

STATUS OF ACTIVITIES OF SEARCH, IDENTIFICATION AND SELECTION OF PRODUCTION TECHNOLOGIES IN SECTOR OF ELECTRONIC SUPPORTING INDUSTRY AND PROPOSAL OF SOLUTIONS

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Abstract:

After long years of efforts, majority of enterprises in sector of electronic supporting industry of Vietnam remain slowly developed. One of the main reasons is the weak and out-dated state of production technologies which are behind demands for participation in product supply chains of some large electronic corporations. In this paper, the authors focus studies on analyzing of the status of the sector and clarifying shortages in activities of search, identification and selection of technologies for production of electronic components and parts by enterprises of supporting industry of Vietnam. Then some recommendations and solutions are proposed to support enterprises of supporting industry to innovate technologies.

Keywords: *Production technology; Search of technologies; Identification of technologies; Selection of technologies; Technological innovation.*

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1. Introduction

Recently, the export values of electronic sector of Vietnam experiences a strong growth rate. Since 2015, Vietnam is ranked the 12th in the world and the 3rd among ASEAN countries in export of electronic products. The total export values passed the volume of USD70 billions by 2017. According to the data by the General Statistics Office of Vietnam, for the first 8 months of 2018, the total export values of Vietnam are about USD155.41 billion where the share of computers, electronic products, components and parts (jointly called afterwards as “parts”) is about USD18.44 billion making a

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growth rate of 11.4%. The one of phones, parts is USD30.88 billion making a growth rate of 15.7% in comparison to the same period last year (*General Statistics Office, 2018*). The above noted figures show a strong development of electronic enterprises in the time of international integration. However, 95% of these export values come from FDI enterprises. Local enterprises do only assembling and fabricating works and then are low competitive, particularly in comparison to FDI enterprises. Recently, the shift to investments in electronic sector in Vietnam has become a prevailing trend of investors. The development of electronic sector of Vietnam attracts attentions of multi-national groups, particularly the Japanese and Korean ones including the final production stage as well as the stage of production of parts. Almost all the world leading electronic corporations are present now in Vietnam such as Samsung, LG, Canon, Intel and Panasonic. Among them, the largest project is of Samsung (the total investment volume in Vietnam is USD11.2 billion) with the main share of mobile phones and high tech products. Also, there are some large investment projects from Intel (over USD1 billion of investment), LG (USD1.5 billion of investment), Canon (USD306 million of investment), Panasonic (USD250 million of investment). The presence of many large electronic groups in Vietnam pushes up the appearance and shift of many enterprises of supporting industry to production of products related to electronic sector. Clearly realizing the trends, situations, roles and importance of supporting industries for development of electronic sector, the Vietnam Government issued policies to promote development of this sector where the particular attentions are paid to development of enterprises of supporting industry of Vietnam in activities of production of electronic parts (*Decision No. 34/2007/QĐ-BCN dated 31st July 2007 by Ministry of Industry; Decision No. 12/2011/QĐ-TTg dated 24th February 2011 by the Prime Minister; Decision No. 1483/QĐ-TTg dated 26th August 2011 by the Prime Minister; Circular No. 96/2011/TT-BTC dated 04th July 2011 by Ministry of Finance; Decision No. 1290/QĐ-TTg dated 01st August 2014 by the Prime Minister*). However, Vietnam is only a new comer in sector of electronic parts and the main activities remain fabricating and assembling operations from imported basic parts and then export of ready units or components. Therefore, the added values remain very low, only about 5-10% of the total values of products. The benefits come mainly from cheap labor costs. Vietnam enterprises in this sector are mainly SMEs and they face short capitals and resources of investment for advanced and modern production lines according to requirements of clients. Local enterprises in sector of electronic parts almost remain outside electronic supply chains of multi-national electronic groups or, in better cases, can provide simple products for overseas large corporations.

This paper is to present the status of production technological innovation in enterprises of supporting industry of Vietnam and their activities of search, identification and selection of technologies for production of electronic parts. On basis of these considerations, the study team gives some recommendations and proposes some policies to promote activities of search, identification and selection of adequate production technologies of electronic parts of Vietnam which target to serve the process of technological innovation of enterprises in sector of electronic supporting industry.

