Toward Development of Mechanical Supporting Industry in Ho Chi Minh City: An Approach to Industry Structure and Its Determinants

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ABSTRACT

This study aims to address the current state of mechanical supporting industry in Ho Chi Minh City (HCMC) by approaching several factors affecting the industry for further solutions to its development in the coming years. Using both qualitative and quantitative methods, we find that: (i) the HCMC mechanical industry has yet to satisfy the demands for development of other economic industries as a consequence of its simple products and its failure to manufacture machine tools and equipment in automatic production lines; (ii) the industry is mostly composed of small- and medium-sized enterprises (SMEs), featuring mainly imported inputs, outdated technologies, and poor quality management, thus causing the output products in large part to merely serve domestic consumption and disabling them to engage in the global supply chain; and (iii) some principal reasons comprise limited access to credit, modern technology, market, and information as well as other constraints to production infrastructure and human resources.

1. Introduction

The industrialization process in HCMC focuses on four key industries (mechanical, electronic/information technology, pharmaceutical chemistry/rubber, food/foodstuffs processing) and two other traditional ones including textile-garment and leather-footwear industries. All of these account for approximately 80% of manufacturing volume of the HCMC's industry sector in 2015. Still, its development process exposes many limitations, such as high proportion of low-tech based industrial production, outsourcing-driven manufacturing along with little control of product design and branding, and little incentives for businesses in assembly and manufacture of the finished product. One among many causes of the problems lies in the shortcomings of the mechanical industry. Since a large number of the industry's products feature appliances, accessories, and intermediate and end devices that support others' manufacturing processes, its development would contribute significantly to rising added values of the whole economy.

Although the mechanical industry makes up 17.55% of HCMC's industrial production value, most of its appliances, components, and other parts in automatic industrial production lines need importing. By end-2015 machinery and equipment surpassed other imported products (Table 1). One downside of mechanical industry is the manifestation of technological passivity that should lead to restrictions in the stages of design, brand development, manufacturing, quality management, and product distribution of the industries within the economy.

Table 1

Major imports and exports of HCMC

Export		Import	
Key products	Increase (+) / Decrease (-) (*)	Key products	Increase (+) / Decrease (-) (*)
Computers, electronic products, and appliances	-11.5%	Machinery and equipment	+26.2%
Steel products	-19.7%	Iron and steel of various kinds	+51.0%
Textile-garment	+13.5%	Fabric of various kinds	+12.3%

Export		Import	
Footwear	+6.4%	Textile and garment/leather and footwear materials and accessories	+13.5%
Wood and wooden products	+22.1%	Plastic materials	+8.2%
Handbags, wallets, suitcases, hats, and umbrellas	+15.3%	Chemicals	+8.2%

Note: (*) denotes increase (decrease) in 2015 compared to 2014.

Source: GDVC (2015)

The above limitations of mechanical are not only the city's but also the country's problem. Addressing such, the Government has issued a number of policies to promote the development of critical mechanical products (Decision No. 186/2002/QD-TTg dated 26 December, 2002 on the strategic development of the mechanical industry, Decision No. 112/2003/QD-TTg dated 9 June, 2003 on establishing the Steering Committee for the Program on Key Mechanical Products, Decision No. 10/2009/QD-TTg issued on 16 January, 2009 on the mechanism of support for manufacture of key mechanical products, Decree 111/2015/ND-CP dated 3 November, 2015 on the development of supporting industries). Despite proactively implemented policies in HCMC that have been enacted by the central authorities and manifested through stimulus programs for increasing investment in production, the growth of mechanical supporting industry and key mechanical products is not as expected. The extant policies have not effectively oriented the preferential development of end products, thus failing to shape the supporting manufacturing process.

Accordingly, there exists an immediate need for research conducted to provide implications for prompting mechanical corporations to support the mechanical industry itself as well as others. To attain this objective this paper surveys the mechanical industry structure and defines determinants of its operation. Next, data collection is described, and analysis is performed of the factors influencing the industry by an industry structure approach. Based on that, several strategies will be suggested to promote its growth in HCMC.

2. Data and methodology

Three groups of mechanical enterprises in this research include electrical appliances, mechanical engineering, and motor vehicles manufacturers. There are a few steps as shown below:

First, analyze the secondary data of HCMC Statistics Office to identify the role of mechanical industry in the national economy.

Second, adopt qualitative approach using enterprise survey, in-depth interviews with managers of mechanical firms and experts from HCMC Mechanical Association and other leaders of relevant authoritative agencies to determine specific appliances and accessories possibly involved in manufacture of the finish product and the factors affecting the mechanical supporting industry's operational structure.

