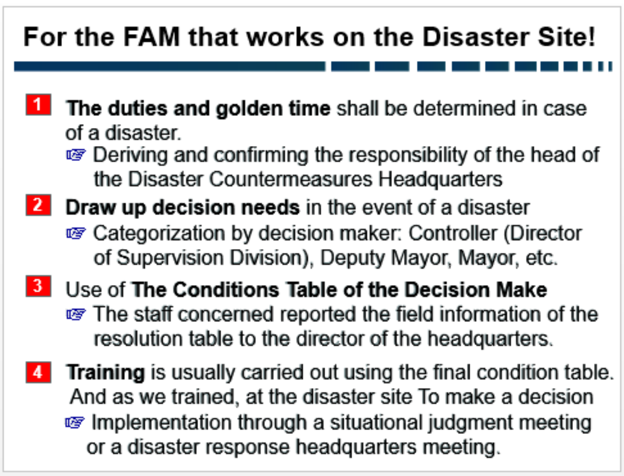
What is the key to make the manual work properly in a disaster situation? Since there is no existing research on the key that allows the manual to function properly in a disaster situation, I studied the key of the working manual that can be used at a disaster site using my military and disaster experience.

4.1. The FAM operation key

In order for the on-site action manual to work, a key must be prepared to operate the manual from peacetime, taking into account the characteristics of the disaster site, such as uncertainty, friction, danger and dynamism. It was named "Manual Operation Key" in the sense that the manual should be prepared in advance to operate automatically in case of a crisis.

The keys for the manual to work at the disaster site can be aggregated into tasks, golden times, decision demands, resolution tables, and peacetime training, as in <Figure 4>

Figure 4. For the FAM that works on the disaster site.



First of all, "Mission and Golden Time" sets missions and golden times in the preparation manual in case of a disaster. Since the mission and golden time play a central role in which all disaster response efforts at the disaster response headquarters can be concentrated and integrated, they should be derived, finalized and reflected in the manual under the responsibility of the head of the disaster response headquarters. Since it is to determine what(mission) should be carried out at the disaster site(including the disaster situation room and disaster response headquarters) until when(golden time), it is necessary to carefully select all of its capabilities with the head of the disaster response headquarters in order to take the first step toward proper operation of the manual.

Second, the manual should reflect the decision requirements necessary to carry out the mission within Golden Time at the disaster site. Of course, experienced officials at the disaster headquarters may be able to respond to the disaster by drawing up decision-making requirements in real-time at the disaster site. However, in order to properly respond to disaster sites that act on uncertainty, risk, friction and dynamics, it is necessary to draw up and prepare decision-making requirements in the manual during peacetime.

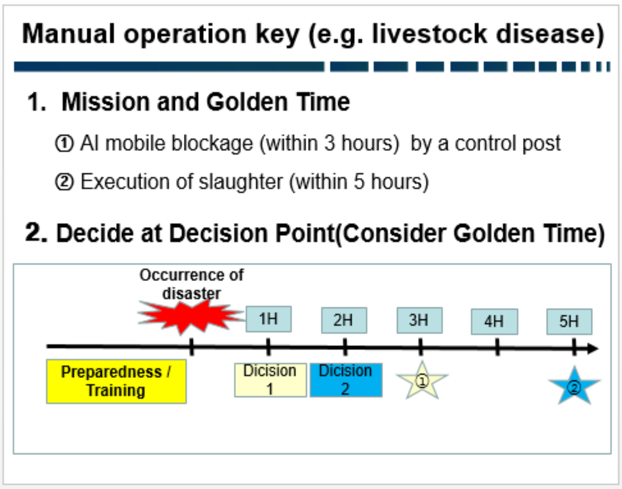
Third, it is preparation of the final condition table. If the decision conditions are met by the decision requirements, timely disaster response will be possible by making a decision quickly and implementing it. The decision criteria table will be judged effectively by utilizing the factors [14] that Kim Sung-geun and Lee Young-jae(2017) consider for assessing the situation of the disaster site.

Finally, training is based on the prepared manual[15]. The manual will work properly at the disaster site if it is used to make decisions and implement them at the disaster site as it is usually trained and trained using the manual will work properly at the disaster site.

