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The Technology Licensing Office as Factor of Success for Spin-off: Case Study of a Research Lab Startup of Korea

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Abstract This is a case study to analyze the role of technology licensing or transfer office (TLO) as factors of success for the spin-off from government research lab. The case company is a research lab startup, which is a joint venture through technology investment by a government research lab or university in the designated R&D parks and cash investment by the partner company. The case company listed on the stock market in 2015 reaching a market capitalization of US$ 1.2 billion. We confirm the success factors of startups pointed out in many studies: original technology, good understanding of core technology and production technology, technological competitiveness in the market. However, there is an important factor not well discussed in the previous studies, the role of TLO. TLO guided the company ownership, management, technology, and solved problems that pause business itself. The case became the sample of research lab startup and technology investment in Korea.

Keywords Technology commercialization, technology licensing office, TLO, research lab startup, spin-off, success factors

I. Introduction

Technology transfer to business is the primary objective of universities under the paradigm of an entrepreneurial university (Slaughter and Leslie, 1997). About 250 universities have established technology licensing offices (TLO) since the Bay-Dole Act of 1980 in the United States (Tseng and Raudensky, 2014; Wu et al., 2015; Bigliardi et al., 2015).

Thanks to the Technology Transfer Promotion Act of 2000, Korea boosted the establishment of technology transfer or licensing office in universities and government research institutions. Although this Act had evolved to the Technology Transfer and Commercialization Act of 2006, technology transfer

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from universities and government labs seems to be insufficient (Kim, 2014; Wu et al., 2015). The success rate of commercialization of transferred technology from universities and government labs was reported to be 15.2% (Kim, 2014).

However, the rate of creation of technology startups from government labs had decreased from 39.5% in 2004 to 8.55% in 2011 (Lee et al., 2012). The main reason is that either government labs researchers are less business savvy or the technology output from government labs is not keeping up with the market (Lee, 2014). In the context of the decreasing importance of government labs, KolmaBNH is a successful case of a government lab that listed on the stock market in 2015 reaching a market capitalization of US$ 1.2 billion. This valuation warrants a closer look at the cause and process.

The findings of this study are based on a close investigation of this company. This case provides useful lessons for the transfer of technology from government labs, from its indirect to direct involvement in commercialization. The case focuses on the changes in the function of TLO and the role of universities and government labs in commercialization in Korea. A startup business can be set up under shared ownership of universities and government labs using the technology provided by them. Before the case under review, universities and government labs only transfer technology to business.

Section 2 introduces the Korean research lab startup and this study presents an analytical framework following a review of literature. Section 3 discusses the factors of success of the company based on our framework. Section 4 describes the historical path of the functional changes of government labs. Section 5 presents the discussions with existing studies and a conclusion.

II. Theoretical Review

1. Technology Transfer and Research Lab Startup

Technology transfer is a transfer of technology from A to B, but the concept shows differences depending contents or methods of transfer as shown in Table 1 (Major, 1988; Roessner, 1994; Megantz, 1998; Park, 2008). The method of transfer includes technology consulting or assistance, contract research, cooperative research, licensing, assignment, use of facilities, strategic alliance, joint venture and M&A.

The specific features of Korean studies of technology transfer are the researcher startup and the research lab startup, a difference that can change the concept of technology transfer of government labs and universities.

Table 1 Concept of technology transfer

Type	Major (1988)	Roessner (1994)	Megantz (1998)	Park (2008)
Technology consulting/assistance		○		○
Contract research	○	○		○
Cooperative research	○	○		○
Licensing	○	○	○	○
Assignment			○	○
Using facilities		○	○	
Strategic Alliance	○		○	
Joint Venture	○		○	○
M&A			○	○
Others	Manufacturing, Supply, Distribution, Workshops/ Seminars, Employee exchange, Sponsored research, Lab visits, Investment			

The researcher startup is a startup set up by government labs researchers under Korean law. The researcher can keep his/her seat on the board of the startup without payment during a certain number of years. Three years is the typical period. The researcher startup is a startup by researchers who are working in universities and government labs. Therefore, the definition of technology transfer from A to B is not applicable. Further, that startup model contains the concept of commercialization in the technology transfer.