2. Status of production technological innovation in enterprises of electronic supporting industry

At present enterprises of electronic supporting industry of Vietnam, in majority of cases, own technologies out-dated with gaps by some generations in comparison to the existing advanced ones. In reality, the modern technologies are found in FDI enterprises. Here, the problem is what to do to enable Vietnam enterprises to access to these technologies then own and master them. Only after that they can think to innovate technologies in order to enhance their production capabilities.

As shown by practice, many enterprises of electronic supporting industry of Vietnam are searching ways to access information on technological equipment for production of electronic parts to meet requirements from clients (coming from large electronic groups actually present in Vietnam, such as Samsung, LG, Canon and etc.) but only a few of them can acquire the desired ones. In practice, the prices of almost all the machines and equipment for production of electronic parts are higher than enterprises of Vietnam can invest. They can do only moderate investments on basis of their adequate financial sources. Then the purchased machines and equipment remain at medium technological level (not at advanced level yet) which cannot make output products meet quality and requirements desired by clients.

However, at present, the investments in Vietnam from large electronic groups start increasing fast which offer opportunities for enterprises of electronic supporting industry of Vietnam to make efforts for large investments of technological innovation and production activities. According to reports by Ministry of Industry and Trade on activities by 2018 of industry and trade sectors (*Ministry of Industry and Trade, 2018, Report of the first 8 months*), the share of electric equipment and electronic parts keeps a high growth rate of export values. The main products are mobile phones and computers which come mainly from FDI enterprises with stable markets. By August 2018, the export values of phones and electronic parts keep increasing with the total export values of USD 4.4

billion making a growth of 13.9% in comparison to the previous month and 4.7% in comparison to the same period of 2017. Globally for the first 8 months of 2018, the total export values of phones and electronic parts are about USD30.87 billion making a growth of 15.7% in comparison to the same period of 2017. Here Samsung is the group with the highest contribution to these figures. A series of new products (such as Galaxy Note 9) are expected to be the main export products of the group as well as for sector of phones for the late months of 2018.

Majority of enterprises of electronic supporting industry of Vietnam are SMEs with limited potentials in capitals, human resources and technologies. Therefore, the topic of technological innovation is not put high in agendas. As shown by investigation outcomes conducted by the study team among 50 enterprises (7 SOEs, 18 FDI enterprises and 25 private enterprises) on needs of technological innovation, only 20% of them conduct technological innovation activities but in various levels. The number of enterprises having R&D units makes a very low share (less than 10%). The enterprises make mainly investments for machines, equipment and production technologies (making 65%). The remaining share 25% are their own efforts for research, modifications and renovation of techniques and technologies. These figures show well that SMEs do not care really investments for technological innovation research. This fact fits well the practical reality where, with low investment rates and limited resources, enterprises of supporting industry have no ways to be pro-active in these activities. Their attentions turn around the existing questions of machines, equipment and technologies. More than that, enterprises themselves are not capable of identifying the most appropriate technologies for search, selection and investment for innovation. State policies do not yet support enterprises for their needs in effective ways in technological innovation, capital sources and development of human resources.

Among the three types of enterprises (SOEs, FDI enterprises and private enterprises) in sector of electronic supporting industry, the category of high techs remains in hands of FDI enterprises. These enterprises, however, in practice do not do R&D activities in Vietnam. They do them home. Their targets are to take advantages from favourable policies and cheap labor in Vietnam to develop production activities, local supply for production and exports. Therefore, it is highly difficult to evaluate the status of production technological innovation in FDI enterprises despite of their practical needs for that (making 27.8% of the surveyed enterprises as noted above).

Private enterprises of electronic supporting industry have only segmented and small sized activities of technological innovation which are mainly in

the enterprises with qualified human resources and mobilized capitals for development investments. As shown by the surveys, the needs of private enterprises for technological innovation are high enough (80% of the surveyed enterprises). It shows that private enterprises see their opportunities of development in this sector and they wish to get good technologies to produce products with high quality enough to enter supply chains. Their strong development needs only a right orientation and effective supports from State policies.