4.2. Manual operation key preparation example

I would like to present an example of preparing a manual key for livestock disease. Livestock diseases are a type of livestock infectious disease, and the most important task is to take measures to prevent the spread of infectious diseases. The sooner, the better, the sooner, the sooner, the better, but within three hours of the shutdown and within five hours of the killing. The reason why the golden time is set is because equipment and supplies from related agencies can be the standard for dispatch to the disaster scene from the resolution of the local government's disaster response headquarters. <Figure 5 > uses examples of livestock diseases to show missions, golden times, and decision making.

Figure 5. Manual operation key example of livestock disease.



In the case of livestock disease, the mission and golden time were determined to be AI(bird flu) mobile block(within three hours) and killing within five hours by operating a mobile control post. In order to block the movement within three hours, the decision maker must make a decision at Point 1 of the resolution, one hour after the incident, in order for the equipment and materials of the relevant authorities and related agencies to be operated on the site. It also shows that in order to perform the killing within five hours, the decision on the killing must be made two hours after the occurrence of the event.

In order for the head of the disaster response headquarters to decide to block the movement within an hour and decide to kill within two hours, the manual needs to prepare a final condition table. <Figure 6> shows the use of a resolution table for the decision to block movement and kill livestock.

In order to decide on the "decision to set up a mobile control center within one hour of AI outbreak" in the final condition table of livestock disease, conditions 1 to 4 must be met, and conditions 2 to 4 must be met before the director can make a decision, and conditions 2 to 4 can be confirmed within golden time, but related information must be verified for Decision 1 to be implemented. The head of the headquarters will decide after receiving a report from the relevant section chief that the conditions of the resolution figure are met, and the director of the department in charge will execute it and the manual will work. If Resolution 2 is reflected in the peacetime manual in the same way, the mission will be carried out based on the manual without panic even if a real crisis occurs[16].

Figure 6. Decision making using the resolution criteria figure(e.g. livestock disease).

Dicision 1	Decide to set up a mobile control center within one hour of AI outbreak. (Mobile control center installation and operation within three hours)	Decision maker (Director)
Codicion 1 (Core)	Are local government officials and related agencies ready to perform their duties?	The Chief of Livestock & Fisheries(Reporter)
Codicion 2	Are AI outbreaks specific?	The Chief of agricultural administration(Reporter)
Codicion 3	Have you decided where to set up the AI mobile control center?	The Chief of Livestock & Fisheries(Reporter)
Codicion 4	Did you check the spread factors of AI (feed car, transport vehicle, etc.)?	The Chief of agricultural administration(Reporter)
Codicion 5	Additional Information Required (Live Situation Reflected)	Related section chief
If then	Determination to install Mobile Control Center / Implementation of installation	Director/The Chief of Livestock & Fisheries

5. A Policy Suggestion

Based on the results obtained from this study, I would like to make some policy suggestions to supplement the actual on-site action manual and to ensure that the manual works in the event of a crisis. First, the manual should be supplemented considering the operating keys of the manual presented in this study. The task, golden time, and decision requirements shall be derived for each type of on-site action manual, and a resolution condition table for each decision need shall be prepared so that the head of the Disaster Prevention Headquarters can make a decision in the event of a crisis, and the manual shall be updated from peacetime to quickly identify and report relevant on-site information[17].

Second, regular training shall be conducted based on the on-site action manual created. The Disaster Countermeasures Headquarters training is to collect and analyze disaster site information necessary for the resolution, report it to the head of the headquarters, and train the decision maker to implement it when the decision maker makes a decision.

Third, disaster officials who are members of the Disaster Prevention Headquarters should be trained[18] field action manuals. It should be thought that once a manual is made, disaster preparedness will begin from then on, not the end of disaster preparedness. The prepared manual must be familiar to all members of the disaster response headquarters so that they can respond organically in case of a crisis.

Finally, a person responsible for each disaster management agency and type of disaster shall be designated to update the manual continuously. Once created, the manual is only the beginning. After the new information is updated or trained, the supplementary information, etc. should be reflected in the manual. For this purpose, a manual officer should be designated and operated.

6. Conclusion

In the above, we looked into why the on-site action manual could not work in a disaster situation and why the manual did not work in the latest disaster cases. He also presented a so-called 'Manual Operation Key' for manuals that can work in times of crisis. The 'Manual Operation Key' provides examples of identifying tasks and golden times for disaster response, deriving decision needs to perform the mission within Golden Time, then incorporating a table of decision conditions into the manual for each decision need and updating the disaster site information needed for determination. Manuals that reflect the operating keys of the manual should be thoroughly familiar with and mastered by the relevant officials so that they can operate in any disaster situation by periodically training the prepared manuals, not by the end of preparation. To this end, four policy proposals were made. In any case, we hope that this research will be actively used to prepare for the on-site action manual, and we hope that it will be used to provide insight into disaster preparedness and response to officials who overcome all kinds of risks at difficult disaster sites.