The research lab startup is a joint venture between transferring organization and transferred company under a Korean law since 2005, the Special Law for Promotion of Daedock R&D Park (changed to the Special Law for Promotion of R&D Parks in 2012). This is similar to one of five types of spin-offs defined by OECD (2001). The law defines research lab startup as a startup, established in R&D Parks, to commercialize the technology developed by universities and government labs, and technology holding companies of university or government labs. The transferring organization should have at least 20% ownership of the startup as the compensation for the technology transferred. The dividend from the startup can be used as R&D expense, reinvestment, compensation for the achievement of R&D and commercialization, and others for transferring organization.

Under this law, investment in startups by research institutes is of two types: cash and technology. In the case of technology investment, the technology should be valued by independent valuation agencies. The technology valuation organizations must consist of at least seven valuation analysts and other certified professionals such as attorney, patent attorney and public

accountants (Innopolis Foundation, 2015). Under the Technology Transfer and Commercialization Promotion Law of 2006, there are now 23 agencies for valuation of technology, most of whom are government research institutions and government technology agencies. Valuation of technology takes about two months with fees of about US$ 20,000.

There are five R&D Parks in Korea's main cities, in Daejeon, Pusan, Daegu, Kwangju, and Chonju. Daedock R&D Park in Daejeon, a small expansion of former Daedock Science Town, is the first of these parks. The parks are under the control of the Innopolis Foundation since 2005. Beginning that year, the number of research lab startups has reached 209 in the first half of 2016 (Innopolis Foundation, 2016).

Currently, the number of this type of startups is increasing rapidly since investment in technology investment is relatively easy. However, the reason for technology transfer organization to set up this type of startups is the financial reward, if successful (La, 2015). This new trend in Korea expands the concept of technology commercialization. There are two types in the concept of commercialization; the first concept defines the sphere of technology commercialization from idea to market entry (Lee, 2004; Park, 2008; Nevens et al., 1990). The second concept includes market activities, so targeting profit (Park, Cho and Seol, 2014).

2. Role of TLO

There are many studies about the technology transfer and transfer office of universities. Conti and Gaule (2011) has argued that the United States is more efficient than Europe in successful transfer and commercialization, because of the experience and resources of technology transfer office. The factors affecting the performance of the office are entrepreneurship education (Boni and Thomas Emerson, 2005), knowledge brokering through the social network between professors and student founders (Hyter, 2016), and the attitude of researchers for technology commercialization and participation for public activities (Wu et al., 2015). However, there are few studies focusing on TLO of government labs. Only Leestma et al. (2013) examines new technology transfer and commercialization program of the NASA Johnson Space Center.

Most Korean studies focus on the research lab startups and the role of government labs. The role of government labs beyond the primary mission of TLO is the key to the success of the startups (Lee at al., 2004). TLO needs a diverse range of expertise (Lee, 1998; Lee et al., 2004; Chung, 2004; Choi et al., 2012; Conti and Gaule, 2011). In particular, TLO needs expertise for the selection of proper technology and feasibility studies (Seol, 2011). Further, the

incentive system and employee dispatch system of transferring organization are pointed out as key factors (Lee et al., 2004; Debackere and Veugelers, 2005; Bae, 2013).

The role of TLO defined in the Technology Transfer and Commercialization Promotion Act is as follows:

- Works related to job invention
- Works related to patents such as application, registration, management, and utilization
- Allocation of profits such as royalties etc. by technology transfer and commercialization.
- Promotion of technology transfer and commercialization
- Supports of technical information for industry

3. Analytical Framework

The case study is KolmarBNH, a US$ 1.2 billion spin-off of the Korea Atomic Energy Research Institute in 2016. Therefore, for context, we need to analyze the history of the company in many of its aspects over the past ten years. These facts lead us to take a combined method of the historical approach and the framework approach. We analyze the history of the TLO and the company using a framework to explore 11 factors grouped into three categories. The analytical framework is shown in Table 2.

Table 2 Analytical framework

Category		Factor	Description
Technology		Innovativeness	Properties of the technology itself
		Property rights	Legal rights
		Technology environment	Developing complementary technologies
Market		Macro Environment	Population, laws and institutions
		Industry	Market size and maturity
		Competitiveness	Competitive strength
Capability	Gov't lab	TLO	Mission, Expertise, and active involvement
		Incentive	Incentives and stock options
	Spin-off	Management /Finance	Parent company's operation and financing capabilities
		Marketing	Business model, strategy, target market
		Network	Internal and external network and cooperation

This analytical framework was a modification of the model of valuation of technology used in the valuation of the technology that valuation analysts use. The original model was from Seol (2000, 2009, 2015), Seol and Lee (2002), and Seol, Oh and Park (2012). The modified model comes from Kim, Ko and Seol (2012) and Kim and Ko (2014).