SOEs in this sector actually turn attentions to equitization activities. Many famous enterprises have adjusted their production-business structures and models but the transformation does not look strong and the development is not based on technological innovation. Many well known them stopped production lines for electronic parts (machines and technologies too out-dated) and transferred production activities to assembling home appliances or production of products with low technological contents such as transformers, coils, power source devices and etc. With this vision, the investments for technological innovation is noneffective.

According to the recent report by VCCI, 75% production enterprises in Vietnam still operate machines with expired depreciation. Local enterprises, particularly SMEs, have no ways to escape the vicious circle of machines with technologies out-dated by 2-3 generations (*Le Thi Huyen, 2018*). Majority of machines and equipment in Vietnam have technologies out-dated by tens years in comparison to the actual level of the world (*Report by Ministry of Science and Technology at the meeting of National Council for Science and Technology Policy, 2016*). But the greatest concern comes from the fact that during the recent years the technological capability indicators of Vietnam enterprises exhibit a lagging trend not only in the world scale but also regional one. According to public data released by General Statistics Office of Vietnam, the expected annual rate of technological innovation is 13% but achieved only 10.68% in reality.

Many reasons can be listed out. But in case of Vietnam SMEs, the *first* reason relates to low qualified machines, equipment, technologies and human resources. The *second* reason comes from requirement of high capital investments for production machines and equipment which are found impossible for SMEs without supports from the State. The *third* reason comes from limited technological information where the enterprises have no ways to be pro-active in search, identification and selection of appropriate technologies for right orientation of their own products. The *fourth* reason comes from clients which are, in majority of cases, large electronic groups. Naturally, they put down very high requirements to

quality of supplied electronic parts to protect their prestige and trademarks of products. Their requirements are simultaneously high challenges but also driving forces for enterprises of Vietnam to move up their technological innovation and investments for production activities.

3. Status of activities for search, identification and selection of production technologies in sector of electronic supporting industry of Vietnam

The assessment of the status of technological innovation activities of an enterprise requires information on related activities of search, identification and selection of technologies of the enterprise.

As shown by the surveys of the 50 enterprises conducted by the Head Office of National Council for Science and Technology Policy, the actual technological level of majority of enterprises of electronic supporting industry remains the medium one, except the advanced level of some FDI enterprises in the sector. Majority of enterprises of supporting industry in general and in electronic sector in particular are SMEs with limited sources (production scale, operational capitals, human resources, technologies and etc.) with a low implementation of technological innovation (technological innovation activities are conducted only by 20% of the surveyed enterprises). Majority of enterprises of electronic supporting industry own production technologies at medium level which means low contents of technologies and limited investment in knowledge, mainly based machinery and equipment imported. Technologies are transferred mainly from suppliers through instructions of use for purchased machines and equipment. Mainly the enterprises do assembling of products for large trademark companies. The products of supporting industries in Vietnam are mainly simple electronic parts with medium and low contents of technologies, and low values in product value shares. Actually, the competition puts high requirements for technological innovation by enterprises. Enterprises of electronic supporting industry realized well that the technologies are key factors for development (85.7% of SOEs, 80% of private enterprises and only 27.8% of FDI enterprises). The most difficult problem of these enterprises is high costed investments for machines, equipment and technologies while facing short experiences in activities of search, identification and selection of production technologies.

In practice, the investment for technological innovation by enterprises of supporting industry in Vietnam is low implemented despite of huge demands for that. The activities for search, identification and selection of production technologies remain also limited in many aspects.

3.1. For search of production technologies

Enterprises have various ways to search technologies required for upgrading and innovation purpose. As rules, they search technological information on basis of analysis of specification of the targeted products. Direct surveys show a common point that enterprises experience shortages of concrete information and difficulties in identification of appropriate technologies for investment moves. Mainly, enterprises can get certain information on machines and equipment without a deep understanding of the technologies attached to the machines and equipment. They can only master operational procedures without controlling the needs of technological upgrading.

