

Technology Transfer Principle & Strategy

Chapter 5: Discovery & Management of Technology Products

This chapter provides understanding of service characteristics of technology items and describes the principal points for the discovery & management of technology items. The aim of this chapter is to understand the following details.

- Service features of technology items
- The necessity and constituent factors of technology items
- Technology item status for each technology field and organizations possessing technology
- Selection method of technology items
- Technology item discovery & management for each technology development stage

In a small sense, technology transfer is the movement of personnel and on a larger scale we can say that it is an M&A, so technology items can comprise of just personnel or the whole company but in general they are patented technology that can be transferred. Recently, there often have been media reports where technology has received recognition and lead to the successful acquisition of foreign investment. While engaged in technology transfer tasks there are many meetings & conference with the management and through this we know that many Korean corporations have great interest in acquiring capital through the technology medium. Technology transfer must become a medium not only for non-continuous revenues like prepayments (payment type for know-how transfer) and ordinary technical fees (income received for the provision of relevant technology) but must also be able to obtain joint investment and foreign capital.

Technology transfer are attempted with the aim of expanding the market, but because of the structural characteristics of technology transfer and the lack of understanding in relation to technology commercialization there are many instances where the process breaks down in the middle. This section seeks to provide understanding in relation to the service characteristics of technology items and explain technology commercialization strategies, technology item discovery & management plans in the view of technology intermediaries.

[Figure 1] Technology commercialization strategy

for each technology development stage
 establishment of technology item discovery & management plans
 technology item status per technology field, & possession organization type
 understanding service characteristics of technology items
 comprehension & constituent factors of technology items
 technology item selection method

[Table 1] Technology item discovery & management

Classification	Technology Item Management	Per Technology Field
Per technology field	- organizations per technology field - government support project management materials - established technology market	- full texts per technology field - technology market information
Per technology possession organization type	- university TLO - corporate patent team or new business discovery team - corporate technology consulting	- technology transfer team of government funded research centers - entry into technology transfer mediation agreement - patent information analysis

Part 1: Service Features of Technology Products

Because technology is a service type that cannot be seen by sight, it displays the features characteristic of services including indivisibility, consumer participation, non-traceability, difficulties in standardization etc.

Firstly, unlike product transfer, a lot of time and effort is required in finding potential consumers because there are not many demanding parties. Especially, because overseas consumers have different language, culture, and commercial practice, favorable industry reputation in relation to company credit rating & technology capability is being gained.

Secondly, many documentation requirements accompany technology transfer activities including objective technology data, technology sales data, document submissions in Korean & local governments etc. As a result, there is a need for technology intermediaries to perform English documentation tasks, negotiation, & contracts. Technology mediators must be experts with international manner & language ability, financial analysis & marketing research ability, international contracts knowledge, and communication ability to be able to logically persuade counterparts. So, rather than being a duty domain of patent attorneys, technology transfer tasks should be recognized as a specialist field called technology mediation.

Thirdly, because technology is an intangible item, it can only gain trust by proving the technology capability on site to the potential customer. Especially, samples (or demonstration workshop) along with evidential data from public organizations with authority such as the patent office, testing & research centers etc. are essential.

Lastly, technology transfer help expand the scope of the corporate market. In terms of market size & opportunities, not only is growth a very important factor but there are also overall favorable market expansion opportunities in that revenues can be gained without production facilities or operation funds.

Part 2: The Necessity & Constituent Factors of Technology Products

Technology items are processed information of technologies that can be transferred through technology mediators who logically provide understanding to potential technology implementation parties. This kind of technology information can be divided into know-how technology, patented technology, and merchandized technology information depending on the extent of technology development.

The current technology market comprises of event type markets such as TCM21 (established technology market), established online markets such as the Korean technology bank (<http://www.ntb.or.kr>), and the global network of technology transfer boutiques that specialize in technology transfer. So, the 3 major factors of the technology market are the technology providers, technology items, and the technology buyers. The point which our corporations mostly overlook in this situation is the "technology item," in that they do not recognize the necessity of the "packaging tasks for merchandizing."

