Managing Technology Transfer in the Korean Military Establishment

Hong, Dae Sun *

I. INTRODUCTION

Korea, one of the poorest countries in the world until early in the 1960's, has maintained a continuous growth in economy and defense power.

From a position uncomfortably close to the bottom of the international income scale and without the benefit of significant natural resources, Korea embarked on a course of industrial growth that became one of the outstanding success stories in international development.[1]

International economic situations and the internal environment in the Korean peninsula will not necessarily be favorable to the future of Korea. To overcome anticipated difficulties, Korea badly needs the support of sience and technology in both economic and military areas. In modern society, science and technology are considered much more important than other fields.

Economic power is the most important force behind any nation's strength, but it can not be maintained without the backup of science and technology. Modern technology is changing so rapidly that today's new technology will be old by tomorrow. Without securing a high level of original technology and the support of science, it is obvious that one nation might fall behind in international competition.

In the particular case of Korea, rapid expansion of the GNP and exports have been made, and the level of technology also has risen through the past several ecnomic development and implementation plans. But because export of the poducts by both, light and labor intensive industry is losing its superior position and confronting its limitations, competition with advanced industrial coununtries is inevitable. This competition will be in technology through the growth of skill intensive industries such as mechanical,

* 国防部 体系分析室

metallurgical, elctrical, and electronics industries which need a heavy industrial base and innovational research and devlopment.[2]

Korea has achieved remarkable military progress. From the army which was with only rifles about 30 years ago, the Korean military has proudly developed the Air Force, the Navy, and the Army, the sixth largest ground force in the world, equipped with modern jet fighters, guided missile boats, and heavy tanks. Modern technology and sophisticated weapons are also needed to maintain such modern armed forces. For a long time after Korea became independent, free-world allies provided a large amount of aid to assist her to remain sucure and to achieve self-reliance. Economic growth and strong national defense are interrelated and both require scientific and technological backup.

Regardless of ideolgy, it is true that a nation mobilizes scientific and technological knowledge as much as possible in order to survive. Needless to say, the effect of the mobilization will be different depending on the strength of the economy and on the skill in organizing the given resources.

Aids from outside, mainly from the U.S., have diminished already, and Korea should achieve its self-reliance in defense as soon as possible. With economic growth, the defense burden competes for scarce resources. The situation requires a somewhat new policy which is different from that of the Grant Aid era. As the Korean economy should transform its policy fron a laborintensive structure to skill-intensive industry, the defense policy also must be formed with more creative and productive activities rather than consumption-oriented performance.

To repay the taxpayers' investment, the defense authority must concern itself with multi-dimensional ways inculding traditional civic action programs, training technicians and management, and technology transfer. The multiplier effect of all of these can not be estimated but obviously it will be a great deal and eventually will achieve the nation's security.

"Technology Transfer" is not a term well-known in the Korean military. But present realities require it more ever before.

The Korean military authority has been in a favorable environment to achieve thchnological improvement because Free World allies are willing to help and in-country industries want to have jobs. Continuous researcl and development, proper stock, regeneration, and transfer of internal anc external technology can continue the improvement under such a favorable environment.

To gain a return on the taxpayers' and allies' invesment in the securi

of Korea, self-relicance in defense should be achieved as soon as possible. Self-reliance in defense can be achieved through technological superiority. And by managing technology transfer in an appropriate manner, a greatdeal of technological improvement could be achieved.

II. IMPORTANCE OF TECHNOLOGY AND ITS TRANSFER

Economists perceive technology as society's pool of knowledge regarding the industrial and agricultural arts. They need acvanced technology or technological change to get the maximum output rate that can be achieved from a given amount of input. Therefore, they expect technology change to result in a change in the production function so as to increase economic welfare through the alteration of production functions due to technological change.[3]

Scientists understand technology is producing some physical changes in the world. Therefore, they see a findamental and inherent incompatibility between input and output in technology.[4]

Strategists emphasize technology to improve the quality of weapons. They need a new and better technology to make better weapons.[5]

The importance of technology and its transfer is perceived differently according to what one wants to get from technology. Therefore there is not one universally accepted definition of technology transfer. But most people who are familiar with the general meaning would agree that technology transfer is inherently good. When it occurs there is at least some small economic, social or other benefit.[6]

For the purpose of this thesis, the importance of technology is discussed in the military aspect; therefore, technology transfer is considered to be the process which "encompasses the collection, documentation, and dessemination of scientific and technical information, including data on the performance and cost of using the technology; the transformation of research and technology into process', products, and services that can be applied to public or private needs; and the secondary application of research or technology developed for a particular mission that fills the needs in another environment."[7]

The importance of military technolgy is well described in the FY 1980 Department of Defense Budget requests for research, development and acquisition activities. Dr. Harold Brown, Secretary of Defense, emphasized that this request reflected the continuing concern of the U.S. over the si-

gnificant growth in both quality and quantity of Soviet weapons and technology and established the following three major objectives:

- —Better justification of programs on the basis of mission needs to reduce waste and duplication:
- —Strengthened technology base;
- —Greater cooperation with allies.