Since there was no theoretical prior study on the "Manual Operation Key," the theoretical study was not conducted in depth, and based on my military experience and disaster site experience, I presented the "Manual Operation Key" based on this study, I hope that the theoretical study will be further expanded.

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8. Appendix

8.1. Authors contribution

	Initial name	Contribution
Lead Author	SGK	-Set of concepts ☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑ -Corresponding ☑ -Play a decisive role in modification ☑
Corresponding Author*	CSC	-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑

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A Study on the Facilitation Factors of NON-COMMISSIONED Officer's Field Leadership: Focused on Delphi and AHP Method

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Abstract

Purpose: *The study applied Delphi and AHP method to analyze the factors that can promote Non-commissioned officers(NCO)' field leadership in about 30 experts.*

Method: *First, we will look at 'NCO Comprehensive Development 2.0' in conjunction with Defense Reform 2.0. Afterward, the Delphi method is applied to a group of experts to promote the survey items that affect the field leadership of NCO as three major factors and nine lower fields. Finally, the deciding factors are prioritized using AHP techniques. According to 'NCO Comprehensive Development 2.0', the army plans to make active efforts to ensure that NCO in the fourth industrial revolution era will become expert warriors in individual and small unit combat, leaders that soldiers follow on their own and connectors with smooth communication, by 2025. The survey of a group of experts applying the Delphi method conducted the first open questions and gradually induced the selective questions to reflect the expert's feedback and finally completed the survey items.*

Results: *The results of the AHP analysis and the Delphi method selected were found to have the highest identification of improvement in the working environment and organizational culture, followed by the selection and training of NCO and enhancement of leadership capabilities.*

Conclusion: *The study is meaningful in analyzing the factors that could facilitate NCO's field leadership by utilizing Delphi and AHP methods.*

[Keywords] ***NCO(Non-Commissioned Officer), Field Leadership, Fourth Industrial Revolution, Hyper-Connected Society, Defense Reform 2.0***

1. Introduction

Expectations for denuclearization and peace on the Korean Peninsula have been raised. Behind the scenes were the military agreement between South-North Korea and the summit between China and the United States, which lasted until the end of last year.

Amid the drastic change in the security environment, the annual ROK-US Alliance Combined Training has drastically reduced the duration, size of participation, and scope of training and U.S. strategic assets to the Korean Peninsula also been halted. In particular, concerns over military readiness posture were raised, with various exercises prohibited under the inter-Korean military agreement. Besides, the Korean Peninsula's security environment has been deteriorating again, with North Korea conducting 16 missile tests since the failure of the North Korea-U.S. summit in Hanoi in February 2019[1].

The military's workforce structure is also undergoing significant changes due to troop reductions following the implementation of Defense Reform 2.0. Moreover, the advent of human population cliffs, the Army is carrying out 'NCO Comprehensive Development 2.0' without a hitch to develop the duties and roles of NCO while actively promoting the reduction of troops, shortening the service period of soldiers, and artificial intelligence and unmanned combat systems following the Fourth Industrial Revolution[1]. As of 2018, about 400,000 of the 600,000 military personnel are composed of soldiers, but once Defense Reform 2.0 is completed, the number of military personnel will be reduced to 500,000, mainly soldiers and officers[2]. Besides, the role and responsibility of NCO are becoming more important as the rapid population reduction is taking place in line with the social low birth rate trend, which naturally leads to troop reduction. As a result, the number of soldiers will decrease absolutely, and the proportion of officers and NCO will increase accordingly. Therefore, NCO who play the pivotal role of the military will become more critical.

As NCO' role has increased, the Army has long been pushing for measures to enhance NCO' expertise and improve their service conditions through the NCO Comprehensive Development 2.0[3].

The Army is working on a grand blueprint for "fostering correct, competent, dedicated, strong and proud NCO" to 2025. NCO of the future Army are evolving as experts in individual and small unit battles, leaders who follow soldiers with actions, and connectors that can smoothly connect 'the officers and soldiers, orders and execution, plan and results, people and the military, past and future.' It is also pushing for innovation in various systems, capacity development, organizational culture[4].