As a result, determining the needs of technology buyers is extremely important in technology mediation, and efforts need to be made to satisfy those needs. Technology buyers engage in technology implementation with strategic aims such as matching product sorts, market release of improved items, new business unit creation etc. And when the technology implemented is

merchandized, a business feasibility study must be done to determine whether there is enough profitability. Accordingly, formal technology & market data “licensing proposal” must be provided to enable the technology buyer to sufficiently conduct business feasibility studies, and only then can the interest of the technology buyer be raised. In the proposal, the technology implementation effects must be emphasized to the technology buyer through selling points, and to achieve this, persuasive information that can be easily understood by the buyer such as market direction of the technology buyer, product mix, marketing strategy etc. must be included.

If the technology buyer shows interest, a confidentiality agreement is entered, and the descriptive materials in relation to the technology & know-how to be transferred is submitted to the buyer, and for this, objective description materials must be prepared beforehand. The objective description materials to be prepared beforehand are different depending on industry type, but in general the document types are as follows.

[Table 2] Technology materials list

Technology description
Blueprints (design/manufacturing/processing/assembly etc.)
Photos (prototype/machine)
Blueprints for work implements
Assembly plan (whole/part)
Processing/assembly process plan (procedural manual)
Raw material/component specifications (Bill of material)
Activation/operation manual
Inspection standard
Post management, annual (test operation/repairs/maintenance)

Once the above objective description materials are prepared, the actual technology merchandizing tasks must be performed with the provision of sales materials such as actual samples with the technology incorporated, pilot plant, exhibit panel, video/CD-ROM CAD simulations etc. Once the sales materials are complete, active promotion becomes possible through item release in TCM21 (established technology market), technology item registration in the Korean data bank (<http://www.ntb.or.kr>), utilization of technology transfer boutiques, direct search of potential buyers etc.

Now, corporation wishing to engage in technology transfer must well prepare materials in relation to the subject technology to be transferred including technology objectivity materials for technology merchandizing, technology sales materials etc. Especially as the short cut to acquiring capital funding under the intense competitive structure, technology transfer has become recognized as necessary management activity that can gain incidental benefits like the raising of company image etc. Conclusively, in order to execute technology transfer the market must be accessed leaning to the rule of thumb, and must establish systematic technology merchandizing plans and precise prior preparations.

By establishing systematic work processes, the technology mediator must ensure that both the technology provider and technology buyer are well prepared for the technology transfer task. The following table explains the technology transfer work flow. To make a technology item, it must be made after determining the entire technology transfer task. A well made technology item can express the entire technology transfer process.

[Table 3] Technology transfer work flow

Classification	Major Tasks	Related Document Forms
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Client discovery	<ul style="list-style-type: none"> - Initial analysis of subject technology - Demand technology (firm) search - Marketing condition negotiation - Fee calculation - Induce mediation request 	<ol style="list-style-type: none"> 1. Consultation journal 2. Technology introduction materials 3. Technology sales request 4. Technology outsourcing request
Commencement contract (MOU, LOI)	<ul style="list-style-type: none"> - Technology transfer task explanation - Construct commencement contract draft - Commencement contract & deposit collection - Additional technology material request 	<ol style="list-style-type: none"> 1. Commencement contract 2. Tax account (for claims)
Marketing	<ul style="list-style-type: none"> - Detailed technology analysis/examination (phase II) - Customer search (on/offline, TCM21) - Establishment of negotiation strategy - Planning, marketing & customer contact - Negotiation of transfer type, condition, payment, payment methods etc. 	<ol style="list-style-type: none"> 1. Technology outsourcing analysis 2. Analysis report of technology provided
Technology transfer contract	<ul style="list-style-type: none"> - Contract condition/negotiation strategy support - Confirm transfer intention & specify conditions - Detailed contract construction support 	<ol style="list-style-type: none"> 1. Technology license contract 1. Technology (patent) transfer agreement etc.
Technology transfer & post management	<ul style="list-style-type: none"> - Technology transfer progressive advice - Transfer education advice - Commercialization fund raising advice - Technology business advice (additional) 	<ol style="list-style-type: none"> 1. Commercialization advice contract

Part 4: Selection Methods for Technology Products

Before attempting technology transfer with a particular technology, the technology mediator must first sufficiently understand technology trends, market potential, and the competitive environment, after which the “core value” to be provided to the technology buyer is examined. The core value must eventually be summarized into selling points for utilization in sales activities, but most technology items are weak in terms of providing core value to technology buyers. As a result, technology items with insufficient core value naturally do not succeed in the transfer.