He also stated that through exploration of innovative technology and through improved management of science and technology resources, it is possible to accelerate the pace of technology so as to expand available technology options. This will allow greater selectivity and lower costs in the more expensive acquisition portion of the total research, development and acquisition process. He supported increasing funds to prevent technological surprise; combining efforts of the federal, industrial, and university communities to increase productivity in the production process, a creative independent industrial research and development program, and a high level of innovation within all of these communities; appropriate management of export controls to prevent a military advantage to political adversaries, and an opportunity for industry to acquire additional resources which can further be allocated to industrial research and development programs for the improvement of the national technological position; cooperative research and development projects with allies to provide for a stronger and more effective defense by increasing real growth in the military science and technology programs and improving the exchange of technological information between countries.[8]

Considering that the U.S. leads in technology around the world and it needs a large amount of funds just to reduce the possibility of technological surprise, it is easily recognized that Korea, which is backward in technology and located at a strategic point where the powerful nations easily collide with each other, must concentrate its efforts much more on technological innovation.

It is true that the Korean Government strongly desires self-reliance and pushes governmental research agencies and private enterprise to develop a defense industry rapidly. Even more the Korean Government officials hope to finance the expanding defense bill by exporting Korean-made arms. Many analysts predict that if Korea develops its defense industry as rapidly and efficiently as its other industries, it will sooon be offering competition to the U.S. and European arms manufacturers.[9]

Therefore the Korean military needs more advanced technology and

much more funding for research and development. These needs create complex management problems. Major objectives for the formulation of the U.S. DoD Research, Development and Acquisition (RD&A) program suggest a way of solving the problems. Advanced technology will be developed from the basis of a strengthened technology base. The technology base will be formulated by research and by combined efforts of the federal, industrial, and university communities. Cooperation with allies can also be a great helf in improving technology. Reduction of waste and duplication would contribute to saving funds while accelerating technological innovation.

It is obvious that all those matters are associated with transfer of technology. It is time that the Korean military research and development establishment open the door, which is closed for reasons of military security, to other public, industrial, and university communities. This open-door policy will contribute to the growth of research and development throughout the country and will promote technology transfer.

This policy will accelerate technological change which will cause multiplier effects on economic growth, with firstorder effects being physical changes in terms of new materials, designs, and production methods. These modifications induce social consequences that in turn feed back and alter the preferences for further innovation through the kinds of new research that are performed.[10]

The realisties discussed so far can be perceived as the benefits or importance of technology transfer. But technological information is not easily controlled.

III. THE NATURE OF TECHNOLOGY TRANSFER

Technology is distinguished from science not only by the kinds of people who are attracted to them but also by the nature of the activities themselves. In science, all of the work up to any point can be found permanently recorded in the literature which serves as a repository for all scientific knowledge.

In contrast, information is transferred in technology primarily through personal contact. Publication occupies a position of less importance than it does in science where it serves to document the end product and establish proirity. Unlike scientists, the vast majority of technologists are employed by organizations with a well-defined mission(profit, national defense, space exploration, polution controll, population abatement, and so

forth). This organizational identification works in two ways to exclude the technologist from informal communication channels outside his organization. First, he is inhibited by the requirements that he work only on problems that are of interest to his employer and, second, he must refrain from early disclosure of the results of his research in order to maintain his employer's advantage over competitons. A good propotion of the truly important information generated in an industrial laboratory cannot be published in the open literature because it is considered proprietary and must be protected.[11]

The problem of supplying information to the scientist thus becomes one of systematically collecting and organizing seientific outputs and making them accessible to other scientists to employ in their work. In technology, on the other hand, there is a fundamental and inherent incompatibility between input and output. Outputs can hardly be utilized as inputs to the next stage because outputs are in a form basically different from inputs. Sometimes technologists analize a competitor's product or weapon systems in order to gain information. This is a difficult and uncertain process, however. It would be much simpler if the information were directly available in written form.[12]

There are many variables in the area of technology transfer. Some of them which can affect the diffusion of technology are; characteristics related to the innovation; characteristics of the adaptor; sources of information and information channels; a number of environmental or contextual variables. In a general thrust at the problem, incorporating many of these variables, Harbey Brooks has suggested two different kinds of technology transfer which he calls vertical and horizontal.[13] In vertical transfer, there is a direct movement from one phase or level to another; the general is transformed to the specific; basic scientific knowledge becomes technology; technology is embodied into a hardwere system.