The categories are technology, market, and capability. In the technology category, we include innovativeness, intellectual property rights, and technological environmental. The technological environment includes the environment between technologies, production, and developing capabilities. In the market category, we include factors for macro environment, industry, and competitiveness. In the capabilities category, we include governmental lab and spin-off.

Let's clarify the position of the parties involved. There are three parties for a research lab startup: government labs, parent company, and spin-off. TLO represents government labs. The mission of TLO is to encourage output of R&D, promote technology transfer and commercialization, and support spin-offs providing technical supports and business consulting. The final goal of TLO for spin-offs is profit sharing or capital gains selling ownership after IPO. The goal of the parent company is the harmony of product mix with spin-offs, supply or demand relationship with spin-offs, and profit sharing and capital gain. If the main goal of the parent company is a relationship, not money income, then there is a conflict of interests between parties. Also, the goal of spin-offs can be different from that of the parent company or research labs: sales increase rather than profit, gradual preparation for listing in the stock market, etc.

III. Factors of Success for KolmaBNH

1. Overview

KolmaBNH was founded in 2004 as a joint venture between a cosmetics company Kolmar Korea and Korea Atomic Energy Research Institute (KAERI). KAERI is a government research institute located in Daejeon Science Town with about 2,000 researchers. Its primary mission is research for national planning in the atomic energy area. Kolmar Korea was listed on the Korea Stock Exchange in 2002. Kolmar Korea did not produce their brands, but only OEM (original equipment manufacturing) and ODM (original design manufacturing). KAERI provided a core technology, and Kolma Korea provided production technology and capital.

KolmaBNH registered as the first research lab company in 2006. The main business was an R&D for natural materials targeting healthy food and cosmetics. KAERI registered three patents for materials for immunity, promoting hematopoietic function, anticancer and inhibitory effect, and one patent for purification technology of materials for food, pharmaceuticals, and cosmetics.

The first product of the company was a functional food called HemoHIM, registered to the Food and Drug Administration of Korea (KFDA) as the first immune function improvement material designated as Individual Recognition health food material in August 2006. Although sales began in 2007, there were two years of preparation for coming up with the product mix with more than 20 products. From 2009, sales increased dramatically to about US$ 200 million by 2015. The operation of KolmaBNH has three parts: research and development, production, and distribution. Parent company Kolma Korea closely links production, and a network marketing company helps the company in distribution.

2. Factors of Success

2.1 Technology Perspective

Innovativeness The technology originated from a recipe of Korean medicine. The products had clinical trials to confirm the hematopoietic and immune enhancement features and were approved by the KFDA as an individual recognition material for healthy food. Second, the material has a high applicability for food, pharmaceuticals, and cosmetics. Third, natural extracts experience problem in making color. However, KAERI technology could get rid of the defect using irradiation technology.

The rights of the technology This is an original technology protected by four patents, so there has been no problem in intellectual property rights. Also, the trademark was registered in 2003.

Technology environment In technological competitiveness, KAERI supports the original technology that is a fusion of nanotechnology and radiation technology. This fusion of technology leads a unique function of color control of natural extracts. In market competition, the main ingredient of products is extracted from plants under a recipe of traditional Korean medicine. Therefore, people have little uneasiness taking the products. This makes the products more acceptable to the market than comparable products.

2.2 Market Perspective

Macro environment Macro environment refers to the factors affecting market performance. The company is the first product of a policy for spin-offs

from government labs. In addition, the product is based on a recipe of Korean medicine, which is also actively encouraged by the government. In the supply side, there is a very friendly environment for the products.

Industry and competitiveness The markets for health functional food have expanded since the early 2000s because of the improvement of the standard of living. The word for the quality of life such as well-being and self-medication has been increasingly used. The products meet these kinds of needs with easiness from natural plants and Korean medicine. In addition, the parent company has experience in the cosmetics market. Therefore, it faces no obstacle in the cosmetics market as well. The cosmetics market has expanded to meet the needs not only of the domestic market but also of the Chinese market since 2000.

2.3 Capabilities - KAERI

Technology Licensing Office Since January 2000, the Korean government enacted the Technology Transfer Promotion Act to support technology transfer to the private sector. KAERI established TLO and searched technologies for transfer to support the industry. In addition, KAERI reviewed many options for technology transfer and reached the decision that a joint venture is more fruitful for the Institute.