Then, with what tool should the technology mediator appraise the technology capability?

When selecting technology items, whether to conduct standardized evaluation of the value or feasibility of the technology should first be decided. And, after individual evaluations per category including technology capability, growth potential, marketability, business feasibility, actual company situation etc. quantitative output should be derived and technology that exceeds the minimum evaluation grade should be selected as the technology item; this is the common method adopted.

[Table 6] Technology items checklist

Classification	Feasibility Study Items	Value Evaluation Items	Item Score	Weight	Evaluation Grade
Technology Capability	<ul style="list-style-type: none"> - Technology superiority - Technology right - Technology utility - Technology standard - Technology materialization - Technology asset & infrastructure 	<ul style="list-style-type: none"> - Originality - Superiority of competing technology - Replacement possibility - 3rd party rights violation - Government regulation - Additional issues to be solved 			
Growth Potential	<ul style="list-style-type: none"> - Market status 	<ul style="list-style-type: none"> - Market size 			

	<ul style="list-style-type: none"> - Market competitiveness - Management ability - Production capability - Marketing ability - Profitability 	<ul style="list-style-type: none"> - Growth rate expectation - Product capability - Product life cycle - Entrance/withdrawal obstacles 			
Business Feasibility		<ul style="list-style-type: none"> - Investment size - Risk level - Existing equipment (technology) compatibility - Additional value (profitability) - Mass production time consumption - Favorable situation creation possibility 			
Company Situation		<ul style="list-style-type: none"> - Vision - Organization culture - Financial situation 			

However, if the technology mediator seeks to appraise and select the technology item utilizing this kind of technology item checklist, precise research ability is required.

First, the technology mediator collects data on rights through patent research centered on official patent reports registered with the Korean, American, Japanese, European patent offices. Patent research in relation to the Korea, America, Japan, and the European region is seen to have a 70% level of reliability. Along with this, the technology mediator obtains technology information through consultation with the technology item developer and specialists of the relevant technology.

Second, in relation to the marketability item, secondary research materials are collected through materials of related associations & trade journals and analyzed. Especially, the factors of continual competitive advantage in comparison with competitor products are determined by classifying into the original value of the product made with the technology and additional value. How much the product made with the technology can be sold in the market is the key point, so the analysis of the product capability is a very important evaluation procedure. A commonly used product capability analysis evaluation sheet is as follows.

[Table 7] Product capability analysis checklist

<ul style="list-style-type: none"> -89 Features & expected benefits -90 Core benefit provided -91 Raw materials/size/weight -92 Number of models provided -93 Differentiation compared to competitor products -94 Product application areas -95 Possible product positioning -96 Usage/exhibition/installation -97 Cost-benefit/efficiency -98 Psychological value addition -99 Target customers -100 Delivery -101 Technical support -102 Quality guarantee
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Lastly, because the technology item is a cooperation model between corporations using technology as a medium, the business capability of the technology provider is done by evaluating vision, organization culture, and financial conditions. Ordinarily, more weight is given to ethics and business determination rather than financial condition.

Part 5: Discovery & Management of Technology Products for Each Stage in Technology Development

There is a saying “if a mandarin crosses the river waters, it becomes a hardy orange.” In the past, if another culture comes into “Haedong” (our country) it changes into the Haedong culture. However, it was not a hardy orange but a pearl. But, lately that has not definitely been the case. When things come in, there are many cases where not only those things become hardy oranges but my mandarin also unfortunately becomes a hardy orange. Technology item discovery, management, and transfer must be a pearl production process, if this goes wrong there are occasional cases of hardy oranges being produced. In terms of the success of transferred technology, firms can create profits through technology transfer. However, efficient technology transfer is in profit maximization. Profit maximization is not only the realization of profits through the transferred technology but also the creation of better technologies by absorbing and improving that technology. The home appliance industry of Japan in the 80s was successful in product size minimization through the absorption & improvement of implemented technologies by which it swept the world home appliance industry, and this can be seen as a representative example. Especially, the information and communication industry related technology developments, which have been expanding rapidly since the 90s, are proposing to us the possibility of significant profit creation through the absorption & improvement of transferred technologies.