Horizontal transfer refers to the adaptation of technology from one to another possibly unrelated application: A firm borrows technology from one field and introduces it into its own area; a laboratory device is modified to be useful in industrial practice; technical assistance is utilized in an underdeveloped country; military/space technology is diffused into the general commercial market. According to the characteristics of innovation, both horizontal and vertical transfer will occur simultaneously or immediately after one another.[14]

The pattern of technology transfer as described above indicates the nee

for a certain degree of organized effort. Usually research and development laboratories are within the thechnology industries. At lower echelons of these facilities there are also functional or project organizations which have specific responsibilities for product or process development or cost savings. Figure 1 is a typical pattern of vertical and horizontal transfer of technology.

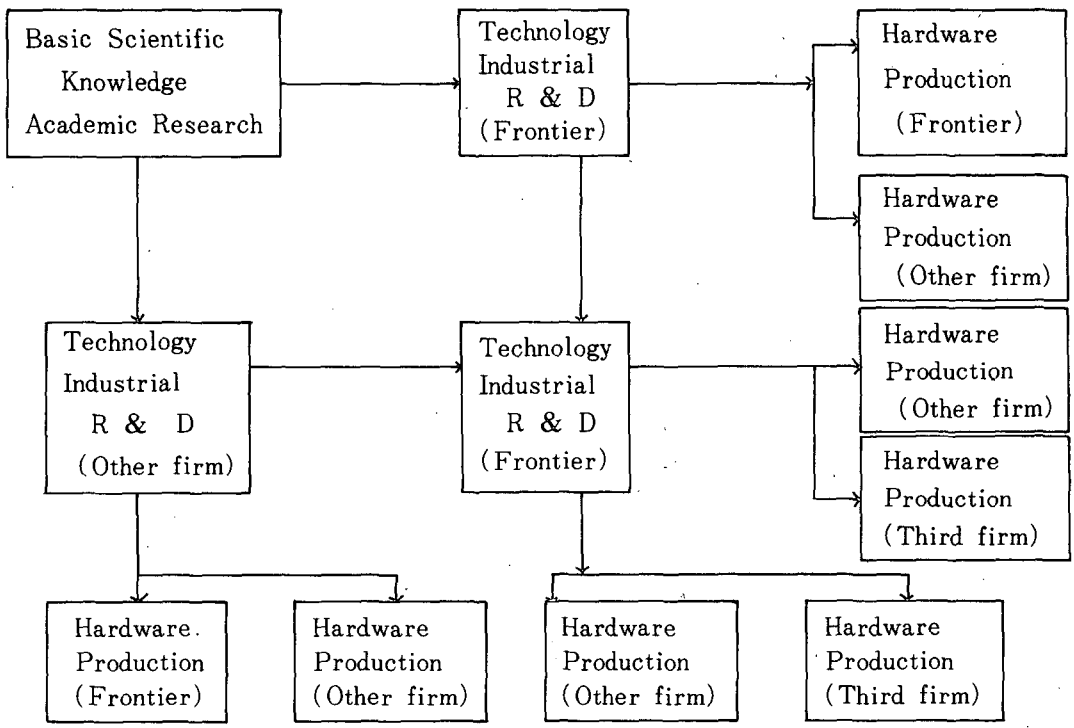

Figure 1: Vertical and Horizontal Flow of S & T Information

Within the pattern of technology transfor, there may be many barriers as mentioned previously. Since technology transfer has been redefined as "a purposive, conscious effort to move technical devices, materials, methods, and/or information from the point of discovery or development to new users, the barriers existing between source and user must be removed." [15]

Availability of information is not sufficient for its transfer or use. There must be both "technology push" and "requirement pull" to effect technology transfer, [16] And then "technology push" and "requirment pull" should be matched. If there is no commonality between the two sides, technology can hardly be transferred. Therefore, considerable focused effort to actively transfer the particular technology should occur so as to expedite the transformation of knowledge into meaningful innovations. [17]

Conscious and well contrived types of human interactions can expedite a transfer mechanism. Professor Creighton J.W. and others first developed a technology transfer process model in 1972 and explained the concept of a transfer mechanism as follows:[18]

"one method for putting the dynamics of technology transfer into a usable perspective is to begin discussing a "transfer mechnism". In simplified terms, the transfer process must include a set of activities designed to effectively link or couple the source of the needed knowledge with its eventual user."

A simplified view of the transfer mechanism developed by professor Creighton and others shown in Figure.2. This transfer mechanism represents the interaction of people and need not be independent but may be incorporated into either the supplier or user environment.

