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AKADÉMIAI KIADÓ

Developing a local supply chain network: The case of Magyar Suzuki in Hungary

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ABSTRACT

This study examines the role of Magyar Suzuki in the Hungarian automotive industry. It is the oldest foreign vehicle manufacturer and a symbol of modernisation in the post-communist era in Hungary. Due to EU's local content rule, Magyar Suzuki, in comparison with its counterparts in the region, has established a locally embedded supply chain network. Magyar Suzuki has facilitated process and product upgrading of the local suppliers in Hungary. Nevertheless, functional upgrading is relatively limited due to automotive multinational corporations' recognition of Hungary as a low-cost production location, a low level of R&D operation, and a small domestic market.

KEYWORDS

automotive industry, Hungary, Magyar Suzuki, assembler-suppler relations, supply chain networks, industrial upgrading

JEL CLASSIFICATION INDICES

L62, M11, O14, P3

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1. INTRODUCTION

The automotive industry has been one of the major drivers in Hungarian industrialisation in the post-communist era.[1] Unlike the neighbouring countries of Czechia, Poland and Romania, only small-scale commercial vehicle and bus production was carried out in Hungary. Although the initial condition of the Hungarian automotive industry was rather weak, the industry gradually expanded its production with inflows of foreign direct investment (FDI) since the 1990s, in particular the establishment of a car assembly and engine production factory by Opel in 1990,[2] and vehicle production by Suzuki in 1991, followed by Audi in 1993 and Mercedes-Benz in 2012.[3] As a result, Hungary joined the major vehicle-producing countries in Central and Eastern Europe (CEE). Currently, four vehicle manufacturers, OEMs (original equipment manufacturers), and approximately 700 suppliers are engaged in the automotive industry in Hungary. In 2019, the country produced 498,158 vehicles and ranked as the 24th largest producer in the world and as 10th in Europe (OICA website).[4] Hungary has also been playing an important role in the export platform of engine production in Europe, producing nearly 2.5 million units a year.

A number of studies examined the role of automotive FDI in the early development of the industry (Sadler – Swain 1994; Havas 1995, 1997; Bartlett – Seleny 1998). For instance, Havas (1997) explained that, unlike the traditional automotive-producing countries in CEE, vehicle production in Hungary was established through greenfield investments. Hence, there was no conflict between the existing and new producers. Such new automotive investments brought new production technology, management skills and organisational culture into the local industry. Furthermore, Hungarian government policy had a positive impact on the technological improvement of the local industry (Havas 1995). Bartlett – Seleny (1998) further examined bargaining power differences between European and Japanese automotive OEMs in relation to the transitional socialist state of Hungary in the 1990s. On the one hand, because of the non-European Union (EU) status of Suzuki, Magyar Suzuki was required to meet a 60% local content rule so that it could export to the EU market duty free. In this context, the development of the local supply chain network was the most critical issue for Magyar Suzuki. On the other hand, the European OEMs holding European-based status expanded their supply chain networks based on intra-firm trade from their home country by taking advantage of geographical proximity. In short, investment commitments by the European-based OEMs into the local supporting industry were virtually obviated.

More recent studies examined the Hungarian automotive industry from competitiveness or global/regional production perspectives (Rugraff – Sass 2016a, 2016b; Lőrincz 2017). For instance, Rugraff – Sass (2016a) investigated the 'keep factors' of the Hungarian automotive industry after the 2008–2009 economic crisis, identifying four significant elements that could successfully retain automotive MNCs within Hungary, rather than relocating to the lower-wage countries in CEE: additional investments by automotive MNCs in the mid-2000s, unchanged

[1]This study was conducted before the outbreak of Covid-19. The Hungarian automotive industry might be influenced after this event.

[2]Opel's vehicle production started in 1992 and ended in 1998 (Jacobs 2017: 244–246).

[3]In addition, an auto-parts production plant was established by Ford in 1991 and morphed into Visteon in 2000.

[4]www.oica.net.

labour market regulation, more business-friendly government policy, and the existence of few alternative site options. Other studies showed how the role in European automotive production of East Central European countries evolved over time, how the automotive industries of these countries were restructured and modernised through FDI from the European and non-European countries (Pavlínek et al. 2017). Pavlínek (2020) underlined that large differences in labour costs and other production costs across the EU shape the growth of the automotive sector in CEE. Csíki et al. (2019) documented that labour market efficiency, infrastructural development and regional innovation capabilities were important factors for the selection of locations in the industry. Szalavetz (2012) asserted that the automotive industry in the CEE countries has been stuck in cost-based competition and local firms have been slow to develop dynamic capabilities due to the absence of state intervention and a large domestic market. The automotive industry has been the focus of policy-making for a long time, and various industry actors have been benefitting from a broad range of policy measures such as cluster policies, research, development and innovation (RDI) support, enhancement of university-industry partnerships, supply chain development, etc. Although the Hungarian government realised the importance of collaboration for innovation (Hernandez-Trasobares – Murillo-Luna 2020) and the 'triple helix model' (Etzkowitz – Leydesdorff 2000; Calabrese et al. 2013), it failed to significantly enhance the networking and innovativeness of the local companies across a broad base (Inzelt – Csonka 2016). Knowledge-intensive development was initiated in the industry during the last decade (e.g., Smahó 2012), but it has not yet emerged from its somewhat peripheral position.

Many studies highlighted the development of the Hungarian automotive industry, but only a few focused on the role of Magyar Suzuki exclusively (and none are recent publications or in English).[5] Our primary aim in this paper is to document how Magyar Suzuki established and controlled its supply chain network in Hungary. The second aim is to examine how and to what extent Magyar Suzuki has upgraded the local automotive industry in the country. The third aim is to identify the challenges in the Hungarian automotive industry.

The article is organised as follows: the next section presents methodology; the third section sets out the theoretical approach of assembler-supplier relations in the global value chain (GVC) concept; the fourth section presents an overview of the Hungarian automotive industry; the fifth section explores the development of Magyar Suzuki; the sixth section introduces four case studies of Tier-1 suppliers under Magyar Suzuki; and the seventh and eighth sections present a discussion and conclusions.

2. METHODOLOGY

Our study employs qualitative methods, based on semi-structured, in-depth interviews with Magyar Suzuki (Managing Director, Deputy Managing Director and two Department Leaders) and its four Tier-1 suppliers: two Japanese-owned suppliers (Vice President, Managing Director and General Manager) and two locally-owned suppliers (CEO and Director), and supplemental interviews with a German capital automotive MNC, the Hungarian Investment Promotion Agency (HIPA) and the Japan External Trade Organization (JETRO) to capture wider issues in the Hungarian automotive industry. The interviews were conducted from October 2019 to

[5]See Bakos (1996) and Mészáros (2009) in Hungarian.

