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Analysis on Comprehensive Income as Well as Influence Factors of China's High-tech Complex Products and International Technology Cooperation

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Abstract: With the rapid growth in China's high-tech complex product export and technology transfer to other developing countries, it has been becoming more important to have a deep analysis on the benefits as well as the key influence factors for these activities. The study set forth the analysis framework of the strategic benefits from international transfer of aviation technology, using expert survey and comparative analysis. National long term political and economic benefits have been proved being top priority of the consideration, followed by aviation industry benefits and the last is the enterprise's benefits. Exploratory Factor Analysis and reliability testing have been applied in the questionnaire survey when analyze the benefit influence factors from technology importing country. After conducting the linear regression, the analysis showed that the industry environment of the importing country is the major influence factor and then the political stability. The economic condition and finance resources have very limited impact to the project revenue.

Key words: High-tech complex products, international technology transfer, aviation industry, comprehensive income

INTRODUCTION

In 1980s, China's economic development has been focused on export oriented development along with import substitution. Moving into 1990s, it has been changed to technology upgrading in China's manufacture industry by attracting overseas investment. Since the new millennium, China's overall technology in manufacturing industry has been developed rapidly and a transformation has been observed that export of high-tech complex products and technology is growing quickly.

Meanwhile, the transformation of the pattern of export-oriented economic development supported by the improvement of the internal technology content brings about the improvement of the comprehensive income of China's open economy.

In the current situation of globalization, how to effectively conduct the international transfer of aviation technology, how to identify the strategic benefit of each level in the process of international technology transfer, how to make use of international technology transfer effectively to obtain the maximum benefit and from the importing country's perspective, how to identify the various factors affecting aviation technology transfer, how to identify the key influence factors on the exporting

country's strategic benefit, all these are important subjects in guiding China's international technology transfer.

French sociologist Gabriel Tal'de is one of the founders of technology transfer theory. He put forward the S curve theory on technology dissemination and the imitation process evaluation standards. This theory has been recognized as foundation. Francis s. Chapin studied the relationship between the transfer of technology and social progress from the viewpoint of social evolution. In his "An Introduction to the Study of Social Evolution-the Prehistoric Period" and "A Historical Introduction to Social Economy", he profoundly expounded the influences of technology dissemination bring to the social progress.

In 1962, the famous scholar Everett M. Rogers published "Diffusion of Innovation", it had become a classic technology transfer theory. From 1964 to 1968, he conducted a survey of international technology transfer. They carried out a thorough study on the technology dissemination in rural areas of Brazil, Nigeria and India. This has created a precedent for international cooperation on technology transfer.

Entering into 1980s, mechanism of technology transfer has become a hot study topic, such as technology transfer selection theory from Lenin, Krugman as the representative of the technology transfer

equilibrium theory and Saito Yu's technology transfer cycle theory and technology transfer "N.R" studies, those are all the achievements from that period. Nowadays international competition has increasingly focused on science and technology, technology transfer is gradually being incorporated into the framework of national and regional development strategy, therefore, research on technology transfer is moving into a broader field, theory background and research content are more widespread and abundant. At present, study on technology transfer policy, strategy and suitable mode of technology transfer for developing countries are to become the new hot spot. Thus, the benefits from the export of China's high-tech complex product and technology export can be roughly analyzed and reflected by the following aspects:

- Export expansion. The technology export brings along the exports of equipment, parts and labor. Generally, the ratio of the technology export verse the driven commodity export is approximately 1:50
- China's enterprise globalization realized gradually by technology export. For example, through technology export, the resource development of the host country can be joined together and the global resource allocation of the company can be realized; at the meanwhile, the industry upgrade of the related enterprises will be benefited and the high value-added manufacturing output will be outstanding (Vernon, 1966)
- Improvement of national open economy development. Actually, the international resources, market resources and scale economic benefits that can be utilized by our enterprises have been advanced with the export increment and technology output of high-tech products
- Economic benefits. With the abundant technology export, the trade income is considerably more than those of commodities with general technological content, thus building up the international income and expense capability of our country
- Also, the high-tech complex product export and technology output are especially beneficial to expanding the economic and political forces of the export country, thus strengthening the overall economic strength of the country (Kim and Oh, 2002)

This study is designed to give an outstanding analysis on the high-tech complex product export and the related technology export in terms of three-level relations of the enterprise economic benefit, industrial upgrading benefit and national economic strength.