Third, employ quantitative approach on the ground of a survey conducted on 314 mechanical enterprises categorized as manufacturers of supporting and end products; descriptive statistics is used to analyze the chain and determinants of mechanical enterprises' operations as a basis for putting forward strategies to develop the HCMC mechanical supporting industry.

Last, confer with experts from HCMC Mechanical Association and industrial sector development policy makers on the research findings' reliability and new strategic orientations.

3. Identification of structure and determinants of mechanical supporting industry

3.1. Structure of mechanical industry

Due to its primary products in various forms of accessories, components, machinery, and equipment to support others, mechanical industry occupies a vital role in the process of industrialization (Dinh et al., 2014). As such, in many industrialized countries priority is generally given to its development in policy-making stages. According to the other experiences of Japan, South Korea, and Malaysia, output mechanical products should be initially treated as a preference, and next comes the formation of a network of companies offering products that serve to facilitate domestic manufacture and global supply.

Promoting the development of mechanical industry relies on the trend of integration. In the 1940s in Japan, when it thrived, mechanical businesses needed further specialization in producing end products and minimized costs, so there was also a need

to order parts from others. This generated important motivation for SMEs' being involved in manufacturing components for the industry, thus resulting in the newly-born mechanical industry and a multitude of policies issued to support and orient SMEs' operations (Kunnanatt, 2011; Campaniaris et al., 2011; Takahashi, 2014).

In recent decades, in countries with developed supporting industries such as Thailand, Malaysia, and Korea, supporting industries began in association with the operations of the industries engaged by the FDI sector, and national governments have gained rather notable success in the policies on attracting and directing FDI enterprises to create incentives for the flourishing supporting industries in these countries, as well as timely formulation of supporting strategies (METI, 2013). The most important task in planning policy on promoting development of the mechanical industry is to identify the industry structure that helps determine preferential products and encourage businesses' participation.

According to our survey on typical mechanical enterprises in 2014 and in-depth interviews with experts from the HCMC Mechanical Association, the industry is structured starting with the input stage featuring natural resources such as metal ores and fuel, from which steel, cast iron, copper, aluminum, and alloy products are made up using metallurgical manufacturing technology. Other kinds of materials are processed through billet manufacture (casting, rolling, forging, welding), cutting and machining (turning, milling, planing, drilling, grinding), and processing and adding protective coverings (thermal, chemical-thermal, plating treatment) to create devices or machine parts. These devices and machine components are made into sub-assemblies and finished products, including electrical appliances, machines used for agricultural and industrial production, molds, engines/turbines, hand operated machines, mechanical processing machines, and motor vehicles through assembling processes (Figure 1).