By 04th July 2014, the Prime Minister signed *Decision No. 1069/QĐ-TTg* approving the Program of search and transfer of external technologies up to 2020. Accordingly, the State organizes the search activities and supports technological transfer from foreign sources, and issued mechanisms to encourage enterprises and S&T organizations in search and transfer of technologies. The target by 2020 is 60% of technologies introduced by the network of search experts are transferred and applied. Up to now, however, the concrete effects of this search of technologies cannot be seen clearly in various sectors. Very low effects are observed in sector of electronic parts. Majority of production technologies remain in hands of FDI enterprises and we do not have any concrete policies to get technologies from this sector of enterprises.

3.2. For identification of production technologies

The problem of identification of technologies relates much to the level of qualification of technological human resources in enterprises and available sources of technological information. Besides, the analysis of demands and necessity for technological innovation as well as information from clients are factors to help enterprises in identification of appropriate technologies. In their activities, enterprises keep doing this type of analysis for identification of technologies to fit their production-business activities. In practice, however, SMEs face difficulties in identification of appropriate technologies. The reason, as they share, mainly comes from shortage of technological information. Another reason comes from permanent changes in markets of electronic parts. Then enterprises need this type of information for their right choice.

In global views, during recent times enterprises in Vietnam made progress and development for their participation in supply chains of electronic parts for large groups. Since 2014, the Vietnam Association of Foreign Invested

Enterprises (VAFIE) and FDI Department cooperates with Samsung for development of supporting industries. Some surveys were conducted, workshops and exhibitions were organized with displayed parts from Samsung. By 2014 and 2015, there were only 10 enterprises doing supporting services for Samsung. They are not high tech enterprises but mainly supply simple products such as packages, boxes, charging wires and etc. But by 2016 and 2017, there was a fast increase of them. By February 2018, there were 225 enterprises doing supporting services for Samsung where 25 enterprises are Grade 1 suppliers (targets by 2020 are to have 50 Grade 1 supplier enterprises and 170 Grade 2 supplier enterprises). Products supplied by these supporting enterprises are not only packages and printing services but also automation service, equipment, plastic devices and others with 57% of localization rate. Certain limitations remain in service of supply of electronic parts. Only a few enterprises can do the supplies as 4P Company (Hai Phong City) does in the chains of LG Corporation.

Also, enterprises of electronic supporting industry manage gradually to identify the types of technologies for right investment moves through supports and consultations from large clients who make orders attached with tough and clear requirements for specifications. Information on machines, equipment and technologies also help enterprises make identification of the required level of technologies for adequate quality of output products.

3.3. For selection of production technologies

Majority of enterprises while doing the selection of technologies, base considerations on required specifications of products or direct exchanges of views with clients. On this basis, electronic enterprises make direct contacts with suppliers for import of technological lines from external sources. Then, selling partners provide supports for technological transfer or hire foreign experts for consulting service of transfer. However, a few SMEs are able to make investments for machines and modern technologies due to limited financial potentials.

The selection of technologies needs to be based on outcomes of activities of search, analysis, evaluation and identification of technologies (as presented above). The selection of technologies is only the final decision of the enterprise on basis of considerations for adequacy (techniques, production capabilities, absorption capabilities and prices). Therefore, it is the important point in process of technological development of every enterprise which would allow them to make right and effective technological innovation.

3.4. Barriers and limitations

Activities for search, identification and selection of production technologies by enterprises in Vietnam in general and by enterprises of electronic supporting industry in particular do not gain yet right attentions. In practice, the enterprises producing electronic parts wish to participate in supply chains for large groups in Vietnam. The most barriers and limitations come from their limited potentials and low-effective State support policies where the enterprises do not see considerable benefits from existing policies for production technological innovation. Despite of presence of some programs (Program of search and transfer of external technologies by 2020, National program of technological innovation by 2020 and etc.), other supports in identification and selection of technologies for innovation and higher production activities by enterprises are nor clearly seen.

At present, Vietnam has about 212 public organizations which provide services of transfer of S&T research results. Also, the non-public service of technological transfer experiences strong development (*Nguyen Dinh Phuc et al., 2017*). The solution of this problem in sector of electronic parts faces many difficulties. The most difficulty relates to shortage of capitals, infrastructure, human resources, qualified experts and limited information of production technologies.