It is expected that the field leadership of NCO at each level will be essential to the discipline, guide, and manage the series of courses from basic training that soldiers will first join the military to adapt to the troops and live smoothly after deployment battalion[5][6][7][8][9][10]. Besides, with the advent of hyper-connected society, information, and communication technology, which has developed more rapidly in the era of the third industrial revolution, is having a tremendous impact on the inside the military. The current millennial generation, who are very familiar with smartphones and Social Media, is good at posting and sharing their lives. It could serve as an 'Achilles' heel' in the military where security is vital. Every move made in the military can be quickly exposed to society and even to the enemy. As the existing closed-minded military became open-minded, it became necessary to prevent and periodically manage accidents in advance through education. As a result, the demand for NCO's field leadership is also increased. After all, demand from military leaders(officers) and soldiers for the field leadership of NCO, who can professionally replace the role of quantitatively dwindling soldiers, is very high.

Isn't there any real challenge for NCO to exercise effective field leadership in this environment? This research was started with the idea that.

2. Selection of Analysis Factors Applied by Delphi Method

2.1. Selection of expert groups

Currently, there are many realistic limitations to smoothly exercise leadership in the field when looking at the role of NCO from various perspectives and the corresponding leadership. A group of experts was chosen as NCO because they thought NCO needed to identify their elements of leadership limitations, not from other classes.

The first group was selected by mail and wire to 300 NCO. Of these 300, 100 were selected as the second group, with more than a year of experience as soldiers. The reason for choosing them is that they are familiar with soldiers' lives, understand their thoughts and activities to a certain extent, and have a will to continue their service. Among the last 100 selected people, criteria were needed to select real experts. Therefore, NCO with less than five years of retirement, lacking experience, or opposite positions, were excluded. The reason for this is that the beginner did not understand everything through his short experience, and veterans, whose retirement is just around the corner, tend to put more emphasis on his own experience than on an objective perspective. Therefore, the criteria for selecting a group of experts were selected from 15 to 25 years of military experience.

The spectrum was judged to be a suitable target for understanding both the changing system, the old and the new generation, and 64 out of 100 were selected as a result. Since then, there were many NCO with various positions in various fields, and some fields were excluded on the basis of whether they had command experience in line with the purpose of a survey of experts in the field. Finally, it was based on whether he had ever worked in a field where various opinions could be heard vividly and lived with soldiers while training, working, and managing the unit. In particular, 30 out of 64 people were finally selected to form a group of experts by filtering out their recent experience and NCO. As shown in the following <Table 1>.

Table 1. Select survey targets for experts.

Targets	NCO	NCO who experienced the soldier	NCO who experienced the soldier + career of more than 15 years	NCO who experienced the soldier + career of more than 15 years + Command Activity Experience
Quantity (people)	300	100	64	30

After the selection, the first study selected six representative leaderships of different personalities out of numerous modern leadership. The six representative leadership required for the NCO was selected through three one-on-one interviews with military experts, as shown in <Table 2> by applying Delphi techniques.

Table 2. Leadership survey for experts.

Survey	Leadership
1st Survey	Servant leadership, coaching leadership, transformational leadership, charismatic leadership, empowering leadership, participatory leadership, vision leadership, emotional leadership, partner-type leadership, power leadership, strategic leadership, democratic leadership, affirmative leadership, self-leadership, mission-oriented leadership, entrepreneurship leadership, issue leadership, team leadership, ethical leadership, transactional leadership, great leadership
2nd Survey	Servant leadership(20), coaching leadership(20), transformation leadership(18), charismatic leadership(20), empowering leadership(20), trading leadership(18), participatory leadership(16), vision leadership(15), partner leadership(16), power leadership(15)
3rd Survey	Servant leadership(20), coaching leadership(20), transformative leadership(20), charismatic leadership(19), empowering leadership(18), transactional leadership(17)

The interviewee was selected as a combatant through a three-dimensional evaluation of shooting, combat strength, and main skills among the NCO in the Army who have served for more than 15 years.

In particular, 20 exemplary NCO with experience in command(Squad leader, platoon leader, company commander) and leadership education were selected as those with experience in direct training at the Soldier Squad leader's educational institution or NCO educational institution.