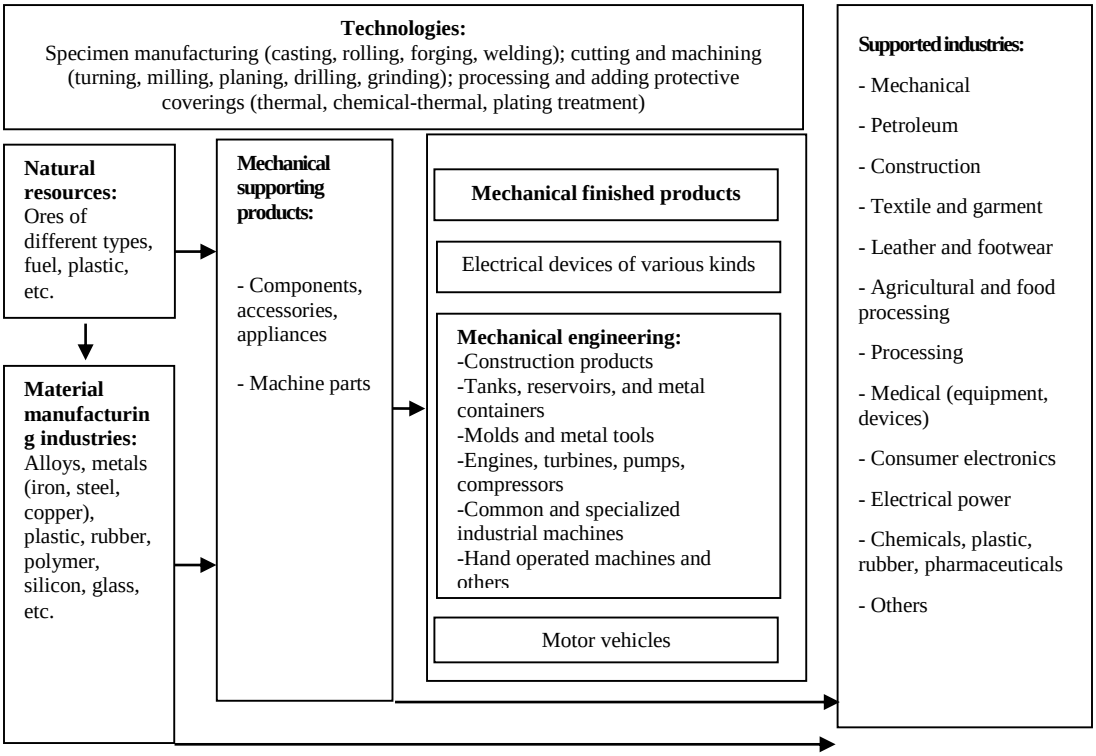

Figure 1. Structure and role of mechanical industry in the economy

Source: authors' survey of typical mechanical enterprises in 2014

Figure 1 illustrates the connections between mechanical industry and others in the economy. Evidently, the motivation for accelerating its growth has been derived from the demand from and/or operations of other industries, and also to motivate the supply, it is necessary for its development with a large amount of appliances and accessories to support the industry itself and others. Within the scope of mechanical industry operations, the products fall into two categories: (i) supporting ones including different kinds of elements and parts that function in support of the manufacture and assembly of finished products; and (ii) finished products classified into such three groups as electrical devices, manufacture engineering items, and motor vehicles. Ohno (2007) sorted out the types of manufacturing structure by modular manufacturing (common parts, supply of all kinds of products, flexibility in the manufacturing organization) and integral

manufacturing (parts provided solely for individual products and technological integration with production of end products).

Worthwhile international experience and identification of the industry structure suggest that conditions for mechanical industry development tend to vary in harmony with the context of international integration, which requires that policies on boosting its development be proposed based on critical analysis of the industry's production structure.

Modelling the structure and determinants of mechanical enterprises' operations

From the qualitative research results using enterprise survey and in-depth interviews with experienced experts and leaders in the field, the framework for operational structure of mechanical firms and factors influencing their performance can be established (Figure 2).

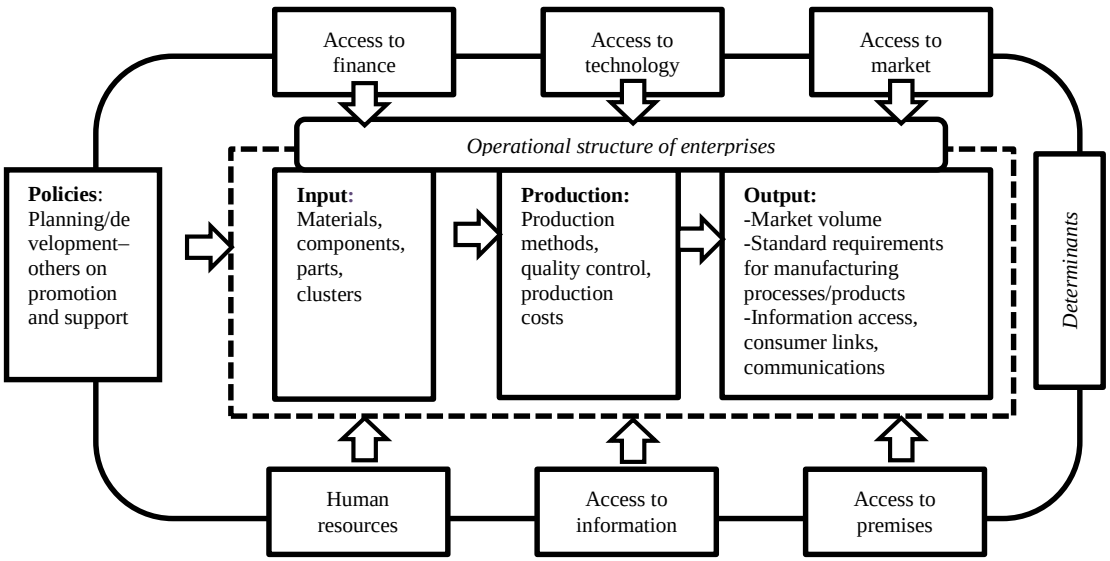

Figure 2. Analytical framework of structure and determinants of mechanical enterprises' operations

Operational structure: This refers to the stages in the chain of firms' activities according to Porter's (1990) classification that fundamentally consists of input, production, and output. Based on the results of surveying 10 enterprises in three groups

of electrical devices, mechanical engineering, and motor vehicles in HCMC, mechanical enterprises' operations can be described as follows:

Input: Having a role in motivating supporting industries' development, these factors include materials or input products, which have a decisive influence on costs, prices, business conditions, autonomy, and quality of the supplies, therefore affecting output and business performance.