METHODOLOGY

The expected benefits from international technology transfer are described in accordance with the two dimensions of long-term and short-term. The study focused on the analysis of the strategic benefit framework of the international technology transfer, described, respectively from the country's long-term geopolitical and economic benefits, the development of aviation industry and economic benefits of enterprise. This has been verified through quantitative analysis and expert survey questionnaire.

The study also focuses on the analysis from technology importing country's point of view. It first proposed a model of influence factors and then analyzed one by one the influence factors of technology transfer.

Routing analysis of virtuous cycle of technology resources of China's open economic development:

The typical China's economy development model has been formed with the rapid development of China's economy since reform and opening up, the core feature of which is to be the open economy way depending on the gradual technical development of manufacturing. The specific process can refer to the following chart (Fig. 1).

As shown in Fig. 1, the promotion of the technology strength of enterprises in China by means of open economy and international development process generally starts from the technology introduction (Lu, 1994). Depending on their own capabilities of adoption and application of transferred technologies when conducting foreign trade activities, both internal and external support on technology development and market competitiveness work to promote the innovative technology transfer are important. Enterprise's technology upgrading and economic performance will be continuously contributing to the whole industry upgrading and finally become the crucial part of national economy as shown in the circle in the Fig. 1.

Analysis of comprehensive income of high-tech complex product export and technology export:

According to the above analysis, the comprehensive income of high-tech complex product export and technology export can be divided into the following several types:

Technology promotion and economic (market expansion)

benefits for enterprise level: For the technology transfer enterprises, the technology export can make the own high-tech complex products more competitive in the market. Actually, due to the characteristic of technology complexity, the maintenance and use of the high-tech

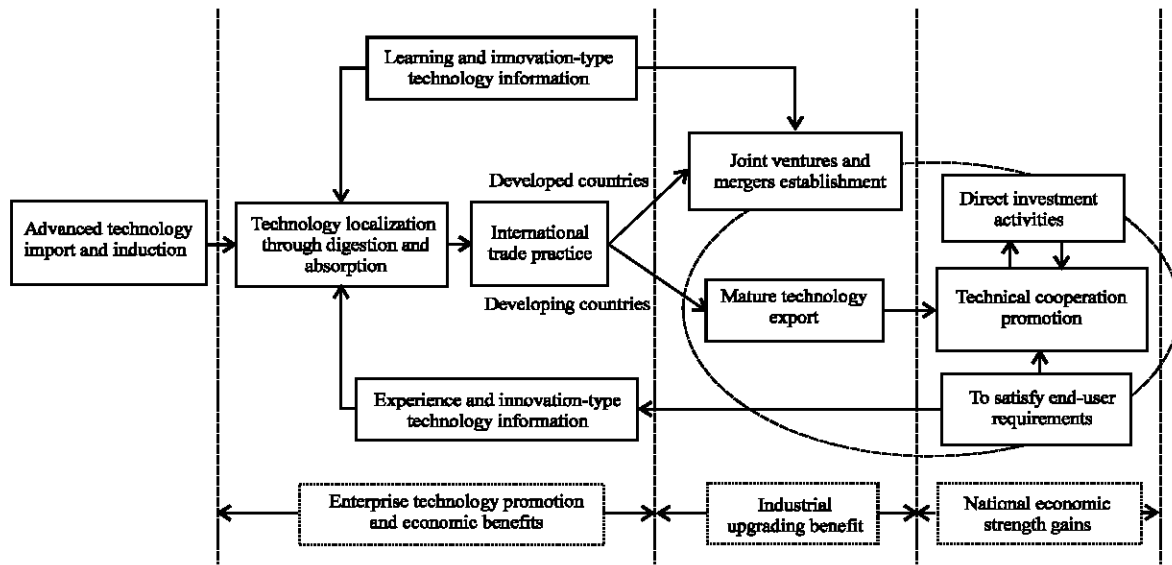


Fig. 1: Analysis of introduction, development and promotion routing of China's manufacturing technology as well as benefit levels