The initial interview asked open questions about the preferred field leadership of the NCO, and 10 of the identified leadership between the initial interviews were selected during the interim interview, and the final interview required the final 10 of them to be re-selected. Finally, the six representative leadership types with the highest score were selected, and the remaining four leadership types were excluded from the survey category with deficient scores of 3 to 5[11][12][13].

2. Selection of analysis factors applied by Delphi Method

2.2. Determining survey items

An expert awareness survey of NCO's field leadership was organized by applying the Delphi techniques.

In this study, a survey using Delphi technique was conducted and analyzed in three stages over two months in an open-type to funnel type. As shown in <Table 3>.

Table 3. Steps to refine the delphi survey.

Step 1		Step 2		Step 3		
Open Question by e-mail	⇨	Inquiries about survey items by e-mail	⇨	telephone conversations and face-to-face interviews	⇨	Determining the final survey item

It is the same as the general expert judgment technique to calculate the cost by placing importance on experience when selecting experts. However, Delphi techniques use coordinators so that experts are not affected by prejudice or mood. First, 30 elected NCO were asked by open questions if there were any obstacles to the NCO exercising their field leadership by using social media such as text messages, e-mail, Kakao Talk, Facebook, and Instagram. As shown in the following <Table 4>.

Table 4. Open survey results summary.

· When selecting NCO, it is necessary to increase the barriers to entry into the military by strengthening evaluation criteria such as personality, group spirit, and military expertise(ex. police officer, fire fighter).
· A more professional and systematic leadership education is needed in a training institution.
· As more and more people lack mannerism and active-moving as they settle for a period of stagnation in promotion of bosses and promotion of master sergeant, the overall perception of NCO is getting worse.
· There are many NCO who have no expertise in their duties. Efforts are needed for self-development.
· NCO should try to become complementary to each other from their relationship with officers, and it is necessary for officers to respect NCO as colleagues.
· Field leadership training is required to suit the reality of field units.
· Receive unilateral instructions from an officer and passive-moving only because he does not have the right to make decisions.
· The workload of NCO has become exorbitant, and the authority and responsibility are granted, but in the end, if problems arise, the NCO who is fully responsible for the work must take responsibility.

· In some cases, officers look down on NCO as subordinates and ignore them to prevent NCO from exercising their abilities. To accomplish a mission, one orders emotionally, with one's rank ahead rather than rational judgment.
· It is urgent for NCO to take responsibility and prepare the atmosphere and conditions in which they can perform their duties.
· Under the pretext of being a NCO, the work has only increased, causing more stress.

First, the opinions of each of the various experts(selected 30 NCO) were collected and aggregated. The results were then communicated to everyone so that they could share and iron out differences. At this time, the adjustment process is not limited to one time, but the same process is repeated several times, and if the result(cost) is finally matched, it is calculated as development cost. Quantitative and qualitative assessments were also conducted so that opinions on the field could be heard, not finished in a one-dimensional survey. Through this, the contents of the survey were questioned without any doubt, and the interview was conducted honestly.

In the second survey, a large factor was selected based on the results of the first survey and detailed factors were selected accordingly. However, this time, experts began to react negatively to the term 'Obstruction factor' as an optional survey was conducted.

Since all experts have served in the military for more than 15 years, they preferred more positive expressions because of their inherent organizational characteristics and conservative tendencies. As a result, all the questions were inevitably changed to positive ones, and the survey was repeated to develop the items.

What was a bit disappointing was that all the experts are working in their current positions, so gathering in one place is practically limited. As a result, the survey was compiled through social media and phone calls, so it is also informed in advance that sufficient communication between each other has not been achieved.

As a result, three major factors and nine lower fields were selected to apply the AHP technique, as shown in <Table 5> below.

Table 5. Setting up survey items for applying AHP method.

Major factors	Lower fields
1. Complementing the selection and training system	1.1 Personality tests and selection criteria between NCO should be raised.
	1.2 The link of leadership education in the training course should be maintained.
	1.3 Classes shall be added to promote job satisfaction.
2. Leadership capacity enhancement	2.1 Voluntary efforts are needed to develop leadership competencies.
	2.2 Opportunities for communication between the higher and lower ranks shall be provided.
	2.3 Leadership opportunity education should be expanded to suit field conditions.
3. Organizational culture improvement	3.1 Appropriate authority shall be granted according to responsibility.