January 2020. This study particularly highlights the types of product contracts used between Magyar Suzuki and its suppliers and how these contracts imply industrial upgrading of the suppliers under the GVC concept. We also used a range of secondary and survey resources in English, Hungarian and Japanese, including data from the Organisation Internationale des Constructeurs d'Automobiles (OICA), HIPA and Fourin.

3. ASSEMBLER-SUPPLIER RELATIONS IN THE AUTOMOTIVE GLOBAL VALUE CHAINS

The GVC theory asserts that the expansion of global production networks (or value chains) has provided various opportunities for the developing countries to upgrade their technological capabilities (Humphrey – Schmitz 2002). Within the automotive GVCs, major multinational vehicle manufacturers have been governing this highly capital- and technology-intensive chain by controlling core technologies, production processes, research and development (R&D), human resources, finance and marketing from upstream to downstream operations through their supplier networks (Barnes – Morris 2008). There are five types (market, modular, relational, captive and hierarchy) of governance structure in GVCs (Gereffi et al. 2005: 86–87). *Market linkages* are typically based on the price-related competition on market or trade (Humphrey 2003; Gereffi et al. 2005). Under *modular linkages*, suppliers specify their own processes and use their own technology to produce components or modules according to the design specification provided by a lead firm. Under *relational linkages*, lead firms typically maintain strong relations with suppliers that are involved in design and product development (Ozatagan 2011). Under *captive linkages*, suppliers conduct specific tasks, following detailed instructions supplied by lead firms that are responsible for product design (Gereffi et al. 2005; Sturgeon et al. 2008). *Hierarchy linkages* are based on vertical integration. When lead firms cannot find suppliers, they tend to develop and manufacture in-house by controlling resources including intellectual property (ibid).

Assembler-supplier relations in the global automotive industry have changed since the 1980s, when US and European assemblers shifted from their more vertically integrated Fordist-style production with *market linkages* types of supply chain networks towards the Japanese-style supply chain networks developed in the 1960s (Humphrey 2003). The Japanese automotive assemblers established a flexible and long-term vertically oriented three-layer subcontracting system (Tiers 1, 2 and 3) under them. Automotive assemblers only directly procure finished components from Tier-1 suppliers that subcontract lower-valued manufacturing activities to lower tier suppliers. This system influenced the global automotive industry in three aspects. Firstly, there was a shift of design activity from assemblers to suppliers. Secondly, a shift towards the supply of complete functions (modules, systems or sub-assemblies rather than individual components) took place. This meant that Tier-1 suppliers tended to be responsible not only for the assembly of parts, but also for the management of Tier-2 suppliers. Thirdly, the involvement of assemblers in the specification of the production and quality systems of their suppliers became increasingly important as a result of the Japanese Just-in-Time (JIT) system and total quality management (TQM) in the automotive industry (Humphrey 2000: 249–250).

In recent years, global Tier-1 automotive suppliers or so-called 'mega-suppliers' such as, Bosch from Germany and Denso from Japan, have established their affiliates in major vehicle-

producing countries by following the overseas relocations of automotive assemblers (Humphrey – Memedovic 2003). The emergence of mega-suppliers has also enabled the automotive assemblers to employ a modular system, which requires mega-suppliers to deliver complete modules rather than the individual components. Accordingly, some higher value-added activities have been transferred from assemblers to mega-suppliers (Doran 2004; Takeishi – Fujimoto 2001). In this context, the rise of mega-suppliers has significantly influenced local Tier-1 firms. According to Humphrey (2000: 266–267), the local Tier-1 suppliers in India and Brazil have shifted into one of five patterns: (i) to maintain a Tier-1 supplier, (ii) to develop an alliance with a leading global component manufacturer, (iii) to become a national Tier-1 supplier, (iv) to find a profitable niche in Tier-2, or (v) to find a specialist position as a global supplier.

With regard to the assembler-supplier relations, some studies are optimistic about the positive benefits in relation to industrial upgrading, claiming that local suppliers can gradually upgrade their technological and management capabilities through these interactions in the automotive industry (Okada 2004; Contreras et al. 2012), while other studies assert that the process is not so easy (Oztagan 2011; Pavlínek – Zenka 2011). Humphrey – Schmitz (2002) showed that a quasi-hierarchical value chain provides favourable opportunities for process and product upgrading, but it prevents the functional upgrading of the firms that participate in the chain. For instance, Ozatagan (2011) revealed that parts suppliers in Turkey acquired design and product-development capacities through MNCs, but cutting-edge innovation activities such as marketing and branding remained in the hands of the lead firms. Pavlínek – Zenka (2011) also asserted that industrial upgrading in the Czech automotive industry was highly selective and uneven. In short, process, product and functional upgrading (R&D) were conducted by mainly higher tier suppliers. However, it is also important to note that upgrading features of automotive suppliers can be determined by the nationality of OEMs. Sako (2004) analysed organisational structure and process in relation to supplier development by identifying the differences in the governance of different nationalities. In her perspective, supplier development under European and North American OEMs is based on short-term assistance and is less ambitious in terms of improving supplier capabilities. Thus, the suppliers in Europe and North America are more likely to distrust their OEM's intention, potentially aiming to appropriate gains from short-term assistance through immediate price renegotiations. By contrast, supplier development under Japanese firms is governed by assembler (customer)-induced learning that excludes short-term price pressures and enhances long-term supplier development assistance.

4. OVERVIEW OF THE HUNGARIAN AUTOMOTIVE INDUSTRY

During the communist era, the Hungarian automotive industry was based on commercial vehicle production due to the regional division of labour within the Council for Mutual Economic Assistance (CMEA). Three major state-owned enterprises were engaged in the automotive industry. Ikarus (established in 1895) manufactured buses, while Rába (in 1896) and Csepel (in 1949) produced heavy-duty trucks.[6] The Hungarian socialist government was keen on

[6]The Csepel vehicle company went bankrupt in 1996. Ikarus had been acquired by French company Irisbus in 1999 before ceasing its activities in 2003. However, the brand name and production facilities still exist under the ownership of various business organisations.

FDI to stimulate industrial modernisation and, due to its early moves towards political liberalisation, initiated negotiations with Suzuki already in 1986 and General Motors (GM) in 1988 (Sadler – Swain 1994). After the collapse of state socialism, the first automotive investment was made in 1990 by Opel (under the ownership of GM) for car assembly and engine production as part of GM's regional strategy in Europe.[7] GM viewed Hungary as a low-cost and high-volume production location to deliver engines to their European subsidiary, Opel, in Western Europe (Bartlett – Seleny 1998). However, Opel's car assembly activities – targeting the local market – were not long-lasting. After producing approximately 85,000 vehicles, production was ended in 1998. More importantly, an investment in car manufacturing was made in 1991 by Suzuki through forming a joint venture firm, 'Magyar Suzuki Corporation', in association with local capital, followed by Audi in 1993 (with the commencement of engine production in 1994 and vehicle production in 1999) and Mercedes-Benz in 2008 (with commencement of vehicle production in 2012). In 2020, of the four OEMs, three are still engaged in vehicle production in the country (see Table 1). In addition, there are over 700 suppliers in Hungary. It is estimated that 175,800 jobs have been created by the automotive industry, which is approximately 4% of the total employment in the country in 2017 (HIPA 2018).