complex products have certain technology transfer content while the transfer and export of the related technologies actually function as market expansion owing to the extremely high added value. For example, the enterprises in aviation industry can rapidly open the market by technology transfer and increase the capacity of the new market as well as expand the market share. Because of large investment and long service cycle of aviation technology and products, it is difficult to give up the aviation technology and products purchased by an enormous sum of money. Therefore, the user loyalty can be easily cultivated and the new markets can be stabilized.

Technical capacity upgrading benefits for industry level: The technology transfer of high-tech complex product production industry tends to prompt the enterprises from export country, even the relevant industries, to strengthen their own technologies and market competitiveness. According to the Porter competition theory, two basic factors forming the competitive advantage are low cost and differentiation, the root of which lies in the technical innovation. The analysis frameworks in accordance with the theory of technical innovation will differ as the characteristics of innovative activities in different industries (Chen, 2008). Later Porter's creative theory has been distinguished into two types of technology innovation activities. One is named Schumpeter I, in this system, technical threshold is low and relatively easy to enter the market, newly set up companies, medium/small size high-tech companies are

playing key roles. This technology system is considered as a creative and destructive in its nature of innovation; the other type is called Schumpeter II, the characteristics of the system include high technical threshold and difficult market entry. Large enterprises are usually leading in the market and continuous innovation based on existing technology is the outstanding characteristic of this kind of technology system, so it has high monopoly and high accumulation, For the development features of the manufacturing industry, the high-tech complex products and related technologies tend to be defined to this development framework, for example, the aviation industry can be called the typical Schumpeter II type industry. The previous policy researches paid inadequate attention to the this type innovation and most believe that as the nature of the technological innovation would be continuity and progressivity, this type may not be important as creative destruction, from policy perspective. However, for the developing countries, this study suggests that the technology innovation and accumulation in these type industries are of equal importance.

On the other hand, the international technology trade of the high-tech complex products may create large amounts of foreign exchange, so that the relevant enterprises boast abundant capital and wider technical cooperation resources which are beneficial to developing technical innovation and further improving the core competitiveness of the industry. At the same time, in the process of relevant technology export, cooperative

partnership established during the research and development stage may be the precondition for sharing the risks, while the reverse technology flow may also promote the industrial capability.

Whereby, due to the characteristic of high value-added industry for the technical complexity, the development of these industries will bring about wider radiation and driving effect (Domar, 1950). For example, although the requirements for aviation industry access are high and the investment is huge, the countries all around the world still scramble to develop the aviation industry. Viewed from radiation effect brought from technical complexity, the focusing, transfer and diffusion of the aviation technology can drive the development of subjects including materials technology, machining process technology, industrial automation, computer, modern management technologies, etc. and industries (Serapio and Dalton, 1999). According to the foreign statistics, 10,000 U.S. dollar investment to the aviation industry may produce approximately 800,000 U.S dollar export value of the aviation industry and the related industries after 10 years. The input-output ratio of the developed countries in the aviation industry such as the United States may reach 1:20. According to the statistics of Japanese Ministry of International Trade and Industry (MITI) in 1982, calculated by unit weight value ratio, if the ship is 1, the sedan is 9, the electronic computer is 300, the jet aircraft is 800 and the aircraft engine is 1400. Besides, except the physical resources of the industry itself, the development of domestic service industries such as finance, insurance and logistics can also be promoted by the export of aviation technologies which accounts for relatively large amount in the international trade (Guo, 2003).