Production: This process is manifested by methods of productions (outsourcing or autonomy in design, trademarks, materials, and manufacture), technologies in use, and quality control practices to meet customers' demands.

Output: A number of factors are demonstrated to motivate businesses to engage in the industry's operations such as market size, requirements for technical standards of products, attractiveness of returns, and conditions for connection with customers.

Concerning the factors affecting firms' operational structure, Porter (1990) indicated six macro ones including technological trend, competition, input conditions, firm infrastructure, policies, and demand conditions. From a microeconomic perspective, firms face constant pressures from such forces as customers, suppliers, rivals, and potential competitors, and also face other internal pressures (Porter, 1985). Many studies adopted Porter's proposed elements to analyze their impacts on different industry structures and in specific settings (Christophe et al. 2011, Cudney & Elrod, 2011). The qualitative analysis using the survey of 10 HCMC-based typical enterprises suggests the following factors that have effects on the operational structure of mechanical enterprises:

Access to technology: firm's capacity for gaining investment opportunities or technological innovations; it is essential to all stages of operations and affects productivity, quality, and business performance.

Access to finance: firm's capacity to obtain credit access or innovative investments; it directly impacts on input and production, and indirectly on output.

Access to premises: the ability of firms to obtain rational production areas planned as clusters or individually used; this factor indirectly influences every operation stage and overall efficiency.

Access to market: attainment of information on supply and demand or business expansion; it interacts with firms' activities as well as business orientations.

Policy related matters: current policies promoting the progress of all industry stages of planning, orientation, and offering support and incentives for development of the industry; the aims should be to remove obstacles and stimulate enterprises to participate in activities with advantageous policy access and clues to strengthen enforcement procedures.

4. The current state of mechanical supporting industry

4.1. Assessing mechanical industry's ability to respond to others' demands

As one of the major industries of HCMC, mechanical industry, despite its industrial production value accounting for 26%, its number of enterprises, 30.8%, and its number of workers, 14.4%, of the total of the city's industry sector, reveals unstable development. This is shown by the industrial production value (decreasing from 28.5% in 2010 to 26% in 2014) and the significant number of SMEs and manufacture enterprises (97% as of 2014), scattered in residential areas (71.2% of enterprises situated outside of industrial zones as of 2015). Mechanical products feature simple technologies and are thus distributed as domestic supplies (production value accounting for 90%). The product type that promotes development of other sectors such as machinery and equipment accounts for low proportions (9.6–10% of the entire sector), and most products are imported (Table 3). The ones having high proportions characterized by low-tech manufacturing include structural metal components and tanks/reservoirs (production value accounting for 34%) and electrical devices, mainly home appliances (production value accounting for 39.2% of the sector's total value).

Table 2

Percentage of domestic sales and export revenue of different kinds of products (Unit: %)

Product type	Domestic sales revenue	Export revenue
Fabricated metal products	89.00	11.00
Electrical devices	86.28	13.72
Unclassified machinery and equipment	80.21	19.79
Motor vehicles, trailers	96.21	3.79

Source: results of 2015 survey

Table 3

Key imported mechanical products in 2014

Product type	2014 turnover (USD mil.)	Percentage of total import turnover (%)
Other electrical household articles & appliances	351.882	1.37%
Other machinery and equipment items and accessories	3,306.333	12.90%
Iron and steel of various kinds (steel billets)	1,447.741	5.65%
Iron and steel products	398.557	1.56%
Other common metal products (copper)	444.724	1.74%
Auto parts and accessories	273.007	1.07%

Source: GDVC (2015)

4.2. Analyzing operational structure of HCMC mechanical supporting industry

Products derived from mechanical industry can be classified by modular type (popular products well-suited with all other kinds) and integral type (any one of those which is individually designed for incorporating into one single finished product). Since the former has been widely adopted by HCMC-based enterprises using simple technologies for domestic supply (90% of products), many restrictions are placed on integral manufacturing along with further advanced technologies and participation in global value chain. For this reason, the operational efficiency of mechanical enterprises as a whole is lower than that of others which operate in the city's major industries as detailed below:

Manufacture of electrical equipment: mainly household electrical products with low proportion produced mostly by FDI firms and consumed as domestic supplies (86.2%). As such, these supporting products reveal simple technological features and a pretty high rate of domestic supply (66.0% of raw materials and 70.9% of components). A large number of raw materials such as copper, polymers, silicone, synthetic rubber, chemicals, glass, cast iron, iron, and steel (in alloy forms), manganese, magnet, and so forth are to be imported chiefly from China, Japan, and Taiwan, whereas domestic supplies include auxiliary materials such as fibers, paper tapes for label printing, paints, pigments, porcelain insulator, packaging, and iron and steel (not in alloy forms). Other demerits

are reflected by product self-design, material purchasing autonomy, and private trademark possession (75.47%), ability to apply advanced management systems to production stages (approximately 58.49% of enterprises with no adoption), and average technological level (Figure 3).

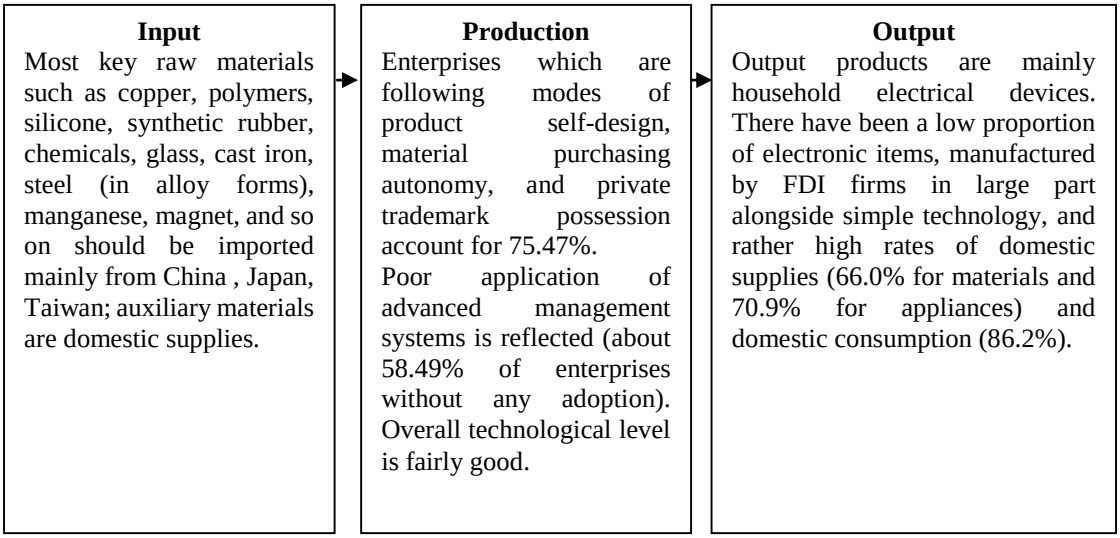

Figure 3. Summary of analytical results for supporting sub-industry of electrical equipment manufacturing

Source: authors' 2015 survey data

Mechanical engineering: Finished products are mainly provided for construction industry or are boilers and stoves (with industrial production value reaching 68%). Major products such as molds, metal working tools, and machinery and equipment account for a low proportion, and most are domestically supplied (fabricated metal products—89%, machinery and equipment—80%) in addition to low export volumes. As such, this group features construction products, tanks/reservoirs, and metal tools in high volumes of domestic supplies (sales volume of 74.2%). Raw materials for domestic supply consist of iron, steel, and common metal, while engineering steel and plastic requiring high technology need importing. Given product self-design, material purchasing autonomy, and possession of private trademark, the sub-industry of machinery and equipment manufacture accounts for 80.65%; manufacture of fabricated metal accounts for 50.27%, and the figure for enterprises adopting no management systems is 67.74 %.