	3.2 A self-directed mission environment shall be created.
	3.3 Measures are needed to relieve excessive work stress.

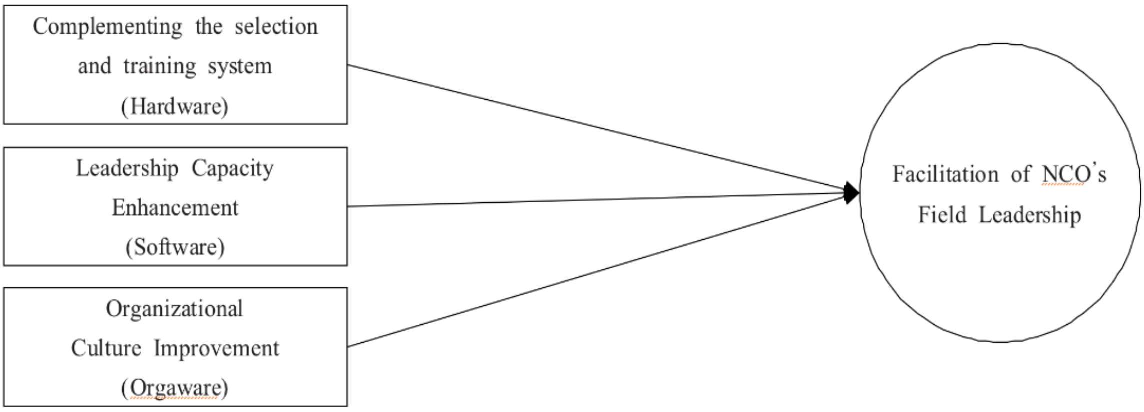
3. Selection of Analysis Factors Applied by Delphi Method

3.1. AHP research model and hierarchy design

The research model for analyzing the factors of field leadership facilitation of NCO is shown in <Figure 1>. The researchmodel determined three areas of the system as the dominant factors through expert recognition surveys using Delphi techniques.

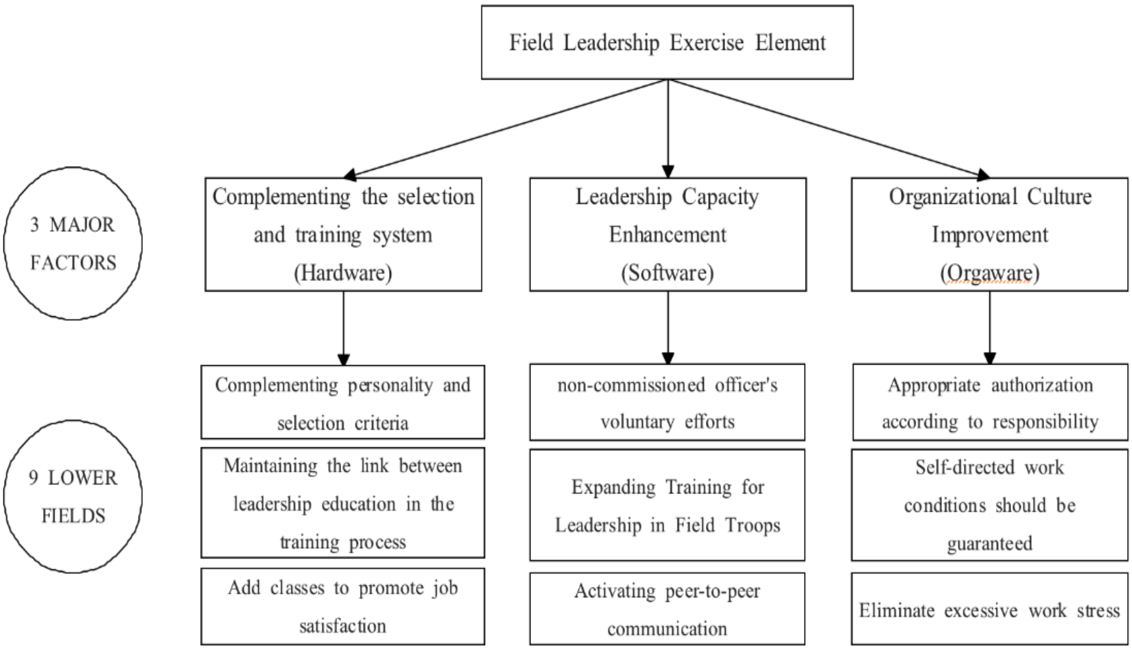
In hardware, selection of adverts and strengthening of the training system through strict enforcement of laws, systems and regulations was selected. In software, valued 'strengthening the field leadership capacity of NCO through self-effort, opportunity education was selected. Lastly, in Orgaware, substantial improvement to the army’s organizational culture was the dominant factor in facilitating the leadership of NCO.