It cannot be ignored that in the process of aviation technology international cooperation a large number of high-quality technical personnel have been trained and well improved in terms of practical experiences. For example, in the enterprises engaged in international aircraft subcontract production, all kinds of personnel had participated both long-term and short-term professional trainings related to the subcontract production. These excellent technicians and technical workers become the fundamental resources to ensure the product quality in the manufacturing process in the industries. Through years of effort, many aviation manufacturing enterprises in China have been developing professional technical teams that are capable of technical and business communication and collaboration with overseas partners. Meanwhile, those related companies trained and maintained a large pool of experts in fields of technical, production and management. This effectively

improved the overall industrial staff quality and prepared the talent resources for the export-oriented development of the industry.

National economic power and influence comprehensive income: Undoubtedly, the export of high-tech complex products and the output of related technologies can strengthen the influence of the export country in the international economic development and international market, thus providing a virtuous cycle channel for the comprehensive development of the national industrial technology.

According to the above analysis, the following will be emphasized on summarization of the comprehensive income analysis framework of China's aviation product export and technology export.

Design of China's international technology transfer analysis framework: In order to estimate the total benefit of China's technology transfer and high tech product export, this study, by using example of aviation technology transfer, the study discusses this issue from country level, industrial level and enterprise level and takes the three groups of investigation factors as a more systematical evaluation framework. This framework involves two-layers of evaluation indicators (Table 1). The strategic benefit can be obtained through investigations under this framework.

Based on the above thorough analysis on each kind of gains in technology transfer in China and by applying strategic management framework to the investigation, this study finds that long-term national economic development potentiality is always the utmost priority as kind of strategic performance for those collaborations and the development in certain industry would be the secondary and the economic benefits for particular enterprises may be considered as more practical matters (Jones, 2006; Liu, 2008).

Influence factors for comprehensive income of high-tech complex product manufacturing technology export: In order to ensure the realization of the comprehensive income of high-tech complex products and the related technologies export, the relevant factors that may affect the development and realization of the purpose must be grasped clearly. Through the summarization of a large number of international and domestic associated research literatures and actual investigations, the study sums up the following several important aspects as conditions and also important influencing factors during such high tech complex product export and technology collaboration:

Table 1: China's aviation industry international technology transfer income analysis framework

First layer factors	Second layer factors
Longterm national political and economic benefits	Strategic partnerships for technology export countries and technology import countries in national level Improvement of the technological path dependence of the technology import countries on the technology export countries Expansion of the geographical range affected by geopolitics political and economic effects of the technology export countries
Sector based industrial development benefits	Promotion of technical capacity of aviation industry system Promotion of international cooperation ability of aviation industry system Radiation effect on upstream and downstream enterprises in the industrial chain Promotion of industrial capability of the technology export countries caused by technology information and requirements provided by the end users of the technology import countries
Enterprise technology resources and economic benefits	Expansion of market occupancy Promotion of alliance capability with domestic and foreign cooperative partners Promotion of capability to develop new markets Cultivation of international cooperative talents in the company

Degree of stability of political and economic environment in host country market:

The degree of stability of political and economic environment in the technology receipt countries is the necessary condition for the aviation technology transfer. The technology transfer is hardly successful in a country with unstable political environment and poor economic environment. Especially, as the aviation technology transfer tends to be longer in the time span, for example, the time span of one project may reach ten years or longer, therefore, this factor is of particular importance.

The degree of stability of economic environment is also the necessary condition for the aviation technology transfer. The technology complexity of the aviation products determines the high-cost and high-value status. The technology import countries should pay a large sum of money for introduction, requiring stable economy and fiscal revenue sources as essentiality; otherwise, the technology export party will face a great risk.

On the other hand, technology transfer in technology and capital intensive industries such as aviation industry, are usually policy oriented operation in national level. Thus policy stability and continuous financial support from government would play crucial role in decision making. Meanwhile the technology transfer marks the strategic cooperation in government level and it also reflects the overall mutual trust and economic and trade cooperation relations among corresponding participating countries.