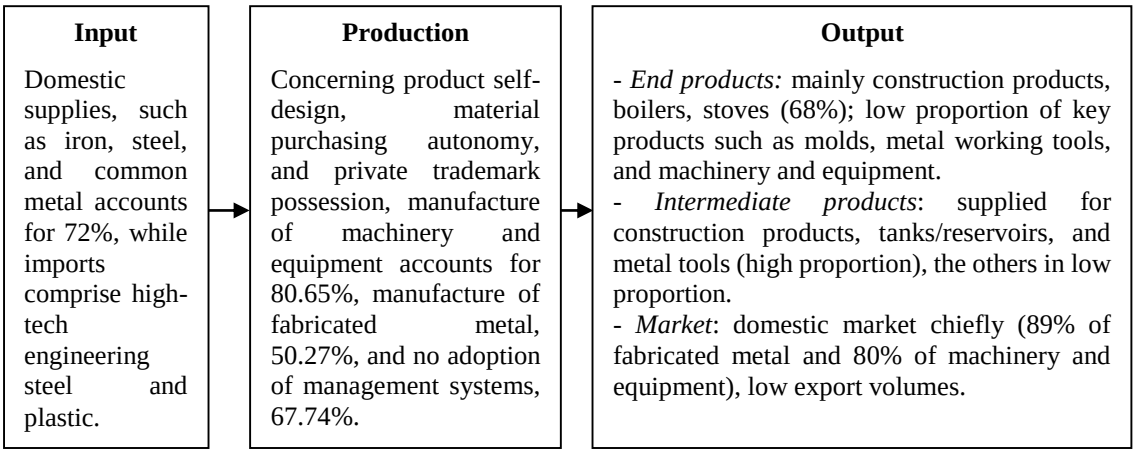

Figure 4. Summary of analytical results for supporting sub-industry of mechanical engineering

Source: authors' 2015 survey data

Manufacture of motor vehicles: Supporting products cover a wide range of parts, which can be categorized into three groups: motorized chassis, vehicle body, and components and accessories (import rate of up to 67% in terms of use-value). Most key inputs for the manufacture of motor vehicles need to be imported in high volumes. These imported items include stainless steel rods and bars; aluminum alloy angle sheets, plates, and bars; paints and varnishes; and stone materials. Similarly, there have been many kinds of other primary imports like rear-view mirrors, molds and patterns, auto-adjusting devices, batteries and electric accumulators used for starting piston engines, headlights, leaf springs, metal-frame car seats, powertrain and engine system components, control systems, and carburetors. The enterprises in this sub-industry by far are involved in the processes of manufacturing electrophoresis paint, electrostatic paint, tires, electric wiring, air bags, inner packing materials, plastic parts, inner tubes, brake pads, seats and beds, lamp shades, oil filters, glass, leaf springs, A/C systems, semiconductor ICs, hydraulic jack control panels, and so forth. Imported materials are more highly appreciated, regarding prices, quality, duration of delivery, design, and the likelihood to innovate and establish persistent relations. Due to constraints to adoption of advanced management systems, obstacles persist in enterprises' satisfying global standards for further access to international orders (Figure 5).

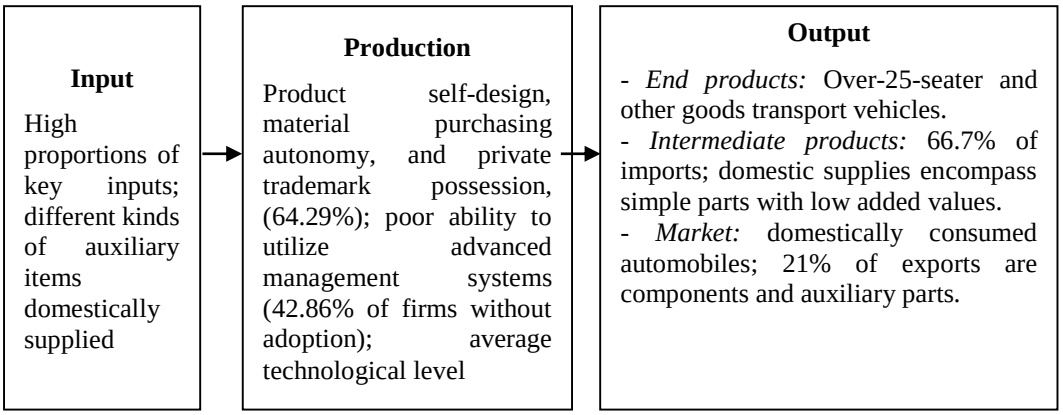

Figure 5. Summary of analytical results for supporting sub-industry of motor vehicles manufacturing

Source: authors' 2015 survey data

5. Analysis of factors affecting performance of mechanical enterprises

The results of different aspects of difficulties encountered by mechanical enterprises are reported in Table 4.