Vehicle output in Hungary accounted for over 10,000 units in 1992 and increased to 88,000 units in 1998 with the growth of Magyar Suzuki's operation (Figure 1). After the commencement of Audi's assembly operation in 1999, production continued to expand until 2008. However, because of the 2008–2009 financial crisis, vehicle output sharply decreased until 2012. The production of vehicles recovered after 2012 with the commencement of Mercedes-Benz's operation. In addition, Audi and Opel produce 2.5 million units of engines in Hungary.

Domestic vehicle sales in Hungary peaked in 2005 and then decreased dramatically by 2010 (Figure 1). With regard to the sales by major brands, Suzuki was leading in Hungary (13.6%), followed by Ford (12.4%), and Volkswagen (7.2%) in 2019 (Fourin 2020: 262). The automotive industry is the largest export-oriented industry at present, with 91.8% of its output exported in 2017 (HIPA 2018).

Table 1. Overview of four OEMs in Hungary, 2017

Firm	Year of establishment	Employment*	Vehicle production*	Engine production*
Magyar Suzuki	1991	3,100	176,705	–
Audi	1993	12,307	105,491	1,965,165
Mercedes Benz	2012	4,000	Below 190,000	–
Opel	1990	1,251	–	486,302

Note: * Numbers of jobs, vehicles and engines produced.
Source: HIPA (2018).

[7]The ownership of Opel changed from GM to PSA in 2017. Opel is now part of Stellantis.

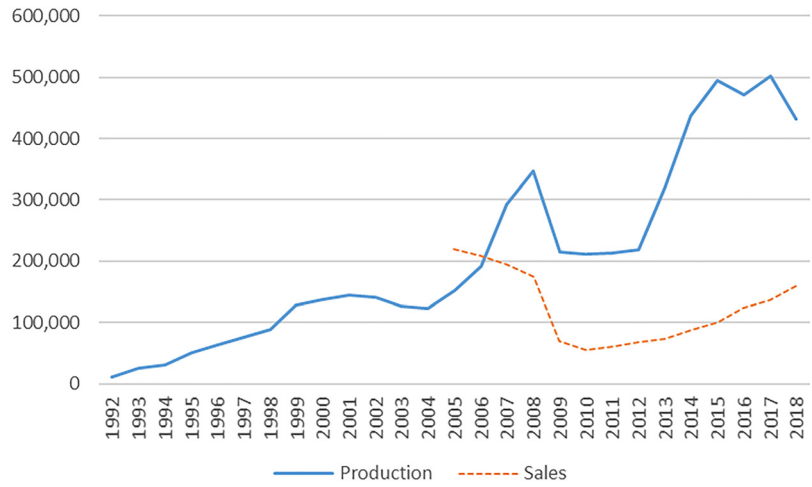

Fig. 1. Production and sales in Hungary, number of vehicles, 1992–2018
Source: 1992–1998 from Worrall et al. (2003), after 1999 from OICA website.

5. MAGYAR SUZUKI CORPORATION

Suzuki was one of the pioneer investors in Hungary. After a fairly long negotiation period, Magyar Suzuki Corporation was established in Esztergom in 1991 as a joint venture between Japan and Hungary, with 40% equity held by Suzuki, 11% by the Itochu Corporation, 9% by the International Finance Corporation (IFC) and 40% by Autókonszern Rt for 10 billion yen (US$230 million) at that time (Havas 1997: 224).[8] In October 1992, commercial production started with the capacity of 15,000 units of the Swift model (Havas 1997). The initial plan of Suzuki was to produce a low-cost vehicle model for the Hungarian domestic market. However, this plan proved to be unsuccessful for two reasons: (i) relatively weak solvent domestic market demand, and (ii) a high vehicle cost based on imported components from Japan (chiefly due to the appreciation of the yen at that time). As a result, Suzuki was forced to revise its strategy and shift the focus from the domestic market to exports, particularly to the Western European market, by replacing direct exports from Japan (Bartlett – Seleny 1998). It is not unprecedented for market-seeking FDI to develop export capacities based on local experience with suppliers and markets (Hansen et al. 2009), and this may be even more pronounced in the industries with high sunk costs, such as the car industry. Magyar Suzuki's production capacity expanded to 50,000 units per year by 1996, increased further until 2008 (Figure 2). Plans to exceed 300,000 units in the subsequent years were overturned by the 2008–9 crisis.

During this period, Magyar Suzuki produced small passenger vehicles (PVs) targeted for sale within the EU. After the crisis, Magyar Suzuki's production continued to decrease up until 2014 due to low vehicle demand in the EU. Accordingly, Magyar Suzuki adapted to the situation by

[8]Shareholders of the firm included Suzuki (97.53%), Itochu (2.46%) and Hungarian investors (0.01%) in 2018 (Magyar Suzuki 2018).

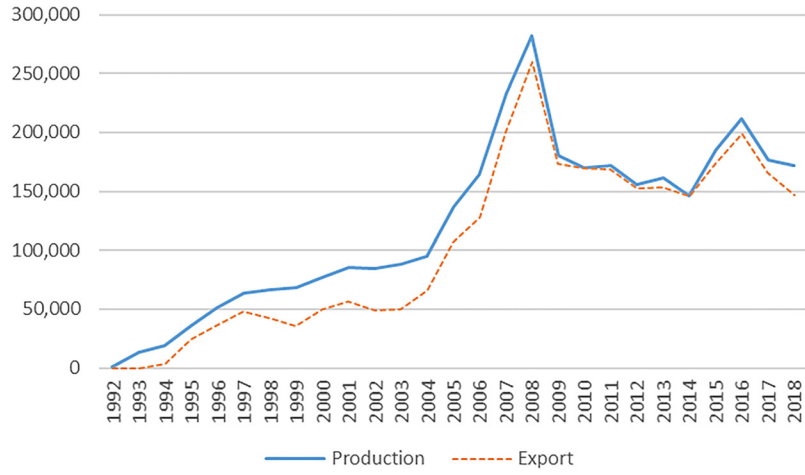

Fig. 2. Production and export of Magyar Suzuki, number of vehicles, 1992–2018
Source: Magyar Suzuki.

conducting harsh restructuring within the organisation and its supplier network (Rugraff – Sass 2016b). In addition, the Japanese suppliers started diversifying the customers by reducing their dependence on Magyar Suzuki (Interview with JETRO, August 2019). Production has been slowly recovering since 2015. In 2018, Magyar Suzuki produced 171,539 units and exported 146,574 units with two production shifts (from a maximum of 3 shifts with 300,000 production capacity). Most recently, in December 2019, Magyar Suzuki was recording positive signals of market recovery in Hungary, but the unexpected outbreak of the COVID-19 pandemic in Hungary stopped this process in 2020.