Total GDP as well as overall development level of economy and technology in host country market:

The economic development level of one country tends to be a reference to the advanced level of the technology of the country and the economic development pattern must be promoted with the help of the key role of technology boosting the economic growth. Therefore, it's believed that the economic development level in a country or region decides the overall willingness of technology

absorption and also marks the level of providing the internal resource guarantee by the party of technology introduction. For the countries or regions still in the early stage of industrialization development, importing advanced devices and equipment may contribute to the country's economic potential growth. The economic development goals could be usually long term based and could be achieved directly through long term production efficiency improvement. During this stage, the introduction party adopts the way of following the existing production mode of the developed countries to establish own industrial facility system, without strong desire of dynamic technology absorption. However, with the on-going industrialization and continuous improvement of the economic development, the technology importing party no longer stay with simple use of the technology piece by piece, but rather, the related companies usually work for building up their own industrial technology development system which could be competing with international advanced manufacturing system through in depth adoption of newly imported technologies and through their own upgrading procedures. For the aviation technology as the representative of high-tech complex product processing and manufacturing, stronger ability of resource allocation is required for technology introduction and absorption. This especially presents in the aspect of technical cooperation between the developed countries and developing countries, the emerging economies.

Viewed from market-driven effect, if the economic growth of a country is continuous and the inhabitant purchasing power is strong, the market potential is huge but the investment risk is small. Multinational corporations are willing to transfer the advanced technologies to the country in the light of the continuous development requirements of the local market. Meanwhile, the local knowledge structure and level as well as the developed productive force are also beneficial to ability allocation during the advanced technology transfer.

Industry and human resource conditions in host country market: The industry and human resource conditions of the technology import country are also the important influence factor affecting the comprehensive income of the technology export country. Generally speaking, the human resource ability and allocation level of the technology introduction party may restrict the channel, pattern and actual effect possibly reached of technology transfer.

From the perspective of technology absorption for analysis, the technology transfer may be realized concretely depending on the engineering technicians in each level. The specific knowledge and ability include the technical forecasting ability and various abilities such as learning, understanding, digestion, absorption, imitation, improvement and innovation which can become complex ability form against the designing and manufacturing processes of high-tech complex products in an echelon evolution manner (Chen, 2009).

For example, the enterprise undertaking the role of absorption has a higher overall requirement to human resource. From the perspective of manufacturing technology, the manufacturing of aircraft requires higher accuracy, more skilled technology and more proficient technical workers; from the perspective of designing process, the requirements of aircraft are rigorous, even more rigorous in the range of application of the military aircraft. Low temperature, high pressure and high speed level are incomparable for some ordinary products and civilian industry products. Therefore, these correspondingly ask for higher requirements for designers (Lin, 2007).

Internal specific technical ability in importing companies in host country market: For the manufacturing process of high-tech complex products, the technical ability requirement of a particular project is prominently performed at the engineering and manufacturing processes.

Special emphasis is placed on production process and technical level of the import country which are one of the key factors for the successful introduction. In the later stage of technology introduction, technology innovation, product reutilization and production scale expansion tend to exist simultaneously. For those importing countries with better and higher technical and manufacturing operation level, the time period for realization of these processes may be shorter and transfer efficiency for those production process may be higher; while for other companies with lower manufacturing quality level, transferring time would be longer and the efficiency would be lower. In fact, some of importing parties were even

incapable of transferring the technology due to poor production quality level.

It is recorded that the high and new technologies are usually used on the aircraft for the first time, mostly for military aircraft. As a carrier for new type of technology development, the importing country and corresponding enterprise must possess certain abilities on specific technology and processing innovation. This would guarantee a win-win situation for both import and export parties and generate the comprehensive cash flows to both parties.