Under this circumstance, a task force team examined the business proposal from Kolma Korea. The members of the team were from the Institute and external companies such as CEO of existing spin-off of the Institute and public accountant. It is noteworthy that there was a member having experience in the big private company as a high-level manager. The team reviewed the following aspects:

- Legal and institutional basis for the investment
- Economic feasibility
- Ensuring technology ownership and loyalties
- Transparency of accounting and management of parent company
- Stability and development potential of joint venture
- Investment method and management configuration

Incentives Incentives are one of the primary reasons why KAERI chose joint venture over licensing. They found out that a joint venture could produce expected earnings 20 times greater than a transfer with royalty. KAERI sold 25% of the shares after the IPO in May 2015, at a price of US$ 45 million, which resulted in net earnings of US$ 30 million after taxes and fees. Under the law, more than half the amount could be used as compensation for researchers involved and members of TLO.

2.4 Capabilities - KolmaBNH

General Management and Finance Kim et al. (2012) point out the factors of failure of technology commercialization: lack of understanding of technology and capabilities for management. Technology understanding includes an understanding of technological composition, product technology, and technology for mass production. In addition, capabilities for management presents a reserve of experience, lack of funds for technology commercialization, lack of capability for further development, and others.

Contrary to these factors, KolmaBNH inherited management capabilities from the parent company. Second, to overcome the lack of funding, the company minimized expenses by renting production plants, using test facilities of KAERI, leased from major facilities from the parent company. Also, the company could get government R&D projects for the development of new technologies, because a government lab verified them.

Table 3 Summary of factors of success

Categories / factors			Key factors of success
Technology		Innovativeness	KFDA approved the 1st Individual Functional Foods for Health in Korea (2006)
		Property rights	Quick Application for original technology ('00.5) Family patents and trademarks (HEMOHIM) ('03.4)
		Technology environment	Combination of KAERI's original technology & parent company's materials and mass production technologies
Market		Macro environment	Strong policy for products from Korean medicine Policy for TLO and commercialization
		Industry	Increasing trend for quality of life, well-being, and elderly growth. High growth in functional cosmetics market (20% p.a.)
		Competitiveness	No alternative products because of technology Parent company is domestic No.1 OEM/ODM Cosmetic Manufacture.
Ability	KAERI	TLO	The government demanded technology transfer of public institutions since 2000.
		Incentive	Commercialization is better than transfer.
	Kolmar BNH	Management & Finance	Tight control of big money led by the parent company. Management & financial supports from Parents Company
		Marketing	Selecting excellent distribution partner
		Network	KAERI, Kolmar Korea, Sales company Further development with Korean medicine institute

Marketing The best source of marketing was the quality of products based on four technological aspects: materials from natural plants, a recipe from traditional Korean medicine, advanced technologies from a government lab, and the approval of KFDA. The facts facilitated access to the general public in health supplements, and could get a distribution network of a networked marketing company thanks to the experience of the parent company in cosmetics. They started exports in 2010.

Network The biggest problem of startups is a lack of resources – technical and human - as well as a distribution network. KolmaBNH has technology support from KAERI, production and distribution from the parent company, and sales network from a networked. However, the company struck cooperative R&D with other government labs such as Korea Research Institute of Bioscience and Technology, Korea Institute of Oriental Medicine and some universities that had a college of Korean medicine.

IV. Changing Role of TLO

1. Overview

Table 4 Changing role of TLO

Stages	Term	Role of TLO
Common relationship	01.9~ 02.7	- Technology transfer, collaborative research, etc.
Feasibility study	02.8~ 02.10	- Review of proposal for joint venture plan
Establishment	02.11~ 04.1	- Agreement for establishment - Legal and institutional review - Request for valuation of technology (03.4) - Final decision for technology investment (03.11)
Monitoring and Consulting	04.2.~ 14.9	- Establishment - 1st product complaints and threat for sustainability (05.6) - 1st research lab startup (06.3) - 1st KFDA approval for health functional food (07.6) - Exclusive sales agreement with a networked company (09.6)
Exit	14.10~	- Listing in stock market (15.2) - Sale of about 25% stake

This section investigates the changing role of TLO. The history since 2002 is classified into five stages: frequent collaboration, feasibility study, establishment, monitoring and consulting, and exit. The relationship lasts

about 15 years. The longest stage is monitoring and consulting, about ten years, and the shortest stage is the feasibility stage lasting two months. The establishment took 15 months. TLO started the exit stage since listing in the stock market.