Figure 1. NCO’s field leadership promotion research model.



Based on these structured research models, the hierarchy, according to the Analytical Hierarchy Process(AHP) for factor analysis that promotes the on-site leadership of NCO, is shown in <Figure 2>.

Figure 2. NCO's field leadership promotion hierarchy design.



Analyzing experts' surveys in the exercise of field leadership is divided into three categories, as shown above. The major factors, divided into three, is again divided into three lower fields.

The first is complementing the selection and training system in the hardware section. The lower fields resulted in the addition of classes for job satisfaction, the link between a personality test and selection criteria, and leadership education. In particular, the addition of classes for job satisfaction has raised concerns about identity due to the current four-tier NCO hierarchy. In addition, there was a qualitative assessment that the job satisfaction level was significantly reduced because there were no more goals after the promotion of the master sergeant.

The second is the leadership capacity enhancement in the software section. The lower fields resulted in the need for voluntary efforts of NCO, active communication between colleagues, and Expanding Training for Leadership in Field Troops. What is noteworthy here is that voluntary efforts by NCO are needed. It is to recognize the internal problems by itself and emphasize those NCO should change themselves.

The third is the improvement of the organizational culture in the army in orgaware section. The lower fields resulted in the need to give proper authority according to responsibility, guarantee self-directed working conditions, and relieve stress on excessive work. The main point is that responsibilities should be appropriately empowered. In other words, the right should be adequately given so that leadership can be exercised through more effective mission execution.

3.2. Analysis results of AHP method

The AHP analysis results on the facilitation factors of NCO's field leadership are shown in <Table 6>. In the AHP survey, all 30 people were reasonably assessed to have a CI value of less than 0.1.

In the major factors, the highest opinion was orgaware that there was a need for substantial improvement in the army's organizational culture. The factors of complementing the selection and training system in hardware was next, and the field leadership capacity of NCO in software was relatively low.

The specific importance of each field is as follows.

The highest weighting was the opinion that the NCO in (2)software should make efforts to develop their leadership capabilities. It can be seen as a concern about the tendency of N-generation that NCO(mostly beginners) neglect self-development during work or after work, rather than developing the counseling and combat skills necessary for field leadership.

Table 6. Weight by assessment item.

Tasks	Evaluation item	Priority
Major factor	1. Complementing the selection and training system.	2
	2. Leadership Capacity Enhancement.	3
	3. Organizational Culture Improvement.	1
Hardware field (1)	1.1 Personality tests and selection criteria between NCO should be raised.	2
	1.2 The link to leadership education in the training course should be maintained.	3
	1.3 Classes shall be added to promote job satisfaction.	1
Software field (2)	2.1 Voluntary efforts are needed to develop leadership competencies.	1
	2.2 Opportunities for communication between the higher and lower ranks shall be provided.	3
	2.3 Leadership opportunity education should be expanded to suit field conditions.	2
Orgaware field (3)	3.1 Appropriate authority shall be granted according to responsibility.	1
	3.2 A self-directed mission environment shall be created.	3
	3.3 Measures are needed to relieve excessive work stress.	2

The second-highest weighting item is the (3)orgaware. It means that before the NCO are held accountable for the consequences, they should first look at whether the authority to follow the responsibilities has been properly granted. A group of experts said that NCO are perceived as "responsible but not authorized." Therefore, officers should be able to properly empower in line with the position and duties of the NCO. It is necessary to ensure that the NCO can take the lead in his work to suit the role of a follower.

The third highest weighting item is (1)hardware. The plan to increase the current four-tier to the five-tier class system was the highest to resolve the long-term stagnation within the classes and to motivate the job. The plan was an issue that was actively reviewed by the military, but it was a pending policy due to difficulties securing the budget and lack of consensus.

Priorities on items that may facilitate the exercise of field leadership by NCO are shown in <Table 7>.

Table 7. Priority by assessment item.