Actual operational experience accumulation level of import companies in host country market: International cooperation and actual operational experience on the introduced technology of the import party are also the important factors to determine the comprehensive income level of the technology export party. Specifically, the following five aspects are given based on aviation industrial collaborating cases by Chinese companies:

- **High tech complex product/equipment maintenance level in import party:** For example, aviation equipment and the relevant maintenance level are of vital importance in the process of technology introduction. The aviation equipment maintenance level itself is an experiential process and the quality promotion of subsequent technology introduction driven by the high maintenance level seems to be natural
- **Internal management level of technology import party:** The production and management ability of the import country is often decided by accumulation of operational experience, while the management level also decides the efficiency of the subsequent technology introduction. A good management system with respect to technology including the procedure of technology introduction, the procedure of production and the management of technology reprocessing can make the technology to be absorbed more fully and rapidly; a good system with respect to management including the management of technology status, the management of organization and responsibilities and the management of contract writing can exert a great effect on the efficiency of technology transfer on the other hand (Spivey *et al.*, 1994; Karani, 2002)
- **Quality control system and management level of technology import party:** In the processing and manufacturing process of high-tech complex products, quality control and management are always concerned with quality management tool and

equipment and facilities level as well as the accumulation. During the processing and manufacturing technology transfer of high-tech complex products, the quality control of the management level matched with the equipment and facilities which can be formed by a long-term process of experience products and the perfection of the system can produce a qualitative leap to the technology transfer. After all, the technology import party needs high-quality products, requiring perfect quality control system. For example, in the transferring process of aviation technology, the quality control and system may be of an important part of the technology transfer and the technology transfer can be realized by improving the product quality supervision system of the technology import country and increasing the management experience accumulation on the quality reliability of the products

- **Financial operation ability and level of technology import party:** Strong internal financial resources of the import party are the necessary conditions for technology transfer

For example, transfer of typical advanced manufacturing technology such as aviation technology, requires a huge amount of service fees, along with time consuming transfer of technologies. Therefore, the import party needs to have both financial capabilities and capability to implement the related technology facility to support the formal running of the system. Among those necessary resources, the so-called investment ability is important in order to develop effective technology conditions. For example, the aircraft manufacturing technology may include such as investment on the airport, spare parts and ground support equipment as well as software such as investment on engineers, ground crew and research staff. As it were, the investment of the import party is equal to build a car while the genuine transferred technology is gasoline and the car can be driven by combining the two. Therefore, the investment ability of the import party is also a factor concerned with the successful technology transfer

- **Corresponding technology service transfer ability and level of import party:** Due to the feature of long-term and complexity of the high-tech products, the export of the associated manufacturing technology requires after-sale service facilities. This type of technology transfer is proved to be the most extensive range of transfer compared with many other

industries. This kind of technology export mainly refers to the export of use and maintenance technologies as well as after-sale service technology support of all kinds of aviation products. For all aviation products for sale, the export of this kind of technology service is bound to provide once the products are sold. As for sales of the aviation products, delivery is just the beginning of sales. Due to particular properties of the aviation products, once the products are delivered, the service condition will directly affect the follow-up sales and the sales potential of other countries. Best doing the export of technology service well and the guarantee of the aviation products in use and maintenance outside are not only beneficial to improving the popularity of the products in the international market, but establishing a good image of China's aviation industry

Analysis of practical projects conducted by Chinese companies:

In order to further analyze the strategic benefits of China's aviation industry foreign technology transfer project, questionnaire analysis and comparative study are carried out on three successful aviation technology foreign transfer projects in this study. It is important to note that these three projects are round-off projects and gain some achievements in the technical cooperation and market development, but vary in the comprehensive strategic incomes because of different project backgrounds and development states.

Concerning the technology type investigation questionnaire, 45 questionnaires are sent out totally for the project executive staff, technical specialists and employees, 39 are taken back and 35 are valid where in the foreign trade staff executing the aviation technology transfer accounts for 92% and the aviation industry technology management staff and aviation industry technical specialists account for 4%, respectively.