Table 4

Major problematic issues relating to firm performance (Unit: %)

Factor	Domestic enterprises	FDI enterprises
Access to finance	59.16	26.92
Access to information	29.01	11.54
Access to market:		
- Competition from foreign rivals	36.64	36.54
- Inefficient means/channels of communication, high costs	16.03	7.69
- Obsolete distribution systems	7.25	5.77
Access to policy (administrative formalities)	37.02	53.85
Access to technology:		

Factor	Domestic enterprises	FDI enterprises
- Obsolete technology	21.76	11.54
- Low adaptation to/acquisition of new technological achievements	12.98	9.62
- Deficiencies in new design, research, and invention	20.23	15.38
- Incompetent management practices	14.12	13.46
Manufacturing infrastructure	28.24	17.31
Shortage of skilled labor	36.64	46.15

Source: authors' 2015 survey data

5.1. Access to market

Customers of mechanical businesses are long-standing clients (78.13%), who often set long-term networks with suppliers for stable production and business procedures, thereby having been reluctant to select new suppliers. In the meantime, the manufacture of finished products is fundamentally completed by FDI enterprises, whereas domestically provided products (about 90%) are consumed in home market, which is perceived with limited participation in the global supply chain. This results from the fact that: (i) due to latent risks from the quantity, quality, and delivery of the supplies attributed to poor management practices, FDI enterprises unwillingly place an order to domestic suppliers and therefore maintain old satellite suppliers during their manufacturing processes in Vietnam; (ii) production orders placed with domestic SME are for pilot products in small amounts, thus failing to encourage business investment plans; and (iii) external orders are made even in case of domestic high demands for part and component supply owing to loose connection between domestic supply and demand.

5.2. Access to information

There has been limited supply-demand linkage among enterprises providing supporting products with manufacturers of end products (including domestic and FDI firms) and with the world market. Fewer links are established between FDI businesses with local SMEs due to their insufficiently obtained information, whereas domestic suppliers have not dynamically accessed to the relevant information and recognized the needs of FDI enterprises. The survey results show that most mechanical enterprises' clients are informed by old customers (78%) and that they reveal little use of means of

communication in search of customers. The problem may arise from the loose relation as mentioned and the government's few initiatives to plan and facilitate the introduction of trading centers for promoting mechanical products.

5.3. Access to technology

Production stages of mechanical supporting industry with high added values and one feature of integration with manufacture and assembling of finished products require that mechanical businesses must develop a closer link with manufacturers of finished products. Nevertheless, the connection has been very weak due to outdated technologies and manufacturing equipment (craft and semi-automatic production accounting for over 60%), the ratio of the remaining value to the historical one of 50% on average, failure to apply modern management systems (Lean, ISO, etc.) in production and business activities (60.83%), and weak governance capacity. Several causes include: (i) limited access to market and information hindering technological orientation and lack of confidence in investment plans; (ii) 'vague' formation of technological transfer mechanisms to facilitate businesses; and (iii) inefficient development of technological support center for mechanical firms which offer ingot/billet manufacturing, material processing, welding and assembling, measurement, and integrated manufacturing technologies.

5.4. Access to finance

Most mechanical enterprises are small- and medium-sized or manufacturing ones with few capital sources for investments in technological innovation (53.8 % assumed their financial constraints). Low capital causes a lack of collaterals and little eligibility for the loans; thus, these are often trapped in a vicious circle of low competitiveness. Meanwhile, the financial support policies available for SMEs are still perceived with many obstacles and are not widely deployed in corporate practices. For instance, credit guarantee mechanisms are still based on collaterals yet not on the feasibility of the project, or the HCMC Credit Guarantee Fund hardly assumes its role in investment consultancy and fails to function as a connection between businesses and banking institutions.

5.5. Access to manufacturing premises

Up to 72% of enterprises in the mechanical enterprise sample are interspersed with town houses, whereas 28%, concentrated in industrial zones or clusters, which, however,

have yet to form supply chains in the industry. Due to this problem, tiny production space can be witnessed among most mechanical SMEs, which entails potential risks. Moreover, investments in new production premises demand high investment costs, involving high levels of risk; therefore, tight areas remain, and it is less likely for firms to fulfill large orders and to grasp business opportunities.

5.6. Human resources

Mechanical industry staff is weak and unqualified in terms of their job-specific skills. There have been a small number of leading experts and skilled technical staff alongside a limited number of sufficiently trained workers. An increase in the number of mechanical engineers and graduate employees hardly satisfies the industry's production. The survey results indicate that in the mechanical industry unskilled workers make up a large proportion (60%), whereas the figures for low-/intermediate-educated and higher educated workers are 24% and below 1% respectively. Several problems involve: (i) old mills, closed production, and lack of specialization and inter-connection; (ii) insufficient training programs for human resource development in different production stages; and (iii) little association between training programs and technological transfer and/or practices.