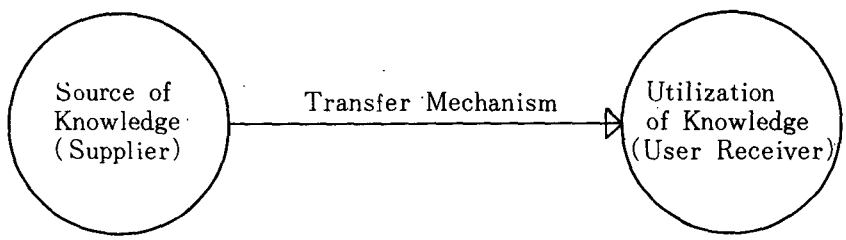

Figure 2 : A Simplified View of the Transfer Mechanism

This simplified model has been developed further, emphasizing the importance of both the potential user's standpoint and the literature support in this field. Whether it is the vertical flow of technology, i.e., from a laboratory to a given application, in a given discipline, or the horizontal transfer of technology, as from one industry or activity to another, the source signal must be transferred through time and space which is filled in by certain media. The media or factors which organize the transfer mechanism have not been measured as to their effect on the transfer mechanism in a given organizational situation. These factors are divided into two parts; formal factors and informal factors. Formal factors are system oriented and can be easily handled and operated directly. Informal factors are highly behavioral and sociological and are quite difficult to handle.

Recently there has been trend that recognizes technology transfer as a "people" thing and takes a serious view of informal factors.[19] One report

to Congress explains the importance of informal factors quite well:

> "the more availability of information does not cause its transfer or use. Printed materials alone, even expertly prepared, cannot stimulate interpersonal relations, define a problem, provide follow-through on problems or relate to other agencies." [20]

But there is a necessary step to understanding the technology transfer process. The formal factors should be perceived as the first and basic step to transfer technology. These are procedures for dissemination storage, indexing and retrieval of knowledge.

The informal factors are perceived as the second dimension. These are more complicated to manage because their science base is primarily behavioral rather than physical. [21] For further understanding, the Linker Model diagram is exhibited and each of its factors is briefly discussed.

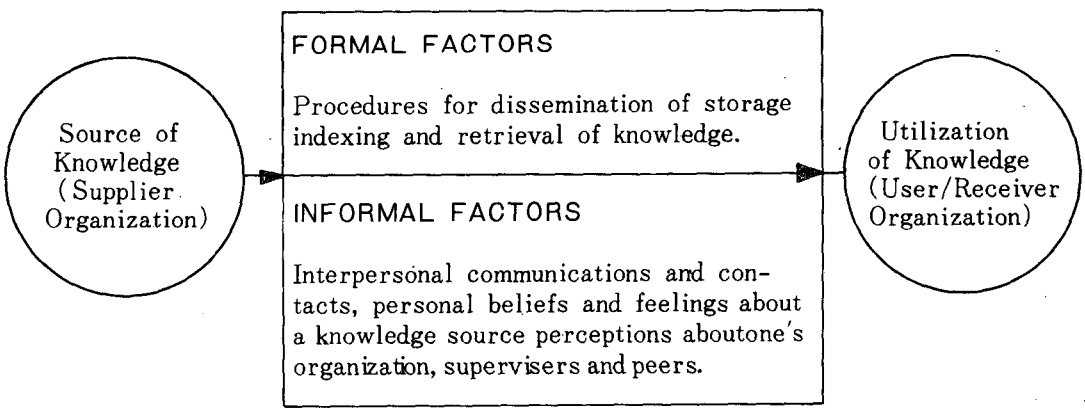

Figure 3 : A Simplified Model of Technology Transfer

DOCUMENTATION(DOCU) is the format, specifications, and presentation of the technology or information being transferred. It can take a variety of forms, but it must be understandable by the users.

DISTRIBUTION(DIST) is the physical channels used to distribute the information. It is accomplished by interpersonal communication, computer assistance, a journal, or by another vehicle. It is the only factor which will determine the sucess of a technology transfer effort.

ORGANIZATION(ORGA) is the impact that the formal organization of the potential technology user has upon a transfer effort. It is a very important factor in which characteristics of technology transfer can be determind

according to the power structure, the nature of the business, the management style, resources, attitudes, bureaucratic tendencies, rules, and norms.