It is important to note that low vehicle demand in the EU after 2008 forced Magyar Suzuki to re-draft its corporate strategy once again. As Rugraff – Sass (2016b) revealed, product upgrading (to increase the value-added of the product) was one of the key strategies for global suppliers in Hungary after the crisis. More importantly, this strategy applied not only to the global suppliers, but also to the OEMs. Indeed, Magyar Suzuki restructured its production models and concentrated on the production of higher value-added, sport utility vehicles (SUVs), after careful consideration between logistical costs and advantages of the centralisation of models. This latter was mainly based on economies-of-scale considerations. From then on, all small PVs (including models previously produced by Magyar Suzuki) were imported. In short, Suzuki created an international division of labour in its global operation. In line with this strategy, Magyar Suzuki has become a strategic production base for SUVs, by exporting two SUV models to 126 countries including Japan. With regard to sales destinations in 2018, local sales, EU and non-EU markets accounted for 10, 49 and 41%, respectively. In fact, Magyar Suzuki is an extremely important operation for Suzuki, representing the third-largest production location worldwide (see Figure 3). With regard to R&D, Magyar Suzuki conducts some R&D activities based on the current innovation regulation and some R&D activities operate within project tenders of Hungary and the EU (Interview, 18 December 2019). Although R&D activities are conducted

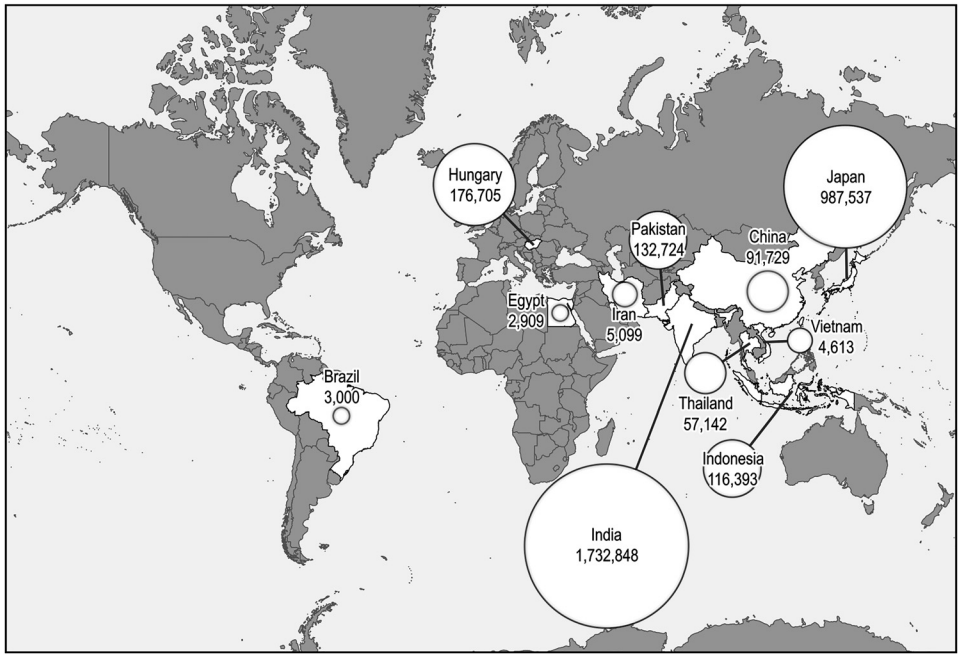

Fig. 3. Global production operations of Suzuki Motor Corporation, 2017
***Source*: Based on Fourin (2018).**

within Magyar Suzuki, these operations target process and production technology, which could be classified as an auxiliary R&D activity.

5.1. Development of a local supply chain network

When Magyar Suzuki reoriented its strategy from the domestic market to the EU in 1994, the EU's local content (LC) rule was one of the obstacles to the expansion of exports. Unlike European OEMs in Hungary, Magyar Suzuki was required to meet the EU's LC rule. European OEMs, by definition, fulfil the rule, but it was a problem for Magyar Suzuki, as it sourced many components from Japan and had no supply base in Europe (Havas 2000). This rule was different from the local content requirement (performance requirement policy) used in many other countries, which violates the current Trade-Related Investment Measures (TRIMs) of the World Trade Organization (WTO).[9] Instead, it can be interpreted along the line of rules of origin. Indeed, Magyar Suzuki was subject to a 60% of LC ratio, which meant that at least 60% of the added value of cars should come from either Hungary or EU members in order Magyar Suzuki to be able to export vehicles with duty-free access to the EU (Jacobs 2017: 250). In response, Magyar Suzuki sought to form a local supply chain network in Hungary based on vertical long-term Japanese-style assembler-supplier relations. In this context, Magyar Suzuki's supply chain

[9]See Natsuda – Thoburn (2014) for more details on TRIMs in the automotive industry.

network clearly differs from the other European OEMs in Hungary that could utilise intra-firm and regional components trade in Europe (Bartlett – Seleny 1998).

There are two types of product contracts between Magyar Suzuki and its suppliers.[10] The first type is the *drawing supplied method* (*taiyo-zu* in Japanese), where a supplier produces components according to a drawing (blueprint) provided by an assembler (Fujimoto 1997). In the GVC concept, such linkages could be considered as *captive* or *relational* (including the supplier's design and product development involvement). The second type is the *drawing approval method* (*shonin-zu* in Japanese), whereby a supplier conducts a design for the drawing and production of components according to a basic specification provided by an assembler and receives approval from the assembler (ibid). It could be deemed as a *modular* linkage in the GVC concept. The former is used for general parts and the latter is used for functional parts. In general, the local Hungarian suppliers produce general parts, including sheet metal parts, press parts and resin parts that are bulky and ideal for a location close to the assembling operation. Meanwhile, multinational suppliers are engaged in the production of functional parts such as electric parts, headlights and air conditioning (Interview, 18 December 2019). With regard to the supplier development, Magyar Suzuki classified its suppliers into three categories: level-1 suppliers with their own know-how to meet Magyar Suzuki's requirements; level-2 suppliers that are a branch of a multinational corporation in Hungary; and level-3 suppliers that lack their own know-how and require assistance. It was very important for Magyar Suzuki to support level-3 suppliers in order to enhance local content. Technical cooperation and a series of training programmes were conducted in association with the Japanese suppliers. In particularly, Japanese production management systems including the *kaizen* method, 5S and JIT were introduced in the training programmes. It is important to note that such training programmes were organised not only in Hungary, but also in Japan (Tsujimoto 2006).