Unlike the common concept of the manufacturing industry of the past, the information & communication related software industry and the information & communication peripheral device industry has the features of not requiring much capital in terms of business start-up and incorporation and there are many cases where there is no need for production know-how. That is, in the information & communication related software and the peripheral device industries there are many cases where it is possible to incorporate just with the technology transfer R&D results. In other words, Small & medium businesses can be established based on technology transfer, and if the strategic emphasis is placed on absorption & improvement based on the transferred technology, it is an area where competitiveness in the market can be secured. Industries related to this have a good chance of success just with development know-how rather than manufacturing know-how accumulated over many years. Especially, in the present situation where the trends of the latest technology can quickly be determined through the rapidly advancing internet, anyone can become the leader of their corresponding field, but maintaining the secured leading position for a long time is extremely difficult. The competition in the information & communication field depends on how economically and how much data can be quickly & accurately obtained, and the contribution to the development of user friendly systems.

Likewise, the incorporation process of new technology & company operation must be performed successfully in technology transfer. That is, the company seeking technology transfer is dependent on the entrepreneur who is managing the firm. The figure below explains the additional commercialization costs for each technology development stage, and this part will provide a discussion focusing on the features of the technology item for each technology development stage.

[Figure 5] Additional commercialization costs for each technology development stage

Mass production
Merchandizing complete
Commercialization technology
Prototype production
Prototype development complete
Lab research complete
Basic technology
Additional commercialization costs
High

Low

1. Research Results (Completion of Lab Research)

In terms of investment, these technology items have similar characteristics to venture capital, and if the technology level of firms wishing to transfer technology is of a high standard, the most economical technology transfer method is to purchase the technology by paying the patent fee for the research results. In a situation where nobody has incorporated the research results, a royalty can be paid to purchase the “exclusive right of exercise” in relation to the research results. However, in this case sufficient in-house resources must be possessed to go through the incorporation process from the development stage, where the technology is verified, to the engineering, testing, production & marketing stages. This should be seen not as a technology transfer but a new technology development. Because this will be equivalent to incorporating a new technology for the first time ever in the world, there will be considerable risk associated with significant capital requirements, large personnel involvement, a long-term incorporation process that cannot be forecasted etc. However, if it is successful, it can monopolize the market as it is protected by a patent,

2. Development Results (Completion of Prototype Development)

In terms of investment, these technology items have similar characteristics to KOSDAQ, and the technology to be transferred in this case is in the utilization stage or the transfer of technology ready for utilization. Patent right is not an exclusive right to exercise but a general right to exercise which has to be purchased by paying royalties.

A representative example is when the PC makers of Korea purchased operating software from Microsoft during the 80s. Engineering, testing, production & marketing is the responsibility of the company receiving the technology, and because there is no exclusive right, it is a technology transfer on the premise of market competition. Although ‘technological capability’ has been verified, there is the burden of verifying ‘marketability.’

3. Engineering & Testing Stages (Prototype Production)

In terms of investment, these technology items have similar characteristics to transfer centers, and this stage is the ‘turnkey plant’ method of technology transfer. The representative examples of this technology implementation and transfer method are the petroleum plants, cement plants, and black & white TV factories of the 60s. This can be called the technology transfer for incorporation. Because the technology transfer was guaranteed to the incorporation stage, there were no problems in production, but there was no guarantee whatsoever in relation to marketability. Fortunately, strengthened by the domestic industry protection policy of the government in the 60s, securing the domestic market was successful, but in the fully open domestic market of today, there needs to be ample prior examination with the ‘turnkey plant’ method of technology transfer which does not take marketability into consideration.

4. Production & Marketing Stages (Product Completion & Mass Production)

In terms of investment, these technology items have similar characteristics to NASDAQ and other multinational funds, and in this stage technology mainly refers to production know-how or management know-how. This is a technology transfer for companies already in operation to reduce cost, improve productivity, and prototype production.