As showed in the research results, project 1 is carried out on the basis of strategic cooperative partnership; the comprehensive income of this project is superior to the other two with purely market-oriented cooperation in nature. This is reflected especially in terms of long term sustainability of the project income. The two parties of the technology transfer in this case have a long-term vision on the cooperative relation and mean while positive geographical regional economic performance also has impact on the project. Project 2 does not have strategic cooperation in nature between the two parties. However, based on their rich experience in technology importing and adoption, the project has shown an outstanding performance in its industry improvement capability and industrial supply chain based diffusion effect. Therefore, the comprehensive income of project 2 is in similar level of project 1. In contrast, project 3 has no strategic

Table 2: Comprehensive income of typical projects of China's aviation technology export

Comprehensive benefit type of the technology export party	Project		
	1	2	3
Long term country level political and economic benefits	4.599	4.014	3.777
Industry development gains	3.943	3.904	3.485
Enterprise economic benefits	4.195	4.040	3.862
Comprehensive benefit summary	4.370	3.990	3.718

cooperation between the two parties. The nature of the cooperation is only for market development and the importing country has inadequate experience in technology transfer. In this case, it is only comparable with the other two projects in terms of market share expansion. Due to big gap in all remaining indicators, especially in character of long term cooperation and technical personnel training on related technology, the project appears less successful than other two. Viewed from the properties of the technology transfer project, the scale and range are far below those of the other two projects and thus the comprehensive income is relatively low.

In general, through the analysis based on various aspects of project cooperation, those projects with special advantages in both market development and policy support (represented as the strategic partner) would have the highest comprehensive income. While for other project only relying on economic performance, without clear policy support, would also gain certain comprehensive benefits. However for those project lacking of advantages in both policy support and market demand (such as project 3), although the project could be completed, the comprehensive income level was relatively low.

The research makes an analysis on the questionnaire results on the basis of determining the associated secondary index to assess the comprehensive income. The results are shown in Table 2.

It is also important to remember that the technology import countries should be relatively strong in economic strength and financial resources according to the foregoing analysis in this study, otherwise, the technology export party would be faced with risks. However according to the analysis in the study, in the three practical technology export projects, although economic strength and financial resources of the three technology import parties were relatively weak, the political environment of these three countries are relatively stable and they all have close economic and political cooperation with China; meanwhile, all these three countries have promoting policies on numbers of industries including aviation industry and have already invested huge fund to support the related industries. The project 1 starts from the 1980s, the project 2 starts from the year of 1997 and the project 3 starts from the year of 2010. All of them are long-term and successful projects.

Thus, in the aspects of project selection and decision-making, the need of the strategic development is the major consideration other than excessive analysis on the possible comprehensive income level of the project. Actually, the related aviation technology export companies in our country do not take the economic conditions of the technology import countries as the decisive condition for technology transfer, but make decisions by taking the political and industrial environment of the technology import countries as the major object. Therefore, the final practice process of these projects dictates on the other hand the rationality and appropriate application spaces of the international economic cooperation comprehensive benefit assessment framework based on these high-tech complex products (such as aviation industrial products and technologies).

RESULTS AND DISCUSSION

This study analyzes the benefit framework of international technology transfer. The long-term economic benefit of national geo-political and industry development benefit as well as the enterprise's income have incorporated the three layer one benefit indicators. In the meantime it also puts forward layer two indicators. The weighting of each indicator under both peace time and high risk period has been determined through expert questionnaire survey process and comparative analysis. The result shows that no matter it is in peace time or in high risk period, the country's long-term geopolitical economic benefit is always the primary strategic benefit, the second is the development benefit of industry, the third is the enterprise economic benefits.

According to benefit analysis framework, 3 typical China aviation project were evaluated and compared. The results proved the validity of the strategic benefit framework. The questionnaire survey on the importing country's influencing factors has been analyzed using exploratory factor analysis, reliability test and the linear regression analysis. The outcome demonstrated that for current China international aviation technology transfer projects, the biggest factor affecting profit is the industry environment in technology importing country, followed by the political environment. The impact of importing country's economic level and financing capability on the project profit is relatively small.

CONCLUSION

By summarizing research findings and practical experience of Chinese companies for high tech complex product export and related technology transfer, this study provides a three level analytical evaluation framework and detailed two layer evaluation indicator system for companies in typical developing countries. After application of this evaluation framework to practical projects conducted by Chinese companies, this research finds that export of high tech complex product and transfer of related technologies can be beneficial to not only companies involved, but also to related industry and even national interests, especially beneficial to companies in technology upgrading, from developing country perspective.

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