As mentioned above, MNCs supply functional parts under the *drawing approval method* and local firms supply general parts under the *drawing supplied method*. In this division, mega-suppliers of Magyar Suzuki participate in developing the functional components and sub-systems of new models (Havas 2007: 10), while local suppliers are engaged in developing general parts. With regard to product development of general parts, Magyar Suzuki requires its suppliers to provide improvement plans. In the first phase, process upgrading (production technology) is required; and in the second phase, product development (design of the product) is required. Suzuki's technical cooperation with suppliers is conducted in three stages: (i) Magyar Suzuki evaluates the technical level of a supplier; (ii) if the supplier is interested in developing more complex parts, Hungarian and Japanese staff members at Magyar Suzuki provide the firm with advice; and (iii) the supplier visits a firm in Japan that produces the same parts to learn production know-how (Interview, 18 December 2019). In this way, Magyar Suzuki facilitates local suppliers in developing general parts through the Japanese-style assembler-induced learning.

Three phases can be identified in the development of the supply chain network under Magyar Suzuki. The *first phase* included the establishment of the network from scratch and compliance with the LC rule. At the beginning of the operation, local firms did not have enough technological capabilities and experience to supply Magyar Suzuki and most of them were typically classified as Tier-2 or Tier-3 suppliers. In addition, a very limited number of

[10]See Table 3 for more details.

multinational suppliers of components were operating in Hungary. Hence, Magyar Suzuki employed two strategies: (i) upgrading local firms and (ii) inviting Suzuki's suppliers in Japan to Hungary. With regard to the first strategy, local suppliers have been engaged in the production of body parts such as plastic and stamping parts. Since local suppliers did not have strong development skills (including tooling preparation ability), tools were provided by Suzuki in Japan, which enabled local suppliers to manufacture their products without developing skills (by using Suzuki's specification drawing) at the initial stage (Interview, 18 December 2019). Thus, there were very good opportunities for the Hungarian firms to become suppliers for Suzuki. In many cases, Suzuki tracked down the potential local suppliers and 'nurtured' them through providing tools, know-how and contracts. In other circumstances, many of these suppliers would have been able to reach only Tier-2 or Tier-3 levels. Furthermore, the overwhelming majority of the Hungarian suppliers were not producing complex integrated products, thus the supplier pyramid is truncated: below the Hungarian suppliers, we cannot find other Tier-2, Tier-3 and so on suppliers (Mészáros 2009). Later, Magyar Suzuki developed its supply chain network with the local firms by covering almost every single business process from procurement of materials (inputs), production methods and machinery, to accounting, sales and management under their technological and financial auditing systems. Under these systems, the Hungarian local suppliers were encouraged to introduce new products and processes through assembler-induced learning. Magyar Suzuki even facilitated its Japanese suppliers to provide their licences and know-how (sometimes free of charge) to the local firms in order to meet Magyar Suzuki's requirements (Havas 1997). As part of the second strategy, many Japanese suppliers, including Magyar Toyo Seat and Diamond Electric, established a production unit in Hungary. In 2019, 22 Japanese Tier-1 firms were supplying products to Magyar Suzuki (see Table 2). In addition, the

Table 2. Magyar Suzuki's suppliers by location and capital, 2019

Location	Type of capital	Suppliers		Local content ratio (%)
		Number	Share (%)	
Hungary	Local	27	11.3	13
	Japanese	22	9.2	9
	Non-Japanese	23	9.6	8
	Sub-total	72	30.1	30
EU	Japanese	42	17.6	18
	Non-Japanese	121	50.6	50
	Sub-total	163	68.2	68
Import	Japan	2	0.8	1
	Others	2	0.8	1
	Sub-total	4	1.6	2
Total		239	100.0	100

Source: Magyar Suzuki (18 December 2019).

Japanese Tier-2 firms were also operating in Hungary. According to JETRO in Budapest, approximately 50 Japanese automotive suppliers were operating in Hungary (Interview, 8 August 2019). During the first phase, the number of suppliers amounted to 27 firms in 1992 and increased to 41 firms in 1994 and 81 firms in 1998 (Tsujimoto 2006: 127). In addition, Hungarian-based suppliers totalled 34 firms in 1995 and 45 firms in 1998 (Havas 2007: 9). With regard to the local content, the LC ratio amounted to 25% of the Hungarian content (and 29% of the EU content) in 1993 (Havas 1997: 227–228) and increased to over 50% of Hungarian (as well as 60% of EU) content in 1996 (Interview, 18 December 2019).

The *second phase* is the rapid growth era after the LC rule was fulfilled. As a result of Opel's withdrawal from vehicle production, Magyar Suzuki started collaborating with Opel/GM to produce small PVs for Opel-brand models and later Subaru-brand models in the early 2000s (Jacobs 2017: 253). Consequently, vehicle output increased by a factor of 3.6, amounting to 77,253 units in 2000 and 281,686 units in 2008. According to Czakó – Zoltayné (2003), EU content accounted for over 60%, and approximately 60% of suppliers were under Hungarian ownership in 2002. By 2007, the supplier number also increased to over 300 firms including the GM suppliers (Tsujimoto 2006). The strategy of attracting traditional Japanese suppliers to Hungary proved to be especially fruitful in this second phase, when Suzuki considerably increased the number of cars produced annually, making it worthwhile for these Japanese suppliers to follow their partner to Hungary and establish a subsidiary, as economies-of-scale factors were now present. In this phase, understandably, Magyar Suzuki was much less active in finding local suppliers; in fact, it recruited only one local supplier before 2009 (Mészáros 2009).

The *third phase* started after the crisis in 2008–2009, which hit Magyar Suzuki hard, inducing it to reshuffle its plans concerning the annual number of cars produced. Many of the traditional Japanese partners were now present in Hungary, with some of them producing the same parts as the Hungarian suppliers. This led to a decrease in the number of Hungarian suppliers, whereby only the most competitive firms could stay direct partners of Suzuki. Some Hungarian suppliers now became Tier-2 or Tier-3 suppliers, below the Japanese subsidiary of Suzuki's partners. Furthermore, cost pressures due to the aftermath of the crisis forced Suzuki to look for the cheaper suppliers, and certain less competitive suppliers were replaced by the foreign ones, e.g. from India (Antalóczy – Sass 2011). The third phase can be evaluated as a consolidation of the Hungarian supplier base: the most competitive Hungarian suppliers survived, and their relationship with Magyar Suzuki has become even closer. The less competitive ones were replaced by other suppliers, including by relatively newly established Japanese subsidiaries in Hungary and the foreign ones. Although there were some discontinuations of local suppliers due to Magyar Suzuki's abolishment of diesel engine models and some suppliers being taken over by a multinational supplier, Magyar Suzuki's current strategy in the supply chain network is to maintain existing suppliers by facilitating their technological upgrading (Interview, 18 December 2019).