S&T market of Vietnam, from one side, gets developed but, from another side, remains incomplete. The reasons come from some factors: certain main lines, policies and measures to promote commercialization of technologies, to support development of intermediate organizations in technological market pass the stages of revision and amendment which require certain time for better practical validity. Intermediate organizations are not strong enough to provide linking and supporting services for partners in transactions related to technologies and intellectual assets. Technological transaction markets do not operate effectively and do not complete the roles of hubs for domestic and international transactions of technologies. The networking works for production enterprises, research institutes and universities, S&T enterprises and distributing enterprises remains limited and low developed. SMEs in Vietnam do not have investment potentials enough for development of technological human resources, management skills and research capabilities. The situation leads to low competitiveness and short life time of produced products. Actually, the main players in sector of electronic parts are FDI enterprises which hold advanced technologies. But only a few of them conduct R&D activities in Vietnam and majority of them look to organize production activities and maximize use of cheap labor market in Vietnam. In activities to attract FDI

sources in general and in electronic sector in particular, Vietnam does not have yet policies to request FDI enterprises to transfer advanced technologies to local enterprises or to cooperate with them.

4. Proposal of solutions for promotion of activities for search, identification and selection of production technologies in sector of electronic supporting industry

On basis of the above noted analysis, some solutions are proposed for promoting activities to support enterprises in innovation, mastering technologies and enhancing production capabilities.

- *First, development of the sector of electronic supporting industry.* The State is to issue more policies to stimulate investors to develop electronic supporting industry. It is necessary to *complete integrated policies including offer of credits, taxation, investments, land use, favour policies for technological transfer, access to sources of technologies, training of human resources for electronic supporting industry.* The State should focus efforts on studies and building up of national level projects to indicate clearly development strategies of the sector of electronic supporting industry where the great attentions are turned to core products and core technologies of high break-through forces for a fast and effective development of electronic sector. Also, every enterprise should identify their right market segments and right clients to catch up with consumption trends and common technologies of the world in electronic sector.

- *Second, development of S&T markets,* namely the development of intermediate organizations to serve technological transfer in electronic sector. Policies should be issued to support transactions for technological transfer from research organizations (research institutes and universities) to enterprises, particularly SMEs. It is necessary to complete methods and tools for assessment and valuation of intellectual assets, new and advanced technologies to support works of identification and selection of appropriate technologies. *It is necessary to support the completion and updating of the national database of production technologies in general and the sector of electronic parts in particular* to serve needs of technological innovation activities by enterprises.

- *Third, favourable investment promotion policies for FDI enterprises.* As known, the main production technologies (source of core technologies, modern and advanced technologies) are mainly from FDI enterprises. They get a lot of favours (land use tax, corporate tax, import tax and etc.) and give certain contributions (jobs for local labors, GDP growth, export values and etc.) without doing active participation in technological development in

Vietnam. Therefore, it is necessary to add certain requirements when FDI enterprises apply for investment in Vietnam such as *commitments to support Vietnam in technological development and enhancement of production capabilities through on-site technological transfer and higher localization rate after 3-5 years of operation.*

- *Fourth, promotion of development of the network of search for external technologies.* Policies are to be issued to develop this network for linkage of research organizations, production enterprises and State administration agencies in S&T sectors, domestic and overseas in order to meet supply-demands needs and transfer of technologies to Vietnam.

- *Fifth, enhancement of effects of implemented programs for technological transfer* where some new beneficiaries should be added such as SMEs, enterprises of supporting industry in general and in sector of electronic parts in particular. These enterprises have common points of weakness and limitations, particularly in development of technologies and then they should be main beneficiaries of favours from State policies for higher technological level and production capabilities.

- *Sixth, building up and completion of the set of indicators and procedures for search, identification and selection of production technologies* in general and for production of electronic parts in particular which would allow enterprises in sector of supporting industry to own their desired technologies for their needs of technological innovation and enhancement of technological level of enterprises.

The above noted proposal is focused to promote activities of search, identification and selection of technologies for enterprises of supporting industry in Vietnam in general and for the sector of electronic products in particular. Facing a lot of difficulties, enterprises in Vietnam make gradually efforts for capital accumulation, technological knowledge and management experiences for adequate growth rate and meet the actual trends of socio-economic development./.

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