PROJECT SELECTION(PROJ) is the selection process for research and development undertaken by the source and receiver's contributions to that process. The effectveness of the utilization of research differs with the entities who initiate the project

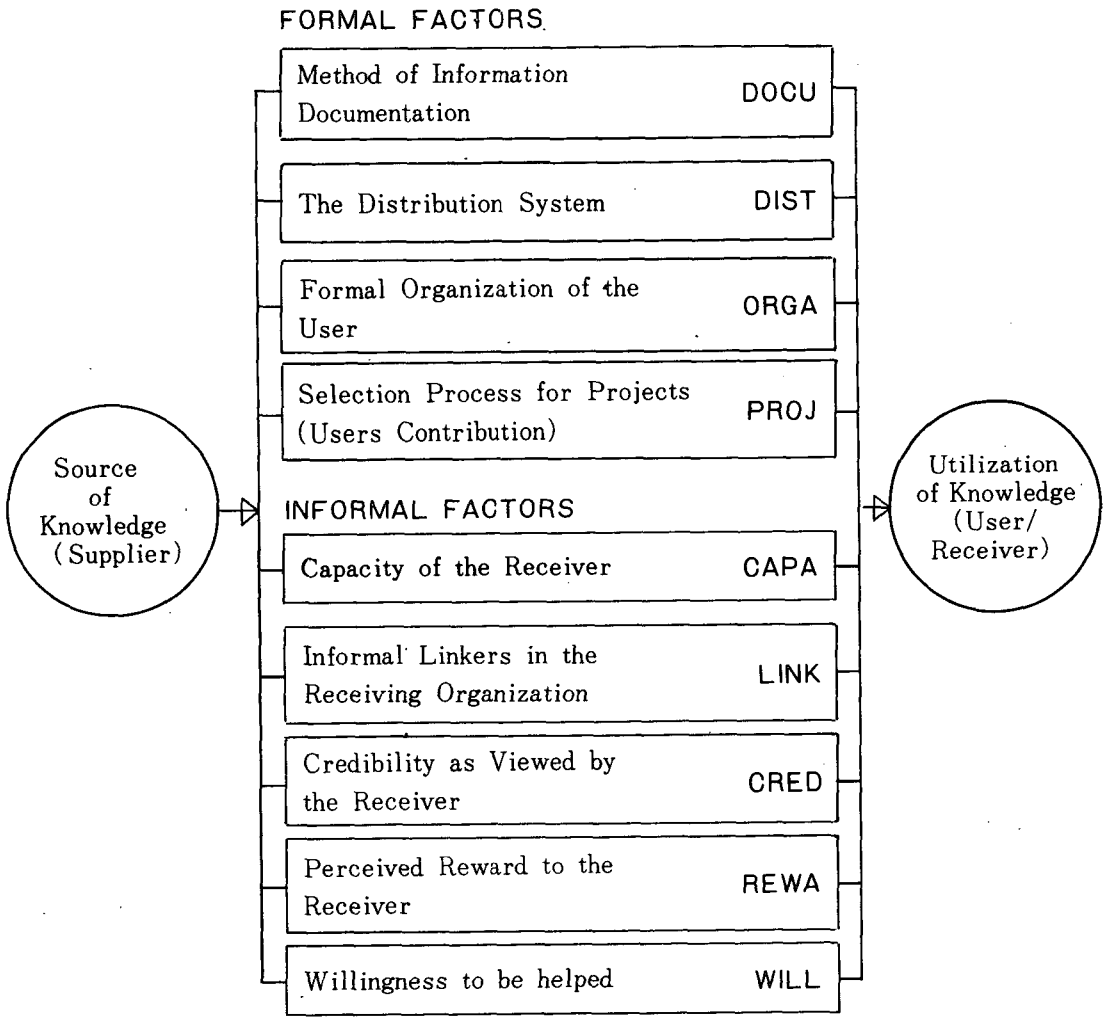

Figure 4 : An Expansion Model of Technology Transfer

CAPACITY(CAPA) is the ability and capability of the potential user to utilize new and/or innovative ideas. It would be different from individual to individual whose levels of venturesomeness, wealth, power, education,

experience, age, self-confidence, ect, differ. The capacity should integrate all the key players' and group's capacities.

LINKER(LINK) is the individual or group of individuals who link the source and the application. Linker fills the roles of leader(gatekeeper or opinion leader), early adopter of an innovation(innovator), and earlyknower of an innovation.

CREDIBILITY(CRED) is the receiver's assesment of the reliability of the information before him. Incredible sources should be rejected by the potential user.

REWARD(REWA) is a compensation which is given to a new technology adopter as a consequence of applying technology. If a man is to be penalized rather than rewarded, he will most certainly be disinclined to import a new technology idea.

WILLINGNESS(WILL) is the individual's ability and/or desire to accept change in the organization of which he is a member. Willingeness will create interest or motivation. Without motivation, a better method, process, or concept will not be utilized.[22]

These fairly complex factors are as mentioned already not for just the flow of information but for the conscious transfer of technology. To guide technology transfer in the desired direction is important to accelerate the rate of technology innovation. None one of the formal and informal factors in the technology transfer process can be eliminated in a technologically backward nation.