In 2019, Magyar Suzuki was dealing with 239 Tier-1 suppliers (see Table 2). Of the 239 firms, 72 suppliers were located in Hungary (27 local firms, 22 Japanese and 23 non-Japanese firms), accounting for a 30% local (Hungarian) content ratio; and 163 suppliers were located in Europe, accounting for 68% of the EU content ratio. Hungarian-owned firms accounted for 11.3% (of the total suppliers) and 13% of the LC ratio. Although these figures might be interpreted as relatively low, the corresponding figures for counterparts in Central Europe are even lower. Indeed, the proportion of locally-owned suppliers for Magyar Suzuki is lower than that of a

major Japanese OEM's affiliate in Thailand, accounting for 25% (51 out of 203 suppliers) in 2010 (Natsuda – Thoburn 2013: 430), while it is much higher than its affiliate in Czechia, accounting for only 0.4% (1 out of 240 suppliers) in 2016 (Natsuda et al. 2022: 231). Moreover, in a Czech national brand producer, Skoda (owned by Volkswagen), majority Czech-owned Tier-1 suppliers in Czechia accounted for 7.7% (3 out of 39 suppliers)[11] in 2004 (Pavlínek – Janak 2007: 140–141). Likewise, the other OEMs in Hungary possess lower numbers of locally-owned Tier-1 suppliers (interview with automotive expert in HIPA, 18 October 2019). For example, in the case of Audi Hungaria, the share of Hungarian-owned suppliers was only 4% in 2014, and most of them were classified as Tier-3 suppliers (Czakó 2014). In this regard, Magyar Suzuki's engagement in local supply chain networks seems to be far more significant than its counterparts in the region.

6. TIER-1 SUPPLIERS UNDER MAGYAR SUZUKI

From October 2019 to January 2020, we conducted in-depth interviews with four of Magyar Suzuki's Tier-1 suppliers (Table 3).

Firm A is a typical global mega-supplier,[12] established as a Hungarian affiliate of a Japanese multinational firm in 1997, employing approximately 4,800 people in 2019. Firm A supplies its products to many leading OEMs including Magyar Suzuki, Toyota, VW, BMW, PSA, Ford, etc., accounting for €745 million in sales in 2018. The operation of Firm A is based on export-oriented production. Indeed, its sales in Hungary accounted for only 10% of its business. In relation to product contract, Firm A supplies its products based only on the *drawing approval method*. Firm A deals with 87 (Tier-2) suppliers globally. Of the 87 firms, 83 are located in Europe (14 firms in Hungary) and four firms are located in Asia. Firm A has been trying to enhance local content in Hungary by assisting local firms in relation to production, technology, management (including mind-setting), marketing, and even finance (when suppliers face a cashflow problem). For instance, with Firm A's support, one of the local suppliers in Hungary successfully developed its business and increased employees from 20 to 300 workers. In this respect, the role of mega-supplier (Firm A) is also important for upgrading the local firms. With regard to R&D activity, major R&D operations are conducted in Japan and some small R&D activities take place in Firm A.

Firm B is also an affiliate of a Japanese multinational firm. The parent firm was established in 1939, operating 94 facilities in 22 countries and employing 8,650 workers in the world (including 1,135 people in Japan). In comparison with the parent of Firm A, the parent of Firm B can be categorised as a medium-sized Tier-1 firm in Japan. Due to the bulkiness of its products, the strategy of the parent firm is to locate the operation close to OEMs. In Hungary, the production operation of Firm B was initially set up within the production line of Magyar Suzuki in 1995, later established as an independent firm in 2007, located next to Magyar Suzuki. Firm B employs

[11] By using the same calculation method, Magyar Suzuki accounted for 37.5% (27 local capital suppliers out of 72 Tier-1 suppliers in Hungary) in 2019.

[12] The parent of Firm A, established in 1949, owns 211 consolidated subsidiaries (70 in Japan and 141 overseas) and 49 affiliates under the equity method (22 in Japan and 49 abroad) and employed 171,992 employees on a consolidated basis in 2019.

Table 3. Overview of interviewed Tier-1 suppliers in Hungary, 2019–2020

Firm	Est. year	Ownership	Size	No. of workers	Main products	Suppliers (Hungary)	Export/ production (%)	Product contract	R&D
A	1997	Japan	Large	4,800	Thermal, Powertrain & Electrification Systems	87 firms (14 firms)	90	D.A. (100%)	Minor
B	2007	Japan	Medium	200	Tubes	50 firms (15% in value)	75	D.S. (100%)	None
C	1896	Hungary	Large	2,000	Axles, Components (seats etc), & Special Vehicles	Special Vehicles: (LC ratio:20–30%), Axles & Components: (small number)	Axles: 86 Components: 44	Axles: D.A. (30%) & D.S. (70%) Components: D.S. (100%)	Axles only
D	1993	Hungary	Medium	140	Press parts	10 firms (15% in value)	2	D.S. (100%)	None

Note: D.A.: Drawing approval method, D.S.: Drawing supplied method.

approximately 200 people. It currently supplies products not only to Magyar Suzuki (25% of its sales), but also to Toyota in France, VW in Spain, Skoda in Czechia, and Jaguar Land Rover in Slovakia. Indeed, 75% of the production is based on the export-oriented operation. As Firm B's products (brake oil tubes and fuel tubes) are categorised as general parts, it supplies the products to OEMs under the *drawing supplied method*. With regard to local sourcing, Firm B deals with 50 Tier-2 suppliers in the world, sourcing 15% of intermediate products in value from Hungary, 30% from Japan, 25% from Germany, 10% from the UK and India, and 25% from other countries in 2019. Firm B purchases metal and plastic parts from local SMEs in Hungary. Since R&D activities are conducted in Japan and China, Firm B is only engaged in production activities in Hungary.