5.7. Planning policies

Toward future prosperity of the national industrial sector, the development of Vietnam's mechanical industry in general, as well as that of HCMC mechanical supporting industry in particular, has always played a fundamental role. However, a few policies are believed to cause obstruction, including the one on zero-percent tariff on whole-form cars and machinery besides certain tariff rates (7%–15%) imposed on spare parts for manufacturing these, which incites firms to order foreign imports instead of domestic supplies. On the other hand, in managerial practices there had been an absence of a managerial hub, which was overcome by the establishment of HCMC Supporting Industry Development Center in August 2015. Too strict requirements for firms' enjoying preferential credit guarantee are truly problematic.

6. Research results and implications for development of mechanical supporting industry

6.1. Results

The results of investigation into the structure and determinants of HCMC mechanical supporting industry suggest that it is of great importance but has yet to serve its supporting function appropriately through supplies of components, parts, and devices for development of other industries. Thus, in terms of demand, its supporting sub-industries have few incentives, and many shortcomings have been reflected in most stages to include no autonomy in supplies of key inputs, simple manufacturing technologies, and poor quality management. These incidents have also led to major domestic consumption and failures to meet export standards or adopt global supply chain practices. Many causes are detected to encompass access to market, information, finance, and technologies besides others pertaining to manufacturing infrastructure and limited human resources. Limitations are also revealed in association with managerial agencies, whereas the demerit of the structure of mechanical supporting industry has yet to be properly solved.

6.2. Policy implications

To formulate sound policies on development of the industry, it should be perceived with its fundamental role in accelerating the growth of HCMC's industrial sector. As such, compiling the list of preferential products for development should be based on the availability of the inputs, the potential use of advanced technology, superior quality, and capacity to reach international standards and support the manufacture of key mechanical products in accordance with the national industrialization approaches. There is also an urgent need to break down the barriers to its upgraded quality as follows:

Improving the connection with firms in carrying out supporting industry development strategies: As many as 48.85% of surveyed enterprises desire simplified administrative procedures with fewer hubs in accessing preferential policies. Since its establishment in August 2015, the HCMC Supporting Industry Development Center has applied one-door mechanism which assists in resolving the puzzle of procedures in support of mechanical firms' operations. It is necessary to strengthen its role in managerial practices, which involves policy counseling/propagation, procedural support for preferential access, market support, investment promotion, coordination in applied research and

technological transfer, human resources training, implementation of joint production programs, and cooperation with state agencies in implementing supporting policies on premises, finance, technology, and manpower development.

Developing programs/projects connecting supply and demand to help firms gain access to information/market: This includes: (i) creating a focal database of supporting industry products to connect data on supply and demand; (ii) establishing commercial distribution centers for mechanical product trading; and (iii) coordinating with foreign supporting industry associations to foster a link between domestic and FDI enterprises and promotion of cooperation between the city and other provinces/cities in the country or with other nations with developed mechanical industries (39.69 % of enterprises expect assistance in getting access to information and market).

Support for technological access: Mechanisms are designed to enable research into technology transfer by creating a link between researchers and enterprises based on financial support provided for scientific projects as needed by them. Besides, the establishment of mechanical technology development and innovation centers is fostered in compliance with public–private partnership model for: (i) ingot/billet production: casting, mold fabrication, shaping (forging, stamping, etc.); (ii) manufacturing technology (rapid manufacturing, precision machining, fine machining, high-performance machining, etc.); (iii) materials and surface processing technology; (iv) welding and assembly technology; (v) measurement technology; and (vi) computer-integrated manufacturing (CIM). These centers should function in line with immediate orientation and preferential product surveys for persistent firm investments and for future technology transfer (31.30% of enterprises wish to have support for their access to technology).

Support for credit access: Banking institutions and enterprises should be collaborated by approving loans for project feasibility in which loan guarantee is unlikely for firms. It is necessary to consolidate the operation of credit guarantee funds by ensuring its function in coordinating SMEs and banks (the majority of enterprises—58.78%—-anticipate support for access to finance).

Support for access to premises/infrastructure: Most mechanical enterprises are SMEs located in residential areas with qualified production space; therefore, it is imperative for land re-planned in the industrial parks and occupied by those operating in this field and for support mechanisms available for investors to keep down the cost of leased

production premises (20.61% of enterprises seek support for access to premises or production infrastructure).

Support for human resources development: This involves enlisting the help of foreign organizations in training and development of human resources with pilot invitations sent to experienced and enthusiastic experts in economics or technological advances, who also express enthusiasm in supporting industry development. Furthermore, it is important to direct the establishment of professional human resources training and development associations/centers toward technology transfer (25.57% of enterprises cultivate support for manpower development)■

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