Ⅳ. THE ROLE OF THE KOREAN MINISTRY OF DEFENSE IN TECHNOLOGY TRANSFER

The Korean Defense Authority has many responsibilities in relation to self-sufficiency. These responsibilities can be roughly divided into internal and external ones. Internally, the Korean military should be in a high state of combat readiness to maintain the country's safety. It is an inevitable duty, the primary mission of the military. The secondary responsibility of the Korean military is to participate in civic actions in order to support local communities. The reason for this duty is that almost one fifth of the Korean labor force is in the military. The third responsibility is to transfer appropriate technology to the civil sector. The Korean military has had many opportunities to contact advanced technology by importing new weapons and equipment, by combined operations with allies, especilly with the U.S.,

and by training many personnel abroad. Furthermore, the military is increasing research and development activities as a national priority. This third responsibility is derived from the necessity to repay the taxpayers.

The external responsibilities are set up, first, to secure peace for Korea by maintaining the Korean military at the proper level to guarantee Northeast Asia's stability; second, to contribute to allies' efforts for collective security by reducing foreign assistance; third, to develop appropriate technology to meet Korean needs so as to relieve allies of the burden of research and development for technologically backward nations.

Internally and externally, the Korean Military Authority has responsibility for technological innovation and its transfer. To fulfill this responsibility the Korean Ministry of National Defense must undertake an important role. That is the role of a catalyst.

As mentioned earlier, the Korean military is in a favorable position to import advanced technology under any conditions of payment. This situation will last as long as the allies, particularly the U.S., want stability in Northeast Asia. The Korean military is also in a situation to carry out this role internally. That is because a trend to develop appropriate or intermediate technology jointly with advanced nations exists in the Korean research and development field, and industries which rush to change their structure need new technology and jobs.

The Korean military can affect almost all Korean industries in regard to small domestic markets and poor progress of research and development activities among the industries.

From this point of view, the Korean Military Authority, Ministry of National Defense, can act the role of a catalyst in the technology transfer process. A catalyst can act more powerfully than a simple linker. A linker simply connects or couples one presence to another. A catalyst not only couples two subjects together but also changes the characteristics of those two subjects. In other words, the Korean Military Authority should stand at the middle of a vertical transfer of echnology rather than of a horizontal flow. Reality requires a three-dimensional role for the Korean military.. Receiving, innovating, and transferring the appropriate technology are equally important. The three should be simultaneous and parallel.

In this sense, the Korean Military Authority is a receiver and supplier of the technology at the same time. As a receiver, the Korean Military Authority seems to have little problem in the informal factors. They are so eager to import or receive advanced technology that Willingness,

Reward, and Credibility factors of the Expansion Model of Technology Transfer are sure to be solved. Informal linkers will also come into being because the Korean military has used foreign arms, mostly U.S. arms, for a long time. There is not much of a problem with Capacity except in highly precise equipment and nuclear weapon production.

There are major problems in formal factors. The fact is that the Korean Military Authority is not functioning at all in the Selection process for projects. There are no organized selective acquisition activities, no storage and retrieval facilities or offices, and also no organized dissemination function. The Formal Organization factor presents much to be discussed, however. Jack G. Callaway stated that the Korean military is a highly professional, highly disciplined and motivated force.[23]

The general feeling of the author about this factor is that there is a lack of delegation of authority and most decisions are made by authoritarian management.

Considering the supplier side, there is a basic problem to be solved. There are no Documentation Activities, no Distribution System at all. As stated previously, the Korean military is ignorant of technology transfer discipline.

Observing industrial firms from the position of information supplier, the Korean Military Authority is confronted with two kinds of problems. The first is that a firm has Capacity but has no Willingness. The second is vice versa. The first case exists among big enterprises which can exploit the foreign market. They do not want to shift existing production lines or facilities to new production lines or facilities for a small domestic market. For the same reason, they do not want to invest in a new production facility. Because the Korean defense industrial base is not broad, the firms are receiving technology information under the condition which requires them to make military articles. The general spirit of the Korean enterprises for making profits explains this situation fairly well.

The second case is happening among small businesses. They have no capacity in terms of technology and capital. But they seriously want jobs. The Korean Military Authority has to analyze the status of firms in order to find adequate users. Thus it plays a Linker role on the supplier side.

V. STRUCTURING THE ORGANIZATION TO MANAGE TECHNOLOGY TRANSFER

Now the Korean Military Authority has to do something to solve the

problem mentioned above. It is considered urgent as long as military self-sufficiency has top priority as a national goal.

The Linker Model developed in the U.S. by professor Creighton and others could be modified to meet Korean needs. By adding Formal Linkers ir in the Supplying Organization among the Formal Factors, the Korean Military Authority can accelerate transfer of technology and control its process.

The following figure shows the modified model of technology transfer.