Firm C, established in 1896, is one of the oldest and largest automotive suppliers in Hungary. Employing 2,000 workers in 2019, Firm C is engaged in three types of production activities: (i) special vehicle production (accounting for 21% of the total sales), (ii) components production (30%), and (iii) axle production (49%). The LC ratio of special vehicles accounts for 20–30% by using its own components such as axles and steel parts, and sourcing body components from local firms. Main components such as engines are supplied by MAN, which used to be a license provider for Firm C in the past. The main business of Firm C is the production of components (seat systems and machined components) and axles. Some differences can be identified between the two production streams. Components production is based on the *drawing supplied method* and the sales are more domestically oriented (56% for the local market and 44% for the EU market). Therefore, there is no original design (and R&D) in the products. In addition, Firm C acts as a Tier-2 supplier. Firm C directly supplied products to Magyar Suzuki, based on the licence agreement, but its role changed to a Tier-2 supplier after the establishment of the Japanese affiliate in Hungary. In order to retain business with Firm C, Magyar Suzuki recommended Firm C as a Tier-2 supplier to the Japanese seat producer. In addition, Firm C supplies seat components to a German Tier-1 affiliate in Hungary. More importantly, Firm C supplies machined components (particularly welded and cast parts) directly to Magyar Suzuki as a Tier-1 supplier. The axle production division in Firm C is more internationally competitive. In fact, its exports accounted for 86% of the sales output in 2018. The product contract for axles is based on a mix of the *drawing supplied method* and *drawing approval method*. The former is used for large orders (about 70% of the production) and the latter is used for smaller orders (30%). In axle production, Firm C employs 30 engineers in the R&D centre, conducting product development and modifications with a budget of €1 million a year.[13] The drawing approval method provides service fees (for designing products) and the margin is higher. Nonetheless, it is relatively limited in terms of the total production, because volume orders with lower margins generate more profit in the total business operation. This indicates adversarial evidence in relation to the functional-upgrading trajectory in the GVC concept. Furthermore, due to the recent investment of 10 billion HUF in forging facilities and machinery, Firm C is keen to increase the large volume orders rather than the small ones. The local suppliers to Firm C are very limited due to the lack of international quality standards. In terms of the five categories identified by Humphrey (2000), as mentioned above, the axle division in Firm C could be classified as finding a specialist position as a global supplier (v), the components division as maintaining a national Tier-1 supplier

[13]The budget can increase up to €2 million for large projects.

for welded and cast parts production (i) and finding a profitable niche in Tier-2 for seat production (iv).

Firm D, which originated from a metal-welding workshop, was established in 1993 with only two employees, in order to supply two types of press parts to Magyar Suzuki. In 2020, Firm D produced 180 types of press parts with 140 employees. Magyar Suzuki accounted for 85% of the business and the rest was with nine Tier-1 firms in Hungary and one firm in Slovakia. Firm D is a typical example of a local capital firm that successfully upgraded through assembler-induced learning. Magyar Suzuki provided all areas of support including strategic business thinking, production management, technology transfer, quality control, maintenance and HR training. These types of support take two forms. Magyar Suzuki sends advisors to Firm D, which sends its employees to Magyar Suzuki for staff training. The advisors from Magyar Suzuki emphasised the Japanese *kaizen* method, for instance changing the layout of the factory, and consequently, Firm D became capable of efficiently conducting process upgrading. Products from Firm D are diversified from small press parts to large press parts and to more complex parts. In other words, Magyar Suzuki also facilitates product upgrading. More recently, due to Magyar Suzuki's model had changed from small PVs to SUVs, Firm D started to supply more value-added components. Hence, the decline in vehicle production in Magyar Suzuki had little impact on the business of Firm D: it could compensate for the loss by replacing it with the production of more value-added products, though Firm D does not have its own R&D operation. Firm D supplies components to Magyar Suzuki, based on the *drawing supplied method*. However, Firm D receives a service charge from the die arrangement operation. To be specific, Firm D coordinates the dies for pressing, and then it sends a sample product to Magyar Suzuki for approval. After this, Magyar Suzuki pays for the die arrangement and ownership fees to Firm D (i.e. the dies in Firm D are owned by Magyar Suzuki). In the governance of the GVC concept, Firm D's relationship with the assembler has shifted from *captive* to *relational linkage* by upgrading its design and product development capacity under the *drawing supplied method*. Firm D deals with 10 direct suppliers; 15% of raw materials are sourced locally and 85% within Europe. From Humphrey's (2000) perspective, Firm D is a typical case of becoming a national Tier-1 supplier (iii).

7. DISCUSSION

The case studies of Magyar Suzuki and its Tier-1 suppliers illustrate some key features of the Hungarian automotive industry. Firstly, according to Hansen et al. (2009), an originally market-seeking FDI may develop export capacities based on its local experience with suppliers and market, and thus, become an export platform type of FDI. Magyar Suzuki was initially established to serve the domestic market in Hungary. However, this strategy had to be revised later to act as an export platform to the Western European market due to low solvent domestic demand in Hungary and the high cost of imported components from Japan. Magyar Suzuki has expanded its export capacity since the mid-1990s. Understandably, this strategy change required Magyar Suzuki to reach for higher quality and build a strong local supply base due to the LC rule. Thus, Suzuki represents a special case. Usually, market-seeking FDI develops many local linkages, while export platform investors have fewer local linkages, because quality requirements are high (ibid). In Magyar Suzuki's case, low initial volumes of production discouraged the

traditional Japanese suppliers to follow Suzuki to Hungary, while changing to an export-oriented strategy required the firm to respect the LC rule, for which it made large efforts to set up a local supply base. Thus, Magyar Suzuki has a relatively large network of local suppliers. Furthermore, assisting these suppliers resulted in upgrading in certain cases. For example, from our company sample, Firm D has successfully upgraded its position from Tier-2/3 to Tier-1 supplier through Magyar Suzuki's assembler-induced learning. It is also important to note that the mega-supplier of Firm A plays a significant role in upgrading its (Tier-2) suppliers through customer-induced learning. Consequently, the role of the mega-supplier can also be an important driver for the development of local capital firms in Hungary.

Secondly, for two reasons, local sourcing in Tier-1 firms (both Japanese and locally-owned) is relatively limited, though they are trying to increase local procurement. The first reason is the low capacity of the Hungarian Tier-2 suppliers. One of the Tier-1 firms pointed out that the problem of Hungarian industry is the lack of process integration, namely weak horizontal collaboration between the local firms in Hungary. This is important, because Hungarian firms that supply such a large company as Magyar Suzuki are usually small in size. Medium- and especially large-sized Hungarian firms are missing from this scenario – they either went bankrupt or were sold to foreigners during the transition process. Smaller firms, on the other hand, have not yet ascended to medium-sized categories. Furthermore, the local suppliers are not able to meet international standards. The Hungarian government tried to provide a series of supplier development programmes, but the programmes were limited in number because the Hungarian companies usually could not meet the quality and even quantity requirements and necessary deadlines (Sass – Szanyi 2004). The second reason is explained by one of the Japanese affiliates, which pointed out that differences in industrial standards between Japan and Europe hinder the localisation process. This issue can be also observed in Japanese automotive suppliers in Czechia (see Natsuda et al. 2020). In short, due to high safety standards in the automotive industry, shifting from the Japanese standard inputs to local sourcing (of materials and intermediate products) requires a long verification period.