	Evaluation item	Weight
1	3.1 Appropriate authority shall be granted according to responsibility.	0.188
2	1.3 Classes shall be added to promote job satisfaction.	0.152

3	2.1 Voluntary efforts are needed to develop leadership competencies.	0.144
4	1.1 Personality tests and selection criteria between NCO should be raised.	0.141
5	3.3 Measures are needed to relieve excessive work stress.	0.108
6	3.2 A self-directed mission environment shall be created.	0.094
7	2.3 Leadership opportunity education should be expanded to suit field conditions.	0.068
8	2.2 Opportunities for communication between the higher and lower ranks shall be provided.	0.062
9	1.2 The link to leadership education in the training course should be maintained.	0.043

Each of the three major factors was weighted individually. Therefore, the total of nine fields of groups were not ranked among all nine, but weighted in the major factors so that they could be ranked from 1st to 9th.

The overall order of items was identified in order of appropriate authorization, the addition of rank, and voluntary self-development. It is essential to give proper authority to the NCO who exercises field leadership. In order for NCO to carry out their duties with a sense of ownership, proper authorization of responsibility should come first before holding them accountable for the consequences.

NCO may easily fall into mannerism and passively perform his duties due to his long-term work in a position in a unit. In order to improve the unique working environment of NCO, structural systems are needed, and measures and efforts must be taken to overcome these problems themselves.

Realistically, the military's unique culture, which values results rather than process, will not change easily. Also, noteworthy here is the fourth-place factor. When selecting NCO in the hardware field, the opinion that personality tests and selection criteria need to be raised is thought to require in-depth consideration.

4. Conclusion and Implication

Today, NCO' status has improved a lot compared to the past, including job security, academic background and so on. Many improvements have been made in salary, pension system, and residential environment, and NCO have also increased their knowledge levels, mostly college graduates. It is no longer difficult to find someone with a master's degree or doctorate. Despite the considerable number of highly educated personnel, 'What does it mean that we need to test our personality and raise selection criteria for the selection?'

The army is a group with a particular purpose of national defense, an organization that requires obedience to orders, community consciousness, strong will to fight, and sacrifice. Some so many people cannot quickly adapt to the military amid a clear gap from the rapidly changing society in modern times. Therefore, the field leadership of NCO should be dealt with deeply and in-depth research and countermeasures will be needed in conjunction with the progress of NCO Comprehensive Development 2.0

The significance and limitations of the research are rapidly spreading to the military the advanced technologies of AI+ICBMS in the fourth industrial revolution amid the high interest of Defense Reform 2.0. Interest in field leadership of NCO with soldiers is also rising due to troop reductions, shorter service periods, the importance of life, and the advent of hyper-connected societies. With the population cliff emerging as a serious social issue in recent years, indeed, interest in 'NCO Comprehensive Development 2.0' is not high compared to the Defense Reform 2.0[14][15]. NCO Comprehensive Development 2.0 is a crucial project that has long been pursued in conjunction with reducing troops due to the population cliff, the development of defense technology in the era of the fourth industrial revolution, and the enhancement of NCO' expertise, and the improvement of service conditions. Nevertheless, little progress has been made until recently in expanding the number of NCO, developing leadership, and specialization under the NCO Comprehensive Development 2.0[16][17][18][19][20][21].

In this study, it has been surveyed the factors that impede the field leadership of NCO in the rapidly changing environment. We examined the expert group's perception of how to promote the field leadership exercise of NCO. A group of experts for the survey was selected from among NCO who served as soldiers and served in the military for more than 15 years as experienced leaders, including squad leaders, deputy commanders, and company commanders.

The survey items were conducted with open and optional questions by applying Delphi techniques, and quantitative analyses were conducted throughout three stages. Furthermore, qualitative analysis was added to the listener's opinions.

Additionally, we examined the expert group's perception of how to promote the field leadership exercise of NCO. A group of experts for the survey was selected from among NCO who served as soldiers and served in the military for more than 15 years as experienced leaders, including squad leader, platoon leader and company commander.

The survey items were conducted with open and optional questions by applying Delphi techniques, and quantitative analyses were conducted for three stages. Furthermore, qualitative analysis was added to the listener's opinions.

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6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	DGL	-Set of concepts☑ -Design ☑ -Getting results ☑ -Analysis ☑ -Make a significant contribution to collection ☑ -Final approval of the paper ☑
Corresponding Author*	SJP	-Corresponding ☑ -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ -Participants in Drafting and Revising Papers ☑ -Someone who can explain all aspects of the paper ☑
Co-Author	YSL	-Getting results ☑ -Analysis ☑ - Play a decisive role in modification ☑