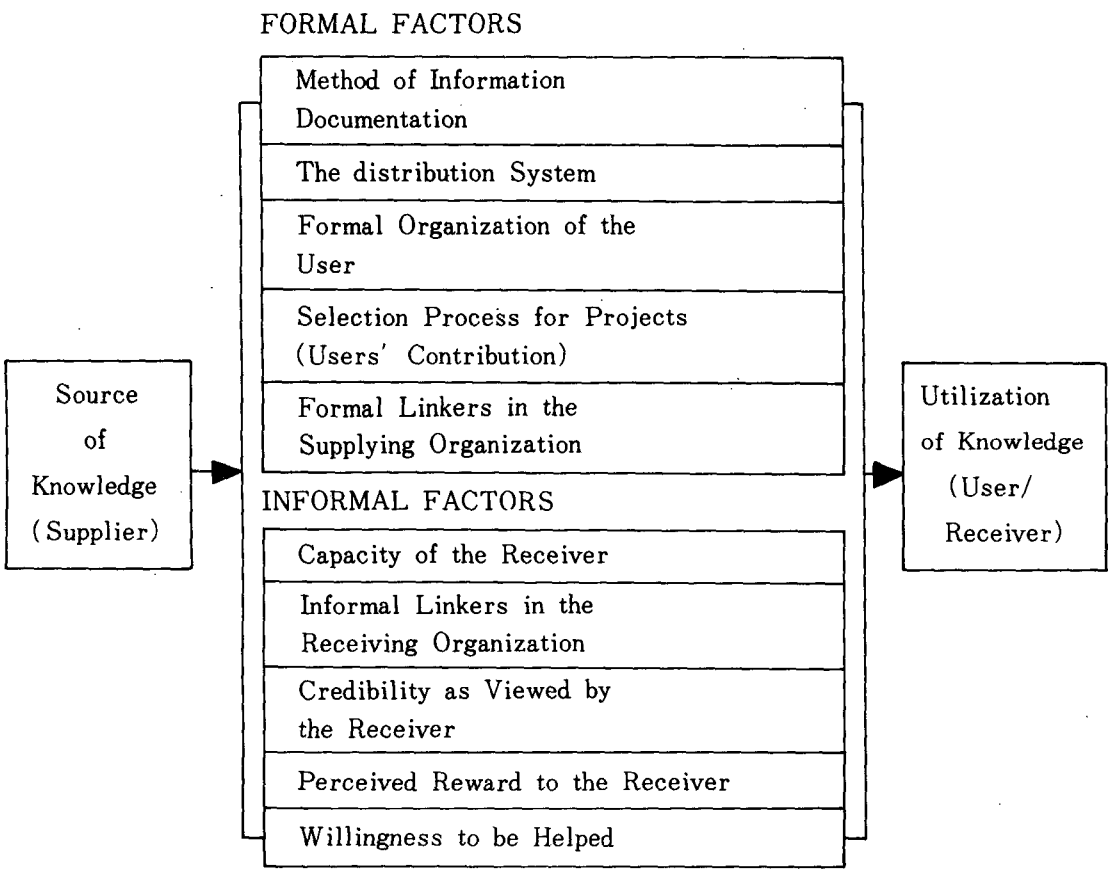

Figure 5 : A Modified Linker Model.

There must be an agency which can suggest military technological information to be reflected as the national strategy or policy. There are agencies which are associated with the defense industry in the Korean military establishment. One of them is the Agency for Defense Development(ADD), a laboratory for research and development in all areas related to defense except tactics and doctrine. The Research and Development Bureau of the

Joint Chiefs of Staff (JCS) controls ADD by providing funds and assigning research tasks. There is no capability or function to process technological information in this bureau.

The Defense Industry Bureau in the Ministry of National Defense deals with contract administration, negotiation, and financing for acquisition. It is not a technology-related office.

Obviously it is necessary to activate an office or agency similar to the Scientific and Technological Information Analysis Center. The primary mission of the agency is to link the sources and potential users of the technological information. The secondary mission is to analyze the status of the objective enterprise firm so as to find potential users. The functions of this agency would be collection, selection and storage of imformation, producing new information through retrieval processes, suggesting the potential users, and dissemination through appropriate channels.

According to the characteristics of these functions, this agency should be at a higher level in the hierarchy of the defense establishment so that the agency can directly contact foreign countries as well as other ministries and agencies of the government.

The infrastructure of this agency would be composed specialists in each field of science and techoology, military specialists, business management specialists, and computer and information systems specialists.

VI. FINDINGS AND CONCLUSIONS

Korea, one of the countries most recently opened to the modern world, has grown as a new developing nation in terms of economic and military strength.

Through ambitious plans and stronng implementation, Korea has achieved a high rate of economic growth during the past two decades. But there are many problems to be solved in order to continue steady growth. The most important and principal problem is lack of a technological base.