The history started with a typical relationship between a company and TLO of the research institute. The relationship, however, changed through a joint venture proposal from a company. Although radiation technology is quite common in atomic energy research institute, the technology of radiation for food was unique at that moment. The technology is a by-product of the Institute. Therefore, the Institute willingly started to review the proposal.

2. Feasibility Studies

In August 2002, Kolma Korea proposed a joint venture to KAERI for the production of new materials based on a technology of KAERI and Kolma Korea. The company was a customer of KAERI for technology transfer and research collaboration. Therefore, the company knew the technology well.

The proposal prompted TLO to organize a task force team with five staffs and two experts from the business. In-house personnel was responsible for the technical analysis, investment strategy, management assessment, financial feasibility and supporting staff of TLO. External experts were from an accounting firm, and there was a CEO of a startup who was a former researcher at KAERI. The primary task of the team was to check the feasibility of the proposal, the quality of the proposer of Kolma Korea, the method of investment, and exit.

First, they reviewed material development trends as well as market needs to secure technological competitiveness. Second, they also examined financial and management plans. In this process, they investigated the transparency and clarity in the accounting of the proposed company. Furthermore, they suggested changes in the financial plan to reduce expenses. Third, they considered what a reasonable share of ownership should be since they are a government research institute. Fourth, they wanted TLO to have the authority to monitor and consult the new joint venture company. Fifth, they suggested the modality of KAERI's exit of investment after listing on the stock market.

This kind of suggestions by a task force team for a joint venture is quite surprising even if we see the rationale for it. The institute was at the initial stage to transfer technology and to help small and medium enterprises following government policy. Therefore, TLO and the research institute wanted to set up a process for the joint venture.

3. Establishment

Although TLO wanted a cash investment for its 49% ownership of the technology, the Board of Directors of the Institute rejected the proposal since they were a non-profit R&D institute supported by the government. The final decision was a technology investment based on the valuation of technology. Therefore, TLO requested a valuation agency to carry out a valuation of the technology which it estimated at US$ 378 thousand. This value altered the respective share of both parties and led to a total paid-in-capital of US$ 1 million with a 37.8% ownership by the research institute.

During this stage, the first role of TLO was to check and review the institutional and legal issues related to the establishment of a joint venture company, since it was the first venture in technology investment. Second, TLO requested valuation agencies to conduct a valuation of the technology. Third, TLO negotiated with the partner company the size of a joint venture in paid-in-capital and the share of ownership participation. Fourth, it negotiated the composition of management. Although they did not dispatch personnel to the joint venture company, they approved the management team.

This experiment became the framework for ownership consideration of the research lab startup defined by the Special Law for the Promotion of Daedock R&D Park since 2005. It was the first research lab startup. From the inception of the law, this type of technology investment has become popular in establishing research lab startups in Korea.

4. Monitoring and Consulting

Due to a different approach from existing technology transfer and investment, the process of establishing the new company took one more year than initially planned. Furthermore, the salespersons or sales company exaggerate the function of the products. Within a year following the launch, this situation resulted in an investigation into food regulation as well as a legal dispute which involved a researcher who developed this technology. That hurt the image of KAERI.

To overcome these difficulties, TLO actively explained the situation to the general public and consulted the joint venture to cut the relationship with the sales company at the origin of the problem. Furthermore, TLO supported technology developments to get KFDA approval for health food supplement under the guidance of developer of the technology. Thanks to this effort, the first approval for health food supplement was granted by KFDA in May 2007.

In addition, TLO provided the usage or rental of KAERI test facilities and advised on the rental of expensive equipment from the parent company to minimize expenses and cash investment.

5. Exit Stage

The parent company suggested an IPO in 2014, and TLO agreed. After the listing in 2015, TLO sold 25% of the shares by block sale for about US$45 million. Total capitalization of remaining shares was about US$ 100 million. TLO planned to sell the remaining shares when the institute wants to proceed with it. About half the amount generated by the sale could be distributed to the participants in R&D and commercialization as compensation under the law for government labs, and the other half earmarked to the Institute. That revenue distribution led to difficult decisions in defining participants and contributors, and in identifying the level of contribution of each participant. Given that the total rewards represented a huge amount, even the smallest contribution represented more than a person's annual salary.