Thirdly, from Porter's perspective, home demand is one of the four determinants in the creation of competitive advantages (Porter 1990). Hungary, however, has a relatively small domestic market. As a result, MNCs tend to use Hungary as an export platform to overcome the disadvantage. Hence, exporting accounts for a large proportion of the business. In comparison, local firms also face difficulties in depending on the small domestic market. One of the interviewed firms (located next to a major assembler in Hungary, but with no trade between them) pointed out a lack of horizontal linkages within the industry in the domestic market.

Lastly, R&D activities are relatively limited in Hungary. In general, Japanese MNCs perceive Hungary as a low-cost production location. Hence, only one Japanese MNC (cable producer) owns a R&D centre in Hungary (Interview with JETRO, 8 August 2019). Magyar Suzuki conducts relatively small-scale R&D activities in relation to process and production technology improvement in Hungary, as does a mega-supplier of Firm A. As for local firms, Firm C has its own R&D centre, conducting product development. Although the margin in own-designed products is higher than in the standardised products, the volume is too small to be profitable for Firm C. Furthermore, the medium-sized Japanese capital Firm B and local capital Firm D do not conduct any R&D activity in Hungary. The low level of R&D can be identified not only in Japanese and local capital firms, but also in some European firms in Hungary. For instance, Audi has been upgrading local capability by creating extensive industry-university linkages (considered

as one of the most successful models in Hungary). Under the partnership, Audi assists Széchenyi István University through curriculum development, sending professors, placing students as part of degree courses, and enhancing joint R&D programmes. Even in Audi's case, R&D activities in Hungary are based on relatively minor operations (Interview, 13 November 2019). However, the Hungarian Audi affiliate has a global mandate in one area of R&D within the network of Audi subsidiaries: tribology. This means that the results of the Hungarian R&D centre are used by all other subsidiaries and the headquarters. Thus, in the case of a few firms we can find traces of functional upgrading through adding limited R&D activities to already existing ones – mainly in the local production-related areas. On the other hand, one must mention the cases of certain German firms, such as Bosch, Thyssenkrupp and Knorr-Bremse, which have been pursuing a different R&D strategy than their Japanese counterparts. These companies established large stand-alone (e.g., not production-related) R&D centres, relying on low-cost but well-trained Hungarian engineers, with a kind of efficiency-seeking motivation in R&D activities. This indicates the larger willingness of German multinationals to offshore certain R&D activities compared to their Japanese counterparts. However, in these cases, the smile curve is truncated, as these stand-alone centres are integrated into the network of the multinational company and basically have nothing to do with the local subsidiary in Hungary. In this context, functional upgrading seems to be difficult to achieve in Hungary. This challenge can be overcome by making investments in knowledge and technology. In short, building R&D capabilities in both local firms and multinational subsidiaries in Hungary is increasingly critical for functional upgrading. However, it is important to stress that it should be conducted with a certain level of independence and authority over own operations within Hungary.

8. CONCLUSIONS

Three phases can be identified in the development of Magyar Suzuki's supply chain network in Hungary. The first phase is characterised by the enhancement of local content ratio. Unlike European OEMs, Magyar Suzuki had to establish its supply chain network in response to the EU's local content rule. Accordingly, Magyar Suzuki employed two strategies by replacing imported components from Japan. The first was to invite suppliers from Japan to Hungary; and the second was to integrate the low technological level of local capital firms into the network and upgrade their technological capabilities. The second phase comprised the rapid-growth era after the fulfilment of the LC rule in the late 1990s. In response to the expansion of vehicle production, suppliers in Japan further relocated to Hungary, while most local suppliers maintained their position in the network. The third phase commenced after the crisis. Due to the rapid production decrease, Magyar Suzuki had to conduct a harsh restructuring of its supply chain network. During this period, competitive local suppliers could maintain their position in the network as Tier-1 firms, while less competitive suppliers were replaced or downgraded into Tier-2 or Tier-3 suppliers. It is worth noting that the current strategy is to maintain the existing suppliers by facilitating their technological upgrading.

There are two types of product arrangements under Magyar Suzuki: the *drawing approval method* is used to source functional parts mainly from MNCs; and the *drawing supplied method* is used to source general parts from local capital firms. By developing its supply chain network, Magyar Suzuki has made vigorous efforts to enhance a capability through process and product

upgrading in the local firms and through an assembler-induced supplier support programme in Hungary. At the beginning of the operation, Magyar Suzuki provided tools for the local suppliers that did not have basic production skills, and later strengthened the process and product-upgrading capacity of those suppliers by assessing the level of TQM. In the Japanese organisational culture of Magyar Suzuki, the local suppliers are governed by assembler-induced learning that forces them to improve their capability by introducing new processes and new products. Obviously, such an organisational culture provides benefits for the local capital firms. As a result, and in contrast to its counterparts in the region, Magyar Suzuki's supply chain network still maintains a number of local capital firms as Tier-1 Suppliers. Most recently, the operation of Magyar Suzuki stagnated after the 2008–2009 crisis. In response, Magyar Suzuki conducted product upgrading by manufacturing higher value-added vehicle models in Hungary. Simultaneously, this strategy resulted in the product upgrading of the local suppliers through a production shift to more complex and higher value-added parts.

Overall, Magyar Suzuki has enhanced process and product upgrading of the local capital firms. In this context, the role of Magyar Suzuki has been significant in the Hungarian automotive industry. Nonetheless, functional upgrading can be assessed as a challenge for the Hungarian automotive industry for two reasons. Firstly, Magyar Suzuki and Japanese (as well as other foreign) automotive MNCs in Hungary have been conducting relatively small-scale R&D operations, viewing Hungary as a low-cost production base. Hence, functional upgrading is less likely to be facilitated by the automotive MNCs. Secondly, large local capital firms (e.g. Firm C) conduct some R&D activities. In the industrial upgrading of the GVC concept, R&D operations can be considered as a potential competitiveness factor (for functional upgrading) of a firm. However, a case study of Firm C reveals that R&D does not simply lead to the economic upgrading of the firm. By balancing business profitability, volume orders (with lower technology and lower margin per product) still prevail over own-designed products (with higher margins, but small orders). In this regard, it is difficult for the local firms to conduct functional upgrading due to a lack of horizontal linkages within the industry in the small domestic market of Hungary.

Lastly, deeper integration, long-lasting extendable supply chain networks, and innovation capacity are important for further development in the Hungarian automotive industry. In response to these challenges, the Hungarian government has been trying to encourage the development of the automotive industry through greater innovation in the last two decades. A series of policy measures for RDI investments, supply chain development and university-industry collaborations have been launched. Nevertheless, the innovativeness and value-added of the local automotive firms have been stagnating. A possible response to this could be a renewed approach to public policy with a focus on the 'triple helix model', ensuring more stability and closer interaction among the helices.

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