As history has shown, Korea has had its trials and survived among the big powers around the Korean Peninsula. Liberation and the consequences divided highly complementary industrial structure in two, the North and the South. The Korean War was a turn for the worse. Social, political and economical chaos continued until the military coup in 1961. Colonial rule and foreign aid did not leave a technological inheritance.

The Korean military has gone through the same growth path as the eco-

nomy. The armed forces, which are maintained with foreign assistance,lack the capability for self-reliance.

For both the economy and national defense, advanced technology is essential for self-reliance. The economy and national defense have responsibilities to support each other. The economy has the responsibility to finance the military while being protected by the military. The military has converse responsibilities.

To fulfill its responsibility, the Korean military must utilize its advantageous position. The Korean military has another responsibility to its allies who have helped to assure Korea's security. To achieve a high level of self-sufficiency in defense is necessary for the Korean military. To do so, technological innovation is required. And technological innovation can be accelerated by proper thchnology transfer processes.

Unfortunately, there are no appropriate activities for technology transfer in the Korean military establishment. As the term "technology transfer" means, there must be considerable activity to accelerate and guide the flow of technology in the intended direction. For this reason, the Korean Military Authority, the Ministry of National Defense, should establish and activate an office or agency which will take the role of Linker(in one sense, a catalyst) in the the technology transfer process.

The primary mission of the agency would be to link the source and potential user of the technological information. And the secondary mission would be to analyze the status of the objective enterprise firm so as to find potential users.

The functions of this agency would be collection, selection and storage of information, producing new information through retrieval processes, suggesting the potential user, and dissemin a tio n .

The agency must be positioned at a higher level in the hierarchy of the defense establishment and be composed of all the area's specialists.

Bibliography

1. Pavez Hasan, Korea, Problems and Issues in Rapidly Growing Economy, 1976, The Johns Hopkins Unversity Press, Baltimore and London.
2. Ministry of Culture and Informoration, Republic of Korea, Facts about Korea, 1978, Korea Information Service Inc. Seoul, Korea.
3. Edwin Mansfield, Microceconomics : Theory and Applications, Second Edition, P 464, W, W, Norton & Company Inc. New York.

4. Thomas J. Allen, Manging the Flow of Technology : Technology Transfer and the Dissemination of Technological Information within the R & D Organization, P 3, The MIT Press, Cambridge, Mass, 1978.
5. Harold Brown, Command policy, Vol 2, No. 8, P4, August 8, 1979
6. G.K. Manning, Technology Transfer : success and Failures, P v, San Francisco Press Inc. 1974.
7. Directory of Federal Technology Transfer, 2nded, Executive Office of the President, Federal Coordinationg Council for Science, Enginering and Technology, June, 1977.
8. Horold Brown, Command Policy, Vol 2, No. 8. PP 3—5, August 8, 1979.
9. Financial Times, P 17, May 3, 1978.
10. Marvin Berkowitz, The Conversion of Military-Oriented Research and Development to Civil Uses, P 167, Praeger Publishers, New York, Washington, London, 1970
11. Thomas J. Allen, PP 39—44
12. Ibid, P 3.
13. Harvey Brooks, National Science policy and Technology Transfer, proceedings of a conference on Technology Office, Washington. D.C. 1966.
14. Marvin Berkowitz, P 273.
15. John S. Oilmore. The Environment and the Action in Technology Transfer ; 1970—80, In a Report of September 36—38, 1969, Dept. commerce N70—26339, Washington D.C. 1969.
16. Subcommittee on Domestic and International Scientific Planning and Analysis, U.S. House of Representatives, Ninety Fouth Congress, Review of Intergovernmental Dissemination of Federal Research and Development Results, Special Oversight No. 5, U.S. Government Printing Office, July, 1976.
17. J.W. Creighton, J.A. Jolly, S. A. Denning, Enhancement of Research and Development output utilization Efficiencies ; Linker Concept Methodology in the Technology Transfer Process. Naval Postgraduate school, Monterey, calif. 1978.
18. J.A. Jolly, J.W. Creighton, P.A. George, Technology Transfer Process Model and Annotated selected Bibliography, Naval Postgraduate School, Monterey, Calif. 1978.
19. B. Curry, Technology Transfer, or People Thing, Department of the Navy pamphlet, July, 1977.
20. Subcommittee on Domestic and International Scientific Planning and Analysis, U.S. House of Representatives, Ninety-Forrth Comgress,

Review of Intergovernmental Dissemination of Federal Research and Development Results, Secial Oversight Report No. 5, U.S. Government Printing Office, July, 1976. 1.

21. National Science Foundation NSF 77-301 V. XXV, Federal Funds for Research, Development and Other Scientific Activities, Fy 1975, 1976, and 1977, December, 1976.
22. National Science Foundation, NSF 70-23, Directory of Federal R&D Installations for the Year Ending June 30, 1969, June 1970.