6. Summary of TLO

Table 5 Summary of changing role of TLO

Role		Feasibility study	Establishment	Monitoring / Consulting	Exit
Period		2002.8 ~2002.10	2002.11 ~2004.1	2004.2 ~2014.9	2014.10 ~ Present
Responsibility		TLO + TF Team	TLO	TLO	TLO
Common Mission[1]		Feasibility study	Valuation of technology	Staffing Registration of research lab	Incentive allocation
Role	Co-founder	Feasibility study Co-founder checking Amending business plans	Configuring shareholders Selecting CEO	Market complaint resolution Selecting retail partner KFDA approval	Listing on stock market
	Investor	Investment plan (Tech + cash) Exit plan	Tech investment Ownership plan	Financial mgt (Cut expenses)	Sale of shares
Effect[2]				Legislation of research lab startup (2005)	Legislation of incentive allocation (2015)

Note 1. Defined in the Technology Transfer and Commercialization Act.
2. Effects on the Special Law for Promotion of R&D Parks (2005, 2012, 2015).

Let us look at the role of TLO on the point of spin-off view through manpower, technology, financing, legal, and market difficulties. TLO helped the spin-off in various aspects in all the stages; 1) manpower issue at the establishment, 2) technology issue at the transfer stage and monitoring stage through sending the Institute's developers of the technology, 3) financing issue at the whole stage through the rental equipment of the partner and the Institute, and 4) market penetration issue by the legal approval of KFDA and the change of retailing partner.

V. Discussion and Conclusion

1. Discussion

This is a case study of a joint venture company recorded many firsts: the first research lab startup established in the designated R&D Parks under a Korean Law in 2006, the first approval for health food supplement by KFDA, the first research lab startup listed on the stock market, and the first exit of a research lab startup. The company was a sample of research lab startup defined by the Special Law for Promotion of R&D Parks. The deal involved a technology investment, not a cash investment.

As for the method of analysis, this study consists of two main parts, presenting two different perspectives: one from the joint venture company, another from TLO. The first perspective uses an analytical framework and the second perspective adopts a historical approach.

In the first part, for the analysis to be successful, the framework consists of three categories - technology, market and capability – and 11 factors. That means we look at the company in details through three domains totaling 11 factors. The analysis shows similar results with the previous study, namely, technological competitiveness and understanding the technology and production are important factors for success (Kim, Ko and Seol, 2012; Kim and Ko, 2014). As for the market category, the spin-off successfully brought industrial products to the market backed up by the approval of KFDA. Therefore, this study confirms the market competitiveness proposed by Seol and Lee (2002) in their research.

As for the second part of the role of TLO, this study validates the knowledge mediation (Hyter, 2016), researcher's participation (Wu et al., 2015), professional capability of TLO (Chung, 2004; Conti and Gaule, 2011; Choi et al., 2012), and incentive for participants (Lee, 2004; Debackere and Veugelers, 2005).

On the theoretical level, the research lab startup is not well research, except a paper (Lee, 2014), a Ph.D. dissertation (Lee, 2016) and a master thesis (Ham, 2016). Therefore, this study may be a stepping stone for further research.

2. Conclusion

Many studies point out factors behind the success of a startup such as original technology, successful productization and mass production, first entrant in the market with authorized products, and good management. This paper, however, ask a fundamental question: How do these factors play out if the target is a technology from government research labs or universities? And what about new spin-offs? Do startups possess those kinds of capabilities? Are those companies that acquire the technology capable of using this technology successfully?

This study details the role of a technology licensing office in the successful commercialization of technology transferred. In this case, TLO conducted a feasibility study regarding technology and market, financial statements and quality of the partner company. It is worth noting that TLO took the view that commercialization is more fruitful for the research institute and researchers than mere technology transfer. Therefore, they were active in the business model configuration and operation. After the establishment of the venture, TLO got involved in monitoring the management. Furthermore, it provided consulting to the joint venture company when it faced problems that pause a threat to the business itself.

A further question to the TLO and the research institute calls for answers: How and who provided the pioneering decisions that led to this successful venture? There may have been two experts at TLO. One is the leader in the research institute with experience in a big company as a member of the board of directors had a decisive role in the case. He offered insights to the task force team during the feasibility study and he persuaded the top management of the research institute. The second person who was in charge of TLO after the second stage also checked all the processes.

An additional question is why there is a paucity of good experts in other government research labs. Don't they have good technologies; can't they make a case for commercializing them? As we have shown, the constructive role played by TLO originated with the vision of the top management, the president of each research institute. If the president of a research institute recognizes opportunities for commercialization, then an active TLO will emerge. If the president does not grasp the importance of commercializing technology, he will not set up a task force team to explore the issue. Unlike

current industry trends, in our knowledge, few presidents of government research labs are involved in the commercialization process